

Space & Electronic Warfare

Lexicon Terms



Space & Electronic Warfare Lexicon

Terms

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3 PLUS 3 - A National Missile Defense System using satellites and ground-based radars deployed close to the regions from which threats are likely. The space-based system would detect the exhaust plume from the burning rocket motor of an attacking missile. Forward-based radars and infrared-detecting satellites would resolve smaller objects to try to distinguish warheads from clutter and decoys. Based on that data, the ground-based interceptor - a hit-to-kill weapon - would fly toward an approximate intercept point, receiving course corrections along the way from the battle management system based on more up-to-date tracking data. As the interceptor neared the target its own sensors would guide it to the impact point. See also BALLISTIC MISSILE DEFENSE (BMD.)

3D-iD - A Local Positioning System (LPS) that is capable of determining the 3-D location of items (and persons) within a 3-dimensional indoor, or otherwise bounded, space. The system consists of inexpensive physical devices, called "tags" associated with people or assets to be tracked, and an infrastructure for tracking the location of each tag.

NOTE: Related technology applications include EAS, EHAM, GPS, IRID, and RFID.

4GL - See FOURTH GENERATION LANGUAGE

5GL - See FIFTH GENERATION LANGUAGE

A-POLE - The distance between a missile-firing platform and its target at the instant the missile becomes autonomous. Contrast with F-POLE.

ABSORPTION - (RF propagation) The irreversible conversion of the energy of an electromagnetic WAVE into another form of energy as a result of its interaction with matter. See also ELECTRO-OPTIC PAINTING and RADAR CAMOUFLAGE.

ABSORPTION HIDING - A LOW-PROBABILITY-OF-INTERCEPT technique in which the radar operates in the ABSORPTION regions of the MILLIMETER WAVE spectrum (i.e., frequencies having large values of atmospheric attenuation by oxygen and water vapor), making it difficult to detect.

ABSORPTIVE CHAFF - CONFUSION REFLECTORS which consist of extremely thin conductors, graphite strands, or other material which will absorb electromagnetic energy. See also CHAFF.

ACCESSIBILITY - A measure of the ease with which an enemy can reach an electronic system with a JAMMING countermeasure of appropriate form and

sufficient power. See also VULNERABILITY, INTERCEPTIBILITY, and SUSCEPTIBILITY.

ACCOMPANYING JAMMING - See ESCORT JAMMING.

ACK EMMA - World War I telephone procedure term for "A.M." Used to avoid the possibility of misunderstanding. [from *Brewer's Dictionary of Phrase and Fable*] See also PIP EMMA.

ACOUSTIC BULLET - A NONLETHAL WEAPON consisting of a high-power, very low frequency acoustic beam weapon that incapacitates by creating plasma in form to the target, generating an impact wave like that of a blunt object. It causes blunt object trauma, as opposed to that of a conventional bullet which cause ripping and tearing of the target. See also SONIC BULLET.

ACOUSTIC DETECTION SENSOR (ADS) - A passive system designed to detect and identify low-flying helicopters and REMOTELY PILOTED VEHICLES (RPV), as well as to detect, identify and localize sniper firings. See also SNIPER ACOUSTIC DETECTION SENSOR (SADS.)

ACOUSTIC INTELLIGENCE (ACINT or ACOUSTINT) - Intelligence derived from the collection and processing of acoustic phenomena. [DoD]

NOTE: Acoustic Intelligence is a component of MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT).

ACOUSTIC JAMMING - The deliberate radiation or re-radiation of mechanical or electro-acoustic signals with the objectives of obliterating or obscuring signals which the enemy is attempting to receive and of deterring enemy weapon systems.

ACOUSTIC PARITY - Simultaneous first passive detection of each other by a submarine and surface ship. See also ACOUSTIC SIGNATURE.

ACOUSTIC SIGNATURE - The noise emitted by a ship to the water used by passive sensors. This NOISE is further defined as broadband or narrow-band to help define both its source by the ship and its utility to the sensor. See also BROADBAND NOISE, NARROWBAND NOISE.

ACOUSTICS SIGNATURE CONTROL - The employment of materials, electronics, and platform design features intended to reduce the susceptibility of the platform to detection, tracking, and engagement by an adversary using acoustic sensors, such as SONAR. ACOUSTICS SIGNATURE CONTROL includes the use of passive and active devices, materials, features, or techniques on a platform to reduce or limit the generation or transmission of sound or vibrations. These include specially designed materials, coatings, absorbers, decouplers or damping, as well as active noise reduction or cancellation systems, and magnetic bearings. See also INFRARED SIGNATURE CONTROL, LASER SIGNATURE CONTROL, MAGNETIC SIGNATURE CONTROL, MULTISPECTRAL SIGNATURE

CONTROL, OPTICAL SIGNATURE CONTROL, RADIO FREQUENCY (RF) SIGNATURE CONTROL, and SIGNATURE CONTROL.

ACOUSTIC WEAPON - A device, which may or may not be a NONLETHAL WEAPON, that emits sonic frequencies causing such sensations as debilitating dizziness and motion sickness or nausea, and can also generate vibrations of body organs resulting in extreme pain, seizures, or death. See also HIGH POWERED ACOUSTIC WEAPON, SILENT SOUND DEVICE, THERMAL GUN.

Note: Acoustic weapons may be grouped as shown below:

<u>ACOUSTIC WEAPON CHARACTERISTICS</u>			
TYPE	FREQUENCY	TARGET EFFECTS	PROPAGATION CHARACTERISTICS
Infrasound	Less than 20 Hz	Mild to severe discomfort; organ functional disturbance; organ disruption	Ground or structure penetration Long-range propagation Non-directional
Sonic	20 Hz to 20 KHz	Hearing interference; performance degradation; pain; hearing loss; tissue damage	Moderate propagation and moderate directionality
Ultrasonic	20 KHz and above	Possible diffuse psychological effects; pain; surface tissue damage; tissue destruction	Limited propagation; highly directional

ACOUSTO-OPTIC (AO) RECEIVER - A SIGINT receiver which process signals using BRAGG CELLS. In these cells, RF signals are converted into acoustic waves which are then sampled with light beams. AO receivers share the positive features of MICROSCAN RECEIVERS, and have good signal probability of intercept (POI).

ACOUSTO-OPTICS - The interaction between sound and light in a crystal. This interaction modifies the light beam's amplitude, frequency, phase and direction, thus processing and revealing information carried by both the sound and the light.

Acousto-optics has application in ESM for analysis of low-probability-of-intercept FREQUENCY HOPPING signals. See also BRAGG CELL.

NOTE: In a typical application, a laser beam is expanded, spatially filtered, and collimated by a set of lenses, which direct the beam to a Bragg cell. Concurrently, a transducer on the cell converts the micro-wave signal into an acoustic wave that modulates the light beam, producing a separate beam for each component frequency of the signal and deflecting the beam in proportion to its frequency. A photodetector array detects each beam's position (its underlying frequency), and produces electric output indicating both the frequency and power of each component in the original microwave signal. This rapid signal processing allows accurate measurement of the signal's pulse timing and duration.

ACTIVE AIR DEFENSE - Direct defensive action taken to nullify or reduce the effectiveness of hostile air action. It includes such measures as the use of aircraft, air defense weapons, weapons not used primarily in an air defense role and ELECTRONIC WARFARE. See also AIR DEFENSE. Contrast with PASSIVE AIR DEFENSE.

ACTIVE ARMOR - Armor designed to dynamically thwart damage to a vehicle. It is comprised of explosive cassettes containing embedded sensors to detect an impacting projectile and to decrease its damaging effect on the vehicle. Active armor includes ELECTROMAGNETIC ARMOR, REACTIVE ARMOR and SMART ARMOR.

ACTIVE ARRAY RADAR - A phased array radar in which each radiating element contains a transmitter and receiver front end, as opposed to a single transmitter/receiver serving all phased array elements. Advantages attributed to active array radars include efficient use of prime power, no waveguide losses, very wide bandwidth, extreme reliability, and potential for ARTIFICIAL INTELLIGENCE (AI) features, such as simultaneously performing radar surveillance, communications and weapon control, among others.

ACTIVE CANCELLATION - A technique for reducing the RADAR CROSS SECTION of a target, done by emitting radiation that will cancel the reflected radar energy. Contrast with PASSIVE CANCELLATION. See also RADAR CROSS SECTION REDUCTION techniques.

NOTE: In active cancellation, an aircraft, when painted by a radar, transmits a signal which mimics the echo that the radar will receive - but one half wavelength out of phase, so that the radar sees no return at all. The advantage with this technique is that it uses very low power (compared with conventional EW) and provides no clues to the aircraft's presence. The challenge is that it requires very fast processing and that poorly executed active cancellation could make the target more, rather than less, visible to the radar.

ACTIVE DENIAL SYSTEM - A NONLETHAL WEAPON (NLW) that uses pulses of electromagnetic energy to heat the water molecules in a person's skin, causing a painful burning sensation but no actual burning.

NOTE: The ACTIVE DENIAL SYSTEM is designed to disperse disruptive crowds as far as 640 meters away without injuring the demonstrators. The radiation can penetrate clothing but will only react with skin to a depth of less than 0.4 mm. These weapons can be either hand-held, vehicle mounted, or mounted on aircraft.

ACTIVE ELECTRONIC COUNTERMEASURES - The employment of active ELECTRONIC JAMMING to prevent or degrade the use of the ELECTROMAGNETIC SPECTRUM by the enemy. Contrast with PASSIVE ELECTRONIC COUNTERMEASURES.

ACTIVE ELEMENT ARRAY (AEA) - A phased-array system having an independently controlled active transmit and receive function for each radiating element. See also PHASED-ARRAY ANTENNA.

ACTIVE EXPENDABLE DECOY (AED) - An RF DECOY separated some distance from the protected platform and which transmits a signal greater in amplitude than that of the SKIN PAINT of the protected craft in order to capture the threatening missile and decoy it away from its target.

ACTIVE HOMING GUIDANCE - See also HOMING GUIDANCE. Contrast with PASSIVE HOMING GUIDANCE, SEMI-ACTIVE HOMING GUIDANCE. {JOINT PUB 1-02} A system of homing guidance wherein both the source for illuminating the target, and the receiver for detecting the energy reflected from the target as the result of illuminating the target, are carried within the missile.

ACTIVE INFRARED SENSOR - An INFRARED sensor which transmits and receives radiation. The sensor may be a COHERENT INFRARED SENSOR or an INCOHERENT INFRARED SENSOR. Contrast with PASSIVE INFRARED SENSOR.

ACTIVE INTERROGATION - The scanning of an object with a beam of neutrons or gamma rays to generate a measurable emission that allows identification of the material in the object. NOTE: While radioactive material produces radioactive particles, and are thus identifiable with passive instruments, the employment of active emission allows the identification of high explosives and other types of substances that are not normally radioactive.

ACTIVE LOADING - A STEALTH TECHNIQUE in which the protected platform generates a false ECHO whose amplitude and phase can be used to cancel real radar echoes from several directions simultaneously to avoid detection by a network of radars.

ACTIVE MAGNETIC BEARING (AMB) - An alternative to conventional bearings, AMB consists of a journal mounted on a rotating shaft surrounded by a stator (electromagnetic coils) that exerts magnetic forces to keep the shaft suspended.

ACTIVE MATRIX LIQUID CRYSTAL DISPLAY (AMLCD) - A type of LIQUID CRYSTAL DISPLAY (LCD). The elements are controlled by a matrix of thin-film transistors (TFTs). An active semiconductor element - a transistor or diode - is located at each pixel location. AMLCDs provide full color, active motion video and readability in sunlight. They are thin compared to CATHODE RAY TUBES (CRTs), have very low power requirements, good environmental characteristics, no convergence or distortion problems, are lightweight, rugged, and offer color purity and brilliance. AMLCDs are gradually replacing cathode ray tubes (CRTs) in most weapons systems. See also REFRACTIVE LIQUIDS.

ACTIVE MAWS - A MISSILE APPROACH WARNING SYSTEM (MAWS) which generally employs PULSED DOPPLER RADAR as its sensor. This radar is able to discern a moving target in stationary or slow-moving background clutter. Further, it permits determination of range information and more precise ANGLE-OF-ARRIVAL (AOA) data. Since use of a radar precludes stealthy operation, and because missile detection distance is generally limited due to low RADAR CROSS SECTIONS (RCSs), the use of active MAWS has some disadvantages over that of PASSIVE MAWS.

ACTIVE NETWORK GUIDANCE IN EMERGENCY LOGIC (ANGEL) - A Navy system originally intended to be an accident, or mishap, avoidance program, but could result in removing man from the cockpit.

ACTIVE NETWORK INTRUSION DEFENSE (ANID) - The capability to respond in REAL TIME to NETWORK INTRUSIONS by making changes to network devices such as ROUTERS, FIREWALLS, INTRUSION DETECTORS, etc.

NOTE: The ANID system will automatically disable routes used by a HACKER. ANID will also employ a distributed ARCHITECTURE with intrusion-detection capabilities installed at very low levels, as well as a collection of smart AGENTS to correlate sensor information and distribute summary-level alert information to neighboring nodes. See also NETWORK-BASED INTRUSION DETECTION.

ACTIVE OPTICS - Optical elements such as mirror surfaces whose shape is actively and continuously deformed by various electromechanical means for the purpose of correcting or controlling the performance of an optical system. The most familiar example is the "rubber mirror" whose surface shape, and thus reflective qualities, can be controlled by electromechanical means.

NOTE: Only a few microns thick, the "rubber mirror" is basically a coated sheet of glass can be moved by hundreds of finger-like actuators thousands of times each second to achieve specified distortions with their associated optical properties.

ACTIVE PROTECTION SYSTEM (APS) - A system composed of a FREQUENCY-AGILE, MILLIMETER-WAVE radar able to detect and track incoming antitank guided missiles, and an active countermeasure suite. See also SLID. NOTE: APS is essentially a "bullet-on-bullet" technology, which involves very high velocity rounds and a very short reaction time, with virtually no room for error.

ACTIVEX (ActiveX) - A computer scripting language, developed by Microsoft Corp., by which small programs, called "controls" can be downloaded from the Internet and executed. (See also JAVA.) NOTE: Once a user's browser downloads an ActiveX control from a site, the control remains on the user's computer. So when the user visits another site (or another page on the site) using the same control, it need not download the control again.

ADAPTIVE BATTLESPACE AWARENESS (ABA) - The ability to provide a common operating picture to provide relevant information to commander-in-chief (CINC), joint task force (JTF), and component-level SITUATIONAL AWARENESS (SA), decision-making, execution, and planning for future military operations by providing user-customized templates and filters; providing links to relevant amplifying information such as TARGETING, intelligence products, status, etc.; introducing new force-level track types; and facilitating information aggregation at the CINC and JTF levels.

ADAPTIVE CONTROL - A control system that adjusts the response from conditions detected during the operation.

ADAPTIVE FILTER - An electronic FILTER that automatically adjusts to changing signal conditions. NOTE: Adaptive filters are used in receivers to reject interfering signals such as those caused by JAMMING or unintentional interference.

ADAPTIVE OPTICS SYSTEMS - Optical systems that compensate for the effects of the atmosphere and other phase distortion sources.

ADAPTIVE SCHEDULER - An ADAPTIVE CONTROL feature of a sensor that can automatically change DWELL and REVISIT times, depending upon the threat environment, *e.g.*, more visits to identify targets, and minimal visits to threat sectors containing hostile countermeasures such as anti-radiation missiles.

ADDRESS HYGIENE - The computerized process of analyzing postal address lists and modifying data in order to increase the accuracy of the data. For example, a set of duplicate addresses may exist because the street address on one record is abbreviated, *e.g.*, "Av.", and the other spelled out, *e.g.*, "Avenue"; one task of address hygiene might be to spell out all abbreviations (*e.g.*, "Dr" and "Dr." changed to "Drive", "Av", "Av." and "Ave" changed to "Avenue", "Rd" and "Rd." changed to "Road", etc...). More sophisticated techniques might include Zip Code correction, telephone area code corrections, name standardization, automatic checking of public records to check for irregularities and errors, as well as other cleansing tasks to improve data quality and create a more consistent and reliable database free of duplicate records.

ADVANCED BATTLESPACE INFORMATION SYSTEM (ABIS) -

A federation of systems that forms an underlying grid of flexible, shared and assured information services and provides advanced capabilities in support of new command and control and force employment concepts. It blends rapidly emerging commercial technologies with advanced military research to deliver comprehensive knowledge to war fighters at all levels. ABIS comprises a collection of distributed data and applications integrated through a grid of supporting services.

NOTE: Development of ABIS would entail an orderly progression from existing STOVEPIPE systems to overarching technology capabilities in less than 15 years (1997.)

ADVANCED CLOSE AIR SUPPORT SYSTEM (ACASS) - A

ruggedized handheld computer system used by forward air controllers to direct pilots to targets quickly and accurately. The computer features a GLOBAL POSITIONING SYSTEM (GPS) device, a LASER rangefinder, and a multi-band inter/intra-team radio. Area data are provided by fresh imagery from a National Imagery and Mapping Agency satellite. NOTE: Data communications is relatively secured because data are transmitted in short bursts.

ADVANCED DISCRIMINATING LADAR [Technology] (ADLT) - A

Doppler-image LADAR sensor for missile interceptors. It employs a LASER to scan a target in the same manner as a RADAR. When employed, the reflected energy from an incoming warhead is received and Doppler processed to gather detailed range and speed data for use by the interceptor.

ADVANCED ELECTRO-OPTICAL SYSTEM (AEOS) - A 3.67 meter

telescope located on the island of Maui. AEOS will have seven *coude* rooms for various experiments, as well as conventional Cassegrain positions located on the mount itself. *Le coude* is French for "elbow" - meaning the light is "bent" from the telescope through a *coude* path to the basement of the facility. From the basement, the light is redirected to the appropriate laboratory for data collection, analysis, or experiments.

ADVANCED ENCLOSED MAST/SENSORS (AEM/S) - A large

composite structure (approx. 90 feet high by 35 feet in diameter) designed to reduce the RADAR CROSS SECTION (RCS) of structure. The upper half of the hexagonal mast, intended to pass own-ship sensor frequencies, is covered with a FREQUENCY SELECTIVE SURFACE (FSS); the lower half can be reflective or covered with RADAR ABSORBING MATERIAL (RAM). The mast encloses a variety of antennas. The mast serves the dual purpose of protecting its contents from the elements and reducing the overall RCS of the vessel.

NOTE: An AEM/S was installed on the *USS Arthur W. Radford (DD-968)* in May of 1999.

ADVANCED GUN SYSTEM (AGS) - A 155 mm gun mount designed with low radar and infrared signatures. The gun will be capable of firing ballistic and precision-guided munitions to ranges up to 100 nautical miles. See also AUTONOMOUS NAVAL SUPPORT ROUND (ANSR), BARRAGE ROUND.

NOTES: **(1)** AGS will satisfy Operational Requirement Document (ORD) requirements for range, accuracy, lethality, and sustained fire, as well as USMC requirements for Naval Surface Fire Support (NSFS) and is consistent with Army requirements for precision engagement and dominant maneuver warfare. **(2)** Attributes: Increased volume of fires for forces ashore; ¶Greatly increased range and improved lethality; Unmanned magazine; ¶Increased Sustainability. **(3)** As a part of the AGS program, a new Long Range Land Attack Projectile (LRLAP) is being developed. The LRLAP will use the GLOBAL POSITIONING SYSTEM (GPS) for in-flight guidance.)

[Source: Navy's DD(X) Web site: <http://peoships.crane.navy.mil/ddx/>]

ADVANCED INTELLIGENT NETWORK (AIN) - A National Communications System (NCS) network, which can provide access control, priority treatment, user authentication, and other survivability features supporting National Security and Emergency Preparedness (NS/EP) telecommunications. It is a service-independent architecture introduced into the Public Switched Network (PSN) that will provide technical and cost advantages and end-user control over service definition, service customization, and choice of equipment suppliers, as well as the ability to modify and manage their services without telecommunications service provider intervention. (View the 1999 AIN architecture.)

ADVANCED JOINT EFFECTIVENESS MODEL (AJEM) - A tri-service developed computer simulation model designed to be the DoD standard computer simulation for evaluating the lethality and terminal effectiveness of munitions and the vulnerability of aircraft, missiles, and ground-mobile systems. [For more details, visit: http://ajem.survice.com/globals/ajem_home.html]

ADVANCED LIGHTWEIGHT INFLUENCE SWEEP SYSTEM (ALISS) - A system which uses new magnetic and acoustic technology to defeat "smart" multisensor sea mines designed to discern real targets from spoofs. Its magnetic technology feature uses closed-cycle, conductively cooled, superconducting magnets arranged in a 5-ft diameter circle that emulates the dipole magnetic moment of assault craft. The acoustic technology feature uses plasma-discharge, pulse-power techniques in three "spark-gap" electrodes to discharge electrical pulses that simulate the sound of the Landing Craft, Air Cushioned (LCAC).

ADVANCED MULTI-FUNCTION RADIO FREQUENCY SYSTEM (AMRFS) - A system which consolidates, in a single aperture, the antennas required for shipboard radar, ELECTRONIC WARFARE (EW), IDENTIFICATION, FRIEND OR FOE (IFF) and communications.

ADVANCED RESEARCH PROJECT AGENCY (ARPA) LINCOLN C-BAND OBSERVABLE RADAR (ALCOR) - See ARPA LINCON C-BAND OBSERVABLE RADAR.

ADVANCED SWIMMER DELIVERY SYSTEM (ASDS) - A dry mini-submarine with a two-man crew, capable of clandestine and covert insertion and recovery of a Navy SEA-Air-Land (SEAL) squad or Special Operations Forces (SOF) troops. The ASDS can be launched from a submarine or from the well-deck of an amphibious ship.

ADVANCED TERMINAL EMULATION - See SCREEN SCRAPING.

ADVANCED TETHERED VEHICLE (ATV) - A tethered, unmanned vehicle system designed for operation at great sea depths. It employs multiple television cameras to provide three-dimensional views of its work area.

ADVANCED THREAT INFRARED COUNTERMEASURES (ATIRCM) - An aircraft survivability system, which performs the functions of missile warning, INFRARED jamming and expendable dispensing. The system features a coordinated, multispectral response from its directable jammer and dispenser that is CUED by either an electro-optical or infrared missile warning subsystem. The missile warning sensors detect all types of missile threats (not just infrared), thus can provide data to other aircraft survivability equipment (ASE).

ADVANCED UNITARY PENETRATOR (AUP) - A sub-caliber (*i.e.*, smaller diameter) high-density penetrator employing ultra-high density tungsten explosives to achieve increased target penetration. The penetrator is carried in a larger-caliber lightweight round, which provides the aerodynamic characteristics needed for accuracy.

ADVANCED WEATHER AERIAL DELIVERY SYSTEM (AWADS) - A multifunction, dual-band radar system providing precise navigation under conditions of zero visibility and/or darkness. NOTE: The AWADS is installed on cargo transport aircraft and supports the aerial delivery via parachute drop of critical supplies and equipment, including humanitarian aid, to desired locations with pinpoint accuracy.

AERIAL DIVERSIONARY DEVICE - A NONLETHAL WEAPON consisting of a multi-shot capability to distract individuals or crowds. In crowd control, it can be used to provide a warning shot by delivering a flash-bang projectile over the heads of a violent or potentially violent crowd to allow other troop formations to maneuver to more advantageous positions.

AEROSOL - (1) (laser-maser) A suspension of small solid or liquid particles in a gaseous medium. Typically, the particle sizes may range from 100 micrometers to 0.01 micrometers or less. (2) Solid, resonant-size particles dispersed in the atmosphere, and having a high index of refraction. The particles both scatter and

absorb visual and laser energy so as to reduce the effectiveness of weapon systems directed by these techniques.

NOTE: The particle size and type are chosen to scatter or absorb radiation from electro-optical system targets. Some forms of aerosols can partially absorb microwave signals.

AEROSTAT - A tethered airship, generally carrying a sensor.

AFFORDABLE MOVING SURFACE TARGET ENGAGEMENT

(AMSTE) - The ability to employ airborne sensor resources to fix, track and engage with precision, moving surface threats from long ranges and in all weather conditions.

AGENT - **(1)** In VIRTUAL REALITY, a software program that can carry out fairly sophisticated tasks in unknown networked environments without human intervention; in other words a "smart" BOT. **(2)** A software component that performs one or more common tasks by acting in a preset manner. Agents may be classified as to characteristics (mobility - stationary or mobile); response method (deliberative or reactive); autonomy; learning; and specific task to be performed (e.g., interface). (Also called SOFTWARE AGENT.)

AGILITY - Acronym for AGILE Information Transfer ability, a new (2000) mobile satellite communications system that provides high-bandwidth secure satellite communications for military platforms. The system consists of an electronically beam-steered antenna made of modular transmit/receive tiles. AGILITY features built-in countermeasures.

NOTE: For aircraft, AGILITY automatically tracks communications satellites, compensating for the aircraft's motion, and provides REAL TIME measurements of the aircraft's altitude and heading.

AIRBEAM TECHNOLOGY - A textile manufacturing technology, which employs continuous braiding or weaving of a high-strength, three-dimensional fabric sleeve over an air-retention bladder, thus providing a seamless high-strength structure. NOTE: A few applications for airbeam technology includes rapid deployable space structures, deployable wings, pollution containment, inflatable antennas, and beamless supports for temporary field hangars and other field shelters.

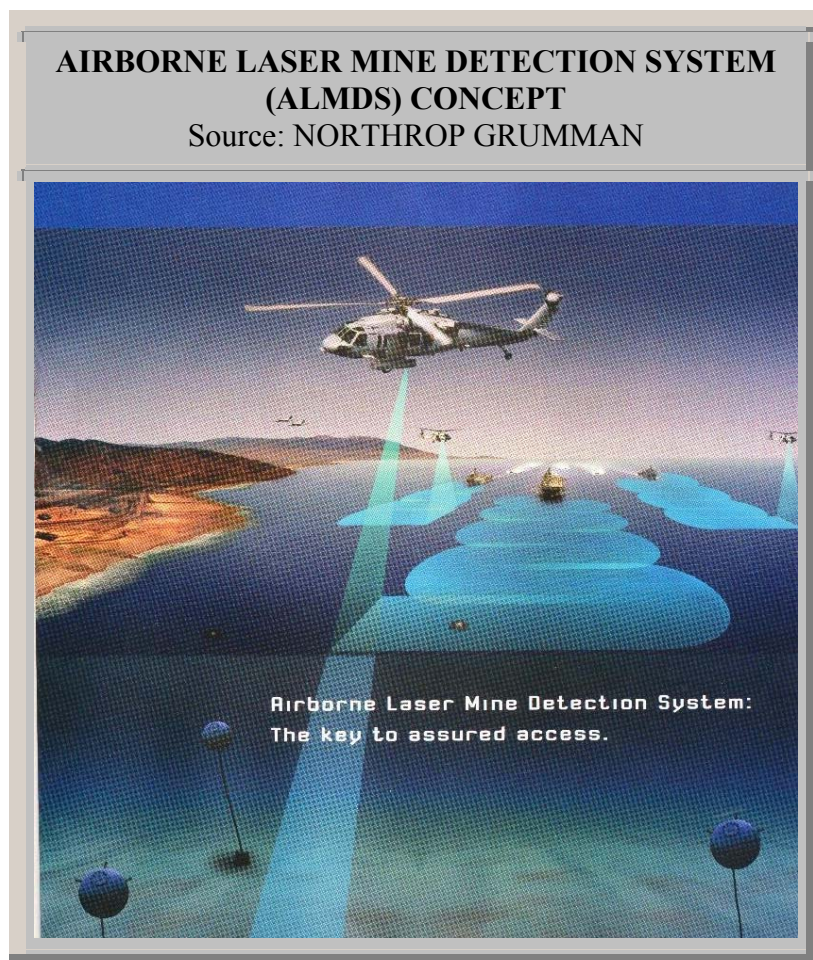
AIRBORNE COMMUNICATIONS NODE (ACN) - An UNMANNED AIR VEHICLE (UAV) designed and equipped to provide hierarchical communications services and cross linking over a broad theater of operations.

AIRBORNE DATA RELAY (ADR) - A communications system used to extend data link ranges of UNMANNED AIR VEHICLES (AUV) or to bend a line-of-sight data link around obstacles, such as mountains.

AIRBORNE ELECTRONIC ATTACK (AEA) - A MISSION area consisting of three activities: **(1)** the non-lethal SUPPRESSION OF ENEMY AIR DEFENSES (SEAD), *i.e.*, electronic jamming of radars and related communications; **(2)** the lethal suppression, or destruction of enemy air defenses (DEAD), *i.e.*, use of missiles or other munitions to physically destroy enemy radars and related infrastructure; and **(3)** self-protection, or use of JAMMING and DECOYS to render missiles harmless to the attacking aircraft. See also ELECTRONIC ATTACK.

AIRBORNE LASER (ABL) - A DIRECTED ENERGY WEAPON (DEW) designed to deliver a lethal LASER beam onto a ballistic missile during the highly vulnerable boost phase of flight. The system autonomously will detect and locate a missile seconds after launch using a series of INFRARED sensors that work in tandem to target the missiles. The ABL consists of three critical laser systems linked by mirrors. The primary mirror both gathers in light beams and focuses them outward; other mirrors reflect the laser beams, split them, sometimes into two separate beams of different wavelengths (diachronic mirrors), steer them, and, for the killing beam, shape its wave front. A megawatt CHEMICAL OXYGEN IODINE LASER (COIL) is the primary killing beam. See also BALLISTIC MISSILE DEFENSE (BMD).

AIRBORNE LASER MINE-DETECTION SYSTEM (ALMDS) - An ELECTRO-OPTIC mine detection system that uses an aircraft-mounted LASER to detect floating and shallow-tethered mines. (Formerly called MAGIC LANTERN.)



AIRBORNE MINE-NEUTRALIZATION SYSTEM (AMNS) - A remotely operated expendable neutralization device that will be employed by helicopters to neutralize - with explosives - proud moored and volume sea mines that are impractical or unsafe to counter using existing mine-disposal techniques.

See also DISTRIBUTIVE EXPLOSIVE TECHNOLOGY (DET), RAPID AIRBORNE MINE-CLEARANCE SYSTEM (RAMICS), SHALLOW-WATER ASSAULT BREACHING (SABRE) SYSTEM, SHALLOW WATER INFLUENCE MINE SWEEP (SWIMS) SYSTEM.

NOTE: AMNS is a 3-foot long torpedo-like device equipped with an onboard reacquisition SONAR, a powerful headlight, and a video camera. Launched from a helicopter, it is guided to the target by a crewman using a fiber-optic cable tethered to the AMNS. When in position, the AMNS fires a shaped charge through the mine. It is effective against mines at any depth.

AIRBORNE OPTICAL ADJUNCT (AOA) - A hump-backed Boeing 767, which carries a large long-wave-length infrared sensor. (Used to collect data on reentry vehicles.)

AIRBORNE REMOTE OPTICAL SPOTLIGHTING SYSTEM (AROSS) - A digital camera mounted in a stabilized turret located on the underside of an aircraft that flies over a beach area. The camera collects time series data about a beach surf in the area. Analysts then examine the behavior of breaking waves to determine the location of mines in the surf. NOTE: This is not yet (2001) a REAL TIME system.

AIRBORNE STANDOFF MINEFIELD DETECTION SYSTEM (ATAMIDS) - (Army) A dual-mode high-resolution INFRARED system using LASER sensors. Very high resolution radars are used to locate mines lying on the surface of the ground, while infrared sensors, able to distinguish slight temperature differences, will be used to detect shallowly buried ordnance. The sensor is designed to be carried in a short-range UNMANNED AIR VEHICLE (UAV).

AIRBORNE TARGETING AND CROSS-CUEING SYSTEM (ATACCS) - A system designed to task multiple sensors automatically on individual targets, thereby decreasing the target-search and data-analysis time requirements of present (1999) reconnaissance systems.

AIR-CHISEL MINE CLEARING - A mechanized method that employs high-pressure air to rapidly uncover soil, leaves, and other debris down to and around a suspected mine without causing mine detonation. See also WATER-JET MINE CLEARING.

AIR COMBAT MANEUVERING INSTRUMENTATION (ACMI) - A system of aircraft-mounted pods designed to capture all the moves and countermoves in airborne training exercises for monitoring, real-time kill notification, and post-mission debriefing.

AIRCRAFT/SHIP SECURE AND TRAVERSE (ASIST) SYSTEM -

A system of LASER beacons used to guide a helicopter to the landing deck of a ship.

AIR DEFENSE - All defensive measures designed to destroy attacking enemy aircraft or missiles in the earth's envelope of atmosphere, or to nullify or reduce the effectiveness of such attack. See also ACTIVE AIR DEFENSE, PASSIVE AIR DEFENSE.

AIR DEFENSE ALERTING DEVICE (ADAD) - A stand-alone guide for a soldier carrying a stinger missile. It can be fully integrated with a multiple gun or surface-to-air missile vehicle. A control panel assigns priorities for targets based on speed and direction. Several missile batteries can be tied into the unit. The system detects aircraft coming head-on from INFRARED emissions from wing edges or helicopter rotor blades. It is designed to reject false signals from sources such as birds. It is claimed that the infrared detector's passive nature renders it immune to ELECTRONIC COUNTERMEASURES. Similarly, it cannot be detected or targeted by anti-radar missiles.

AIR DELIVERABLE ACOUSTIC SENSOR (ADAS) - A passive non-line-of-sight distributed all-weather acoustic sensor system that provides REAL TIME (RT) continuous threat data for precision tracking of air and ground vehicles in hostile territory.

AIR-DIRECTED SURFACE-TO-AIR MISSILE (ADSAM)

ENGAGEMENT - The use of an airborne (e.g., from AEROSTATS) fire control radar to provide long-range tracking and in-flight control of interceptor missiles launched from surface and aircraft platforms in order to achieve the longest-range engagements of cruise missile threats that friendly interceptor missiles can support. See also JOINT LAND-ATTACK CRUISE MISSILE DEFENSE ELEVATED NETTED SENSOR (JLENS.)

AIR SURVEILLANCE - The systematic observation of air space by electronic, visual, or other means primarily for the purpose of identifying and determining the movements of aircraft and missiles, friendly and enemy, in the air space under observations. See also COMBAT SURVEILLANCE, SEA SURVEILLANCE, SURVEILLANCE.

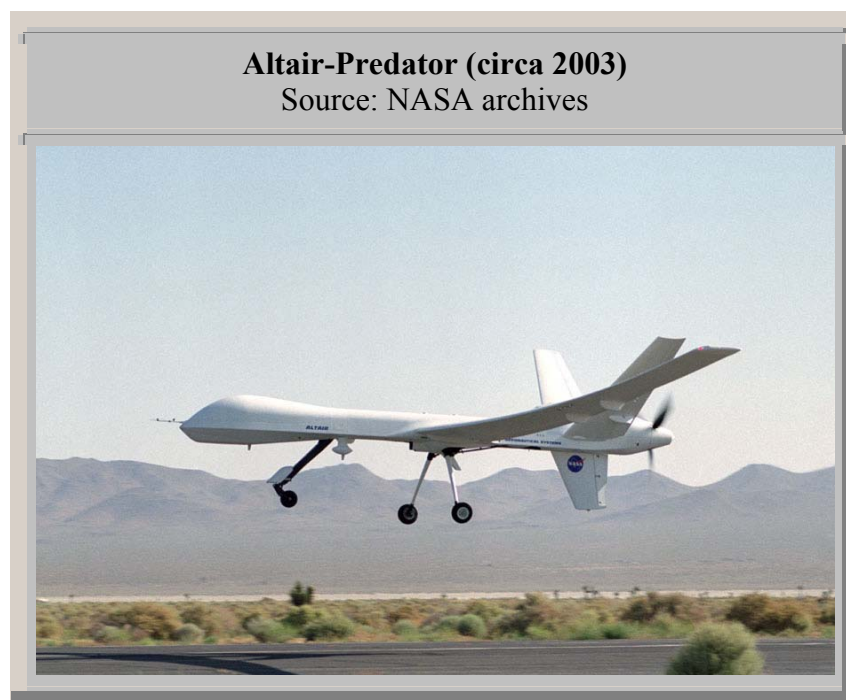
ALIASING ERRORS - Errors arising in sampled-data systems when the input signal is sampled too slowly (at under twice the frequency of the highest- frequency component of the input signal).

ALL-GAS CHEMICAL LASER - A CHEMICAL LASER which creates its light by combining two specific gases: nitrogen chloride and atomic iodine. The device is expected to be relatively light in weight, operate in zero-gravity environments and possess a built-in heat rejection exhaust.

ALL ELECTRIC SHIP (AES) - A new ship concept developed by the Royal Netherlands Navy (RNLN). Because power management that controls the distribution

of electrical power to the loads can be extremely rapid and flexible, the ship's war fighting capabilities can be improved. Advantages include improved survivability, since pre-hit and post-hit reconfigurations assure that power to vital loads is uninterrupted. The AES will have a reduced SIGNATURE, because there are no noisy gearboxes, and reduced thermal emissions (IR SIGNATURE), because there are no fuel exhaust stacks. The AES is expected to have reduced vulnerability to damage since prime movers can be divided over different zones and compartments and the propeller shafts can be much shorter, or PODDED PROPULSORS employed for increased maneuverability as well. The AES is expected to be fitted with DIRECTED ENERGY WEAPONS. [TNO Prins Maurits Laboratory research program announcement www.pml.tno.nl/en/pt/all_electric_ship.html]

ALTAIR - An extended-wing version of the UNMANNED AERIAL VEHICLE (UAV) Predator. Altair includes a fault-tolerant dual architecture flight control system with an automated collision-avoidance system and a voice relay capability that permits air traffic controllers to communicate with the UAV's ground-based pilots. The aircraft has an over-the-horizon data link for communications.



NOTES: (1) Designed with flight duration up to 32 hours, the Altair has a maximum ceiling of about 52,000 feet and a range of 4,200 miles. (2) Do not confuse this with the ARPA LONG-RANGE TRACKING AND IDENTIFICATION RADAR, which has the "Altair" as an acronym.)

AMIABILITY AGENT - A NONLETHAL WEAPON consisting of an agent which causes those with whom it comes in contact to become very easily persuadable.

AMPLIFIED RETURN SIGNAL - A FUZE JAMMING technique employing a REPEATER JAMMER that increases the amplitude of the returned signal to the fuze.

AMPLITUDE - The amplitude of a sinusoidally varying quantity (WAVE) is the maximum, or peak, value of this quantity. NOTE: Sometimes the rms (root-mean-square) value of the wave is used to characterize the amplitude of a sinusoidal oscillation.

AMPLITUDE MODULATION (AM) - The process by which a CARRIER wave (CW) is caused to vary in amplitude by the action of another wave containing information. See also ANGLE MODULATION, FREQUENCY MODULATION (FM), PHASE MODULATION (PM.)

AMPLITUDE MODULATION EQUIVALENT (AME) - A method of independent sideband transmission in which the carrier is reinserted at a lower level after its normal suppression to permit reception by conventional AMPLITUDE MODULATION (AM) receivers.

ANALYZER JAMMING - A SELF-SCREENING or SUPPORT ECM technique that analyzes the received radar signal and then transmits back to the radar a false ECM-oriented signal that has the appearance of a legitimate signal, but which is actually offset in range and/or azimuth from the actual target return.

ANALOG RADAR - A radar (e.g., earlier radar system) that employs analog means, such as timing circuits, for system control and signal processing. Contrast with DIGITAL RADAR. NOTE: Analog radars are susceptible to drift, internal and external radio frequency interference, and to temperature and humidity variations.

ANECHOIC TILE - SONAR reflectors/sound absorbers designed to provide confusing echoes. NOTE: Anechoic tiles are analogous to CHAFF.

ANESTHETICS - As used in NONLETHAL WEAPONS - tranquilizers, dispensed with gas or darts that could put people to sleep.

ANGELS - [In EW] (1) Radar interference from natural sources. (2) Radar interference caused by confusion reflectors, such as CHAFF and ROPE, etc. (3) CORNER REFLECTORS (4) Aircraft altitude (in kilo feet).

ANGLE OF ARRIVAL (AOA) - The angle between the negative of the propagation vector and a reference direction. NOTE: If the reference direction is the course vector of a target, then the angle of arrival is the same as the TARGET ANGLE with respect to the radiating source.

ANGLE MODULATION - The process of causing the angle of the CARRIER wave (CW) to vary in accordance with the signal wave. PHASE MODULATION (PM) and FREQUENCY MODULATION (FM) are two particular types of angle modulation.

ANODE - (1) An electrode through which current enters any conductor of a non-metallic class. Specifically, an electrolytic anode is an electrode at which negative ions are discharged, or positive ions are formed, or at which other oxidizing reactions

occur. **(2) (ELECTRON (VACUUM) TUBE or valve)** An electrode through which a principal stream of electrons leaves the inter-electrode space.

ANOMALY DETECTION - A type of INTRUSION DETECTION that infers a HACKER attack is taking place by recognizing deviations from the normal behavior of a computer or network. Contrast with SIGNATURE DETECTION. See also HOST-BASED INTRUSION DETECTION, NETWORK-BASED INTRUSION DETECTION, PORT SCAN.

ANONYMOUS REMAILER - An INTERNET computer service that launders the true identity of an e-mail sender by stripping away the message header before forwarding the message to the recipient, by padding the message to disguise its true length, or by encryption. Compare with PSEUDONYMOUS REMAILER.

ANTENNA - That part of a transmitting or receiving system that is designed to radiate or to receive electromagnetic waves. NOTE: Antennas are characterized by coverage (non-directional or directional), Gain (generally in decibels), Frequency Range, POLARIZATION (linear or circular), BANDWIDTH (narrow or wide), and type. There are many types of antennas. The table below lists some antenna types.

<u>ANTENNA TYPES</u>	
Type	Typical Polarization
Biconical	Vertical
Blade	Vertical or Linear
Cavity Backed Spiral	R & L Horizontal
Conical Spiral	Circular
Conical Spiral, 4-arm	Circular
Diffraction Plate	Linear
Dipole	Vertical
Horn	Linear
Horn with Polarizer	Circular
Helix, Axial Mode	Circular
Helix, Normal Mode	Horizontal

Linderblad	Circular
Log Periodic	Vertical or Horizontal
Loop	Horizontal
Parabolic Dish	Depends on feed
Periscope	Depends on feed
Phased Array	Depends on elements
Reflector	Depends on elements
Swastika	Horizontal
Whip	Vertical
Yagi	Horizontal

Antennas may also be classified into four types of fundamental operation as follows:

<u>TYPES OF ANTENNA ELEMENTS</u>		
Antenna Type	Properties	Examples
Electrically Small	Very low directivity	
	Low input resistance	Short dipole
	High input reactance	Small Loop
	Low radiation efficiency	
Resonant	Low to moderate gain	Half-wave dipole
	Real input impedance	Microstrip patch
	Narrow bandwidth	

Broadband	Low to moderate gain Constant gain with frequency Real input impedance Wide bandwidth	Spiral
Aperture	High gain Gain increases with frequency Moderate bandwidth	Horns Reflectors

(See also SPRAY-ON ANTENNA.)

ANTENNA AUXILIARY SCAN-ON-RECEIVE-ONLY - An ECCM technique that uses an auxiliary non-scanning antenna and associated receiver that is boresighted with the transmit-and- receive antenna of a conical scan SORO (scan-on-receive-only) tracking system, to detect the ECM amplitude modulations on the receive signal and to use this to cancel the ECM modulation from the radar's received signal prior to angle processing within the radar.

ANTENNA POLARIZATION MISMATCH - The condition that exists when a PLANE WAVE, incident upon an antenna from a given direction, has a POLARIZATION, which is different from the receiving polarization of the antenna in that same direction. Contrast with POLARIZATION MATCH.

ANTI-AIR LASER - A NONLETHAL WARFARE weapon consisting of a vehicle, ship or aircraft-based laser cannon to ground pilots or force them to veer off or risk damage to pilot vision or to the aircraft windscreen, optics or targeting sensors. See also BLINDING LASER.

ANTI-AIR WARFARE (AAW) - A US Navy/US Marine Corps term used to indicate that action required to destroy or reduce to an acceptable level the enemy air and missile threat. It includes such measures as the use of interceptors, bombers, antiaircraft guns, surface-to-air and air-to-air missiles, ELECTRONIC COUNTERMEASURES, and destruction of the air or missile threat both before and after it has launched. Other measures which are taken to minimize the effects of hostile air action are COVER, concealment, dispersion, DECEPTION (including electronic) and mobility.

NOTE: "Bombers" in this definition implies their air-to-air capabilities and not air-to-ground destruction of enemy aircraft, which is a strike function.

ANTI-ARMOR MATERIALS - That category of MATERIALS TECHNOLOGY which addresses materials for projectiles used to defeat enemy armor, including various types of penetrators, sabots, shaped charge liners, and their launchers. Anti-armor materials include steel, titanium, ceramics, forged or explosively formed or rolled molybdenum, tantalum, tungsten, and depleted uranium (DU).

ANTI-COMMUNICATIONS WARFARE - Military action to reduce the effectiveness of enemy communications.

ANTI-JAM DATA LINKING - The establishing of data links, which have the capability to counter jamming.

ANTI-MATERIEL CHEMICALS/BIOLOGICALS - NONLETHAL WEAPONS involving materials to block access to bridges, roads, sea lanes and other means of passage; and to contaminate fuel and render high-explosives ineffective.

ANTIMATTER PARTICLE BEAM (APB) - A DIRECTED ENERGY WEAPON (DEW) under DoD's WEAPONS SYSTEMS TECHNOLOGIES (WST). The generation, propagation and control of antimatter beams of hydrogen or its isotopes. Interaction of the APB with a target consisting of normal matter results in complete annihilation of the beam and an equal amount of normal matter in the target. [Details from: <http://www.dtic.mil>]

NOTE: APBs must be charged to be accelerated, but exoatmospheric beams must be neutralized so that the repulsion of like-charged particles will not spread the beam to a non-effective power density before it reaches the target. APBs potentially have only exoatmospheric, or space, applications because the atmosphere would erode them significantly. See also CHARGED PARTICLE BEAM (CPB), GAMMA-RAY LASER (GRASER), HIGH POWER MICROWAVE/RADIO FREQUENCY (HPM/RF), KINETIC ENERGY WEAPON (KEW) and NEUTRAL PARTICLE BEAM (NPB.)

ANTI-PERSONNEL BEAM WEAPON (APBW) - A NONLETHAL WEAPON LASER device, similar to the TASER, designed to stun a person or freeze him in his tracks. In place of the TASER's wires to carry the stun charge, the APBW employs two ultraviolet light laser beam to create two charged channels of ionized air that carry the disabling electrical current for a distance of up to 100 meters. See also VEHICLE-DISABLING WEAPON (VDW.)

NOTE: It is claimed that while the APBW current had a repetition rate sufficiently rapid to tetanize (*Tetanization is the stimulation of muscles fibers at a frequency which merges their individual contractions into a single sustained contraction.*) muscle tissue, it is insufficient to affect the muscles of the heart and diaphragm. In addition, the APBW will not incur retinal damage because the cornea absorbs all the ultraviolet radiation at the wavelengths used. Moreover, the beams are too weak to

produce photokeratitis (corneal inflammation) unless they are directed at the eyes for several minutes.

ANTI-PERSONNEL ENTANGLEMENTS - See ENTANGLEMENTS.

ANTI-PERSONNEL OBSTACLE BREACHING SYSTEM

(APOBS) - A man-portable device capable of quickly creating a footpath through anti-personnel (AP) mines and wire entanglements. [U.S. Army Field Manual *FM* 3-34.2] NOTE: APOBS includes a portable line charge that is rocket-propelled over the obstacles from a standoff position on the obstacles field's edge.

ANTI-RADIATION MISSILE (ARM) - A missile which homes passively on a radiation source. See also HIGH SPEED ANTI-RADIATION MISSILE.

ANTI-RADIATION MISSILE (ARM) DECOY - A miniature radar transmitter designed to protect radars in the field. The DECOY provides protection by emulating the transmission characteristics of the protected radar, thereby deceiving the incoming missile.

ANTIREFLECTION OVERCOAT - A coating of material, such as polytetrafluoroethylene, which reduces the reflectance of a material at infrared wavelengths. See also RADAR CAMOUFLAGE.

ANTISUBMARINE ROCKET (ASROC) - See ASROC.

ANTISUBMARINE WARFARE (ASW) - (1) Operations conducted with the intention of denying the enemy the effective use of his submarines. (2) The destruction or neutralization of enemy submarines.

ANTI-SURFACE SHIP WARFARE - See ANTISURFACE WARFARE.

ANTISURFACE WARFARE (ASUW) - The destruction or neutralization of enemy surface combatants and merchant ships. Its aim is to deny the enemy the effective use of his surface warships and cargo carrying capacity. Synonymous with ANTI-SURFACE SHIP WARFARE.

ANTI-SURVEILLANCE WARFARE - Military action intended to reduce the effectiveness of enemy surveillance operations.

ANTI-TARGETING WARFARE - See COUNTER-TARGETING.

ANTI-TORPEDO TORPEDO (ATT) - A specialized small-diameter torpedo that tracks and destroys incoming underwater projectiles. The ATT uses digital signal processing and FUZZY LOGIC to identify, track and intercept incoming torpedoes running in a variety of attack patterns.

ANTI-TRACTION LUBRICANT - A NONLETHAL WEAPON consisting of a lubricant applied to roadways which reduces friction of the surface and adversely

affects the traction of vehicle wheels and tracks on the treated surfaces such as roads, runways, and tracks. A Teflon-type environmentally neutral lubricant that make footholds or traction exceedingly difficult. In this application, the product can be used to deny access to areas or cover a unit's flank.

APPLIQUE - The Army's "Force XXI Battle Command Brigade-and-Below (FBCB²)" initiative to digitize the battlefield.

ARCHITECTURAL DESIGN - The process of defining a collection of hardware and software components and their interfaces to establish a framework for the development of a system.

NOTE: The architectural design process begins with the identification of functions, which must be performed by the system in order to meet specified requirements. These functions are then allocated to software, hardware, or humans comprising the system. Differing allocation schemes become "architectural alternatives", and the chosen alternative results from consideration of various criteria and constraints, such as cost and manning. System inputs, outputs, internal and external interfaces, data sources and destinations, data stores, and transformation processes are all identified, diagrammed, and described in the architectural documentation.

ARCHITECTURE - See SYSTEM ARCHITECTURE; SOFTWARE ARCHITECTURE.

ARCNET - See ATTACHED RESOURCE COMPUTER NETWORK

AREA DENIAL SYSTEM (ADS) - Self-contained, semi-autonomous, long standoff munitions that can defend an area by defeating, disrupting, and delaying vehicles that enter its battlespace.

AREA JAMMING SUPPORT - An ECM tactic in which the aircraft jams long-range systems over a wide area to mask incoming attack aircraft. See also CORRIDOR JAMMING SUPPORT, DIRECT JAMMING SUPPORT, STAND-OFF JAMMING SUPPORT, TARGET AREA JAMMING SUPPORT.

ARMED DECOY - A DECOY able to inflict damage, thereby forcing the enemy to engage it even if it is recognized as a decoy. See also REMOTELY PILOTED VEHICLE, ANTI-RADIATION MISSILE, CRUISE MISSILE, AUTONOMOUS DECOY.

ARMOR MATERIALS - That category of MATERIALS TECHNOLOGY which addresses materials specifically designed to protect equipment and personnel from enemy threats. Armor materials include metals and related composites (e.g., titanium diboride), ceramics and related composites (e.g., crystal whiskers in a bonded matrix), organic fibers and composites (e.g., arrays of woven cloth), and layered combinations of these.

ARMY TARGET SENSING SYSTEM (ATSS) - A generic term for SMART WEAPONS, sensors, processors, and Aviation Survivability Equipment (ASE) that rely on SIGNATURES for TARGETING, recognition, identification, and warning. These systems use signature data (radio frequency, ACOUSTIC, ELECTRO-OPTIC, and other parametric data) to identify specific targets or events. Signatures are analyzed and compared to stored libraries to identify distinctive features associated with the source emitter to facilitate the identification and targeting process. [Fort Monmouth, NJ Web page (cited on 1/30/2002): http://arat.iew.sed.monmouth.army.mil/ARAT/ARAT_information/arat_terms/list.htm; newer link (2003) is: <http://www.sec.army.mil/arat/>]

NOTE: To be useful, ATSS devices must be capable of being rapidly reprogrammable to accommodate modifications in potential threat system signatures.

ARPA LINCOLN C-BAND OBSERVABLE RADAR (ALCOR) - An Army-operated radar located on the Kwajalein Atoll in the western Pacific. It has two missions, Anti-Ballistic Missile (ABM) testing in support of the Western Space and Missile Center (WSMC) and space surveillance. ALCOR is a Near-Earth (NE) tracking radar.

NOTE: ALCOR is unique because it is the only radar besides Haystack that can provide wideband Space Object Identification. ALCOR is one of the 25 sites worldwide of U.S. Army, Navy and Air Force operated ground-based radars and optical sensors composing the Space Surveillance Network. Two other radars are the ARPA Long-range Tracking and Identification Radar (ALTAIR) and the TRADEX (Target Resolution and Discrimination Experiment.)

ARPA LONG-RANGE TRACKING AND IDENTIFICATION

RADAR (ALTAIR) - A high-resolution radar located at Kwajalein Atoll in the western Pacific that provides precision metric, signature, and imaging for deep-space operations, satellite observations, strategic reentry missions, and multiple-intercept engagement tracking. ALTAIR is a Near-Earth (NE) and Deep Space (DS) tracking radar. ALTAIR has two missions: Anti-Ballistic Missile (ABM) testing in support of the Western Space and Missile Center (WSMC) and space surveillance. (NOTE: ALTAIR is unique because it is the only radar in the Space Surveillance Network with an equatorial location. ALTAIR can track one third of the objects in the geosynchronous belt, more than 42,000 tracks per year. ALTAIR is one of the 25 sites worldwide of U.S. Army, Navy and Air Force operated ground-based radars and optical sensors composing the Space Surveillance Network. Two other radars are the ARPA Lincoln C-Band Observable Radar (ALCOR) and the TRADEX (Target Resolution and Discrimination Experiment.)

ARRAY ANTENNA - An antenna comprised of a number of identical radiating elements in a regular arrangement and excited to obtain a prescribed radiation pattern. See also PHASED ARRAY ANTENNA.

ARTIFICIAL EYELID - A MICROELECTROMECHANICAL device consisting of a surface covered by tiny shutters, ranging in size from about a millimeter to 50 micrometers. In the transparent state, the shutters are open, like an

open Venetian blind. When a sensor detects light, the shutters quickly (about 100 microseconds) snap closed, presenting an opaque surface to the light.

NOTE: The primary application of the artificial eyelid is to protect military pilots and equipment from disabling laser attacks. The artificial eyelid also has potential consumer applications, such as programmable sunglasses, or advanced camera lenses.

ARTIFICIAL INTELLIGENCE (AI) - Computerized reasoning. Branches of AI include EXPERT SYSTEMS, robotics, and knowledge representation.

ARTILLERY DELIVERED ANTIPERSONNEL MINE (ADAM) -

One of a number (e.g., 36) of mines contained in an artillery shell. When the mines fall from the disintegrating shell they release a tripwire-fired, pop-up fragmenting warhead. Each mine ejects several tripwires that, when disturbed, trigger the mine to jump four to eight feet in the air and spray shrapnel across a forty-foot area.

NOTE: ADAM is in the class of SMART MINES. ADAM has been adapted for hand-emplacement and has evolved into the Pursuit Deterrent Munition (PDM.)

ASPHALT ABLATION - A ballistic missile countermeasure involving deployment of an asphalt cloud in the exoatmosphere in front of an incoming missile. The asphalt particles cling to the warhead, and during re-entry the asphalt ignites and ablates unevenly, degrading the missile's accuracy.

ASROC - Acronym for Anti-Submarine Rocket. ASROC is a weapon consisting of a rocket booster used to deliver a payload torpedo or depth-charge over an extended distance, providing long-distance ASW capability. When launched, the ASROC proceeds to the area of the target, releases the weapon, which deploys a parachute to slow the weapon before entering the water. After entering the water, the weapon begins its programmed target acquisition maneuvers. (NOTE: The ASROC launcher is usually trainable in azimuth and elevation. If the launcher is fixed in the vertical plane, then the weapon is a VERTICAL-LAUNCH ASROC (VLA.)

ASSEMBLY LANGUAGE - A programming language that corresponds closely to the instruction set of a given computer, allows symbolic naming of operations and addresses, and usually results in a one-to-one translation of program instructions into MACHINE LANGUAGE.

ASYMMETRICAL MILITARY FORCE - A military force that does not attempt to match the size of that of an adversary, but is designed to exploit the weakness of the larger force. The asymmetrical military force would be small, mobile, elusive, efficient, inventive and high-tech.

ASYMMETRIC ENGAGEMENT - A battle between dissimilar forces. [JCS Pub 1, 1995, pp. Iv-10, iv-11]

ASYMMETRIC WARFARE - (1) Warfare between dissimilar forces. (2) War between two sides with dissimilar goals. (3) Warfare in which new technology is used to defeat the superior with the inferior. (4) Warfare which encompasses anything

such as strategy, tactics, weapons, personnel that alters the battlefield to negate one side or the other's advantage.

NOTES: **(1)** Asymmetric warfare has been described as "not fighting fair". There are many "definitions" of asymmetric warfare, as the forgoing suggests. These descriptions come from the web site:

http://www.amscc.belvoir.army.mil/asymmetric_warfare.htm.

(2) According to the Defense Advanced Research Project Agency (DARPA), "The most serious asymmetric threat facing the United States is terrorism, a threat characterized by collections of people loosely organized in shadowy networks that are difficult to identify and define." [DARPA's Total Information Awareness Office (IAO) Vision statement, 2002]

ASYNCHRONOUS COMMUNICATIONS - A communications PROTOCOL in which data are transferred serially. Each transmitted character is preceded by a start bit and followed by a stop bit. Contrast with SYNCHRONOUS COMMUNICATIONS.

ATMOSPHERIC INFRARED SOUNDER (AIRS) - A sensor (to be launched in late 2000) that can measure Earth's air temperatures from space with great precision, allowing accurate weather predictions. The AIRS will read atmospheric temperatures to within one degree Celsius in 1-kilometer layers of altitude in the Earth's lower atmosphere. AIR's high-resolution spectrometer will sample precisely the Earth's atmosphere from the ground up to 30 miles.

ATOMIC-LEVEL MANUFACTURING - The construction of materials that do not occur naturally by depositing atoms in layers which are spaced to achieve the desired effect. NOTE: An example of this approach is the VERTICAL CAVITY SURFACE - EMITTING LASER (VCSEL.)

ATTACHED RESOURCE COMPUTER NETWORK (ARCNET) - A LOCAL AREA NETWORK (LAN) employing a token-passing PROTOCOL. NOTE: In an ARCNET, all nodes have equal access to the network, eliminating transmission collisions on busy networks.

AUTO-ID - A system comprising an electronic tag containing a microchip that can, in REAL TIME, wirelessly store and transmit data to a reader device. The processor uses the Electronic Product Code (EPC), a 96-bit code that can identify more than 80 thousand trillion trillion individual items. Data about an item, which may include information such as shipping instructions, inspection schedules, location, expiration dates, technical manuals associated with the item, and more, are stored in a database, where its EPC serves also as an Internet address.

NOTE: For certain sensitive items such as food and medical supplies, the EPC may also contain information regarding the environment experienced by the item, *e.g.*, temperature, vibration, rough handling, and chemical or biological contamination.

AUTOMATED RADAR PLOTTING AID (ARPA) - An INTEGRATED BRIDGE SYSTEM (IBS) sub-system that automatically acquires and tracks contacts, providing timely information to watchstanding personnel.

AUTOMATIC GAIN CONTROL (AGC) - A process or means by which gain is automatically adjusted in a specified manner as a function of input or other specified parameters.

AUTOMATIC GAIN CONTROL DECEPTION - A SELF-SCREENING ECM technique that produces angle errors in a conical scan and some MONOPULSE tracking radars that use AGC.

AUTOMATIC LOCAL OSCILLATOR TUNING - An ECCM technique wherein the radar's local oscillator is tuned either side of its normal setting to see if the target signal ECHO can be more easily detected in a JAMMING environment.

AUTOMATIC SPOT NOISE (ASN) JAMMING - Automatic transmission of a jamming response when a programmed victim signal has been detected. The jammer automatically adjusts its jamming frequency to that of the victim signal. Also called RESPONSIVE SPOT NOISE (RSN) JAMMING.

AUTOMATIC VIDEO NOISE LIMITING - An ECCM technique where the NOISE level out of the radar receiver is maintained constant by a closed-loop feedback system that varies the gain of the video amplifier.

AUTOMATIC VOICE NETWORK (AUTOVON) - Formerly, the principal long-haul, unsecure voice communications network within the Defense Communications System, superseded by the DEFENSE SWITCHED NETWORK (DSN). See also COMBAT CIDERS.

AUOVON SWITCHING CENTERS



Thanks to Albert LaFrance – Cold War Communications Aficionado

AUTONOMIC COMPUTING - Computing which includes the ability respond to problems, repair faults, and recover from system outages without the need for human intervention.

AUTONOMIC HEALING - The automatic dispersing of a series of microspheres that contain a healing agent and a catalyst in a polymeric composite. When a crack propagates in the treated material, stress causes the closest spheres to break open and release the healing agent and catalyst, which generate a chemical reaction to polymerize and heal the crack through capillary action, bonding the crack faces to each other. Also called MICROENCAPSULATED HEALING AGENT, HEALING AGENT.

AUTONOMOUS BENTHIC EXPLORER (ABE) - An AUTONOMOUS UNDERWATER VEHICLE (AUV) designed to perform a predetermined set of maneuvers to take photographs and collect data and samples within an area about the size of a city block. During long deployments, ABE enters a "sleep" mode to conserve power, allowing for months of repeating its tasks. ABE is about 10 feet long with a beam of approximately 5.5 feet and a height of 5 feet. It is propelled by seven thrusters and can operate at depths up to 20,000 feet. Dive durations are from 6 hours to one year. [Woods Hole Oceanographic Institute's website: http://www.whoi.edu/home/marine/abe_main.html]

See also REMOTE ENVIRONMENTAL MONITORING UNITS (REMUS.)

AUTONOMOUS DECOY - A self-propelled platform, which emulates a protected unit, for example, a self-propelled surface acoustic DECOY playing a tape recording of ship sounds.

AUTONOMOUS INTELLIGENT NETWORK AND SYSTEMS (AINS) - A DARPA initiative (*circa* 2002) for developing a system intended to operate independently from the Global Positioning System (GPS) with a "pseudo-GPS" system in the event the former is jammed by an adversary. AINS would link various unmanned and manned systems without the need for human intervention, except to assign specific tasks.

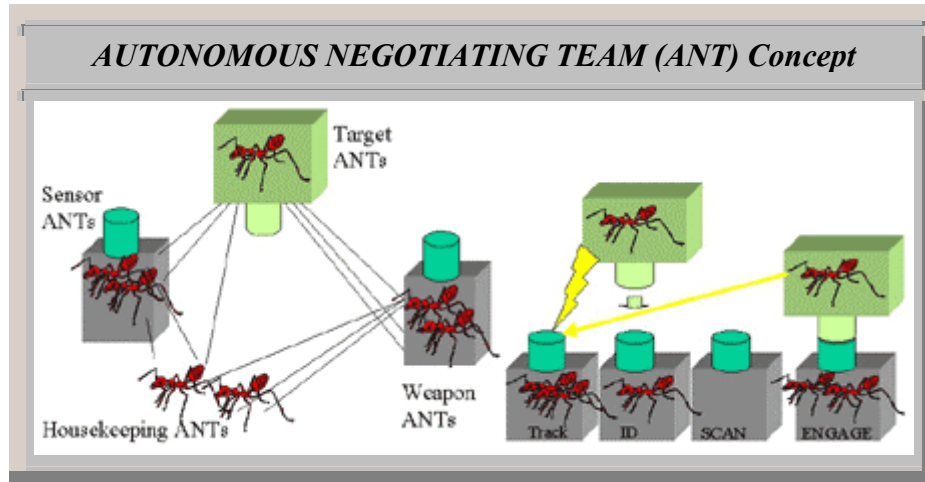
AUTONOMOUS NAVAL SUPPORT ROUND (ANSR) - A rocket-assisted gun projectile that has long range, high speed, and great accuracy. Its accuracy is provided by a miniaturized guidance package that combines Global Positioning System (GPS) and inertial-sensor technologies. The ANSR destroys its targets by dispensing metal fragments embedded in a composite matrix. See also ADVANCED GUN SYSTEM (AGS), BARRAGE ROUND.

AUTONOMOUS NEGOTIATING TEAM (ANT) - The automated negotiation among units to assign and customize resources and weapons to tasks such as moving targets. ANT's will emphasize local, rather than global, information for mission accomplishment.

NOTE: A system, based on ANT, has been developed to assist in the decision-making process for management of combat air squadrons. Here, the individual ANT modules

represent different concerns and goals. The modules communicate with each other, share information, and overrule or yield according to a set of predetermined priorities. The result is a set of alternative schedules for air operations.

AUTONOMOUS NEGOTIATING TEAM (ANT)



AUTONOMOUS TARGET RECOGNITION (ATR) - The ability of a weapon to locate and engage a target without data updates or guidance from external sources. ATR involves automated highspeed signal or imaging processing, rapid data base management and high fidelity classification and correlation. Contrast with MAN-IN-THE-LOOP SYSTEMS.

See also BRILLIANT AMMUNITION, SMART WEAPON. NOTE: There are three primary components of ATR: algorithms, processors, and sensor technology.

AUTONOMOUS UNDERWATER VEHICLE (AUV) - A sub-group of UNMANNED UNDERWATER VEHICLES consisting of autonomous, untethered craft that can execute a variety of missions, generally of the type too dangerous for manned submersibles or divers. Contrast with REMOTELY OPERATED VEHICLE.

AUTONOMOUS UNTETHERED VEHICLE (AUV) - An AUTONOMOUS UNDERWATER VEHICLE (also AUV) designed to operate at ocean depths as great as 13,000 feet. Also called INNER SPACE SATELLITE.

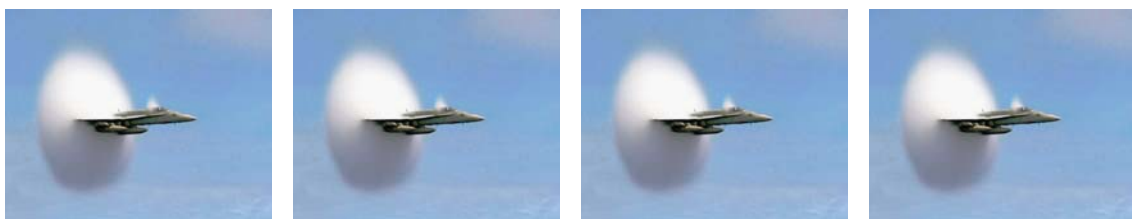
AUTOVON - See AUTOMATIC VOICE NETWORK.

AUTOVON WIDEBAND - See COMBAT CIDERS.

AVATAR - In a VIRTUAL ENVIRONMENT, a three-dimensional image (which may also include live video) that serves as a stand-in for the person who controls it. Its motions, gestures, and speech may be derived from the user's voice, keyboard, or other input device. More generally, an avatar is a representation of any object functioning in a virtual world, and so its meaning may cover graphical representations of BOTs and AGENTS.

AVIONICS - All of the electronics systems contained in an aircraft. NOTE: Click Keoz2.com-Business Vertical Portal: <http://keoz2.com/> for a Web directory on aviation and avionics.

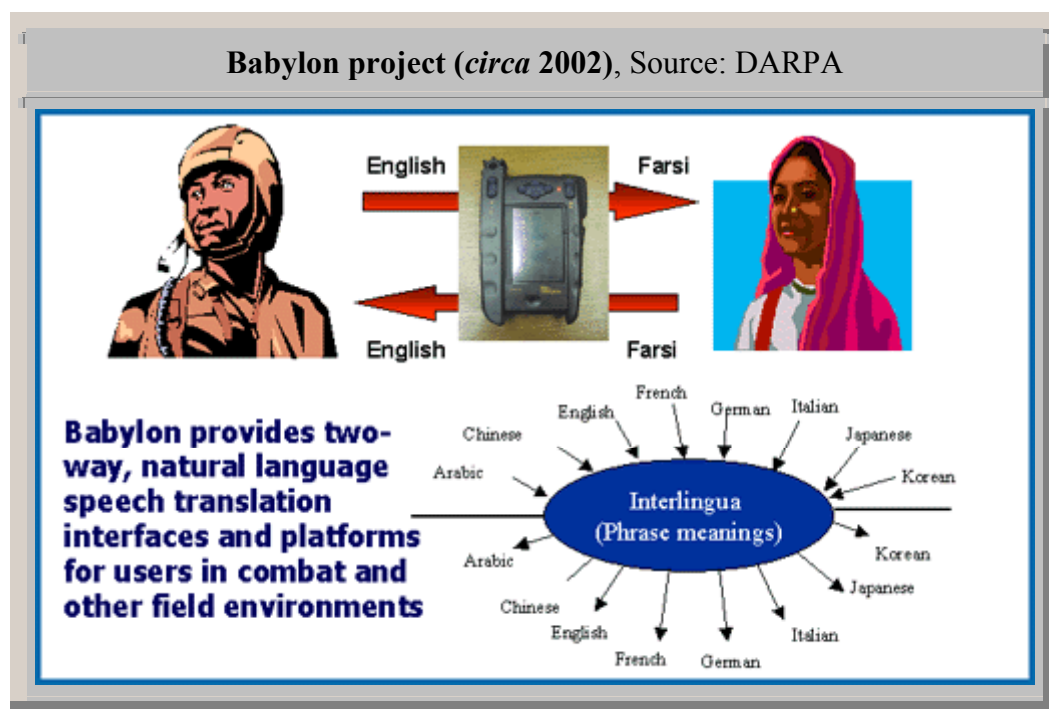
AZIPOD - The Azipod system is an azimuthing electric propulsion drive where the propulsion motor is installed inside a submerged azimuthing (unlimited 360 degrees) pod and coupled directly to an extremely short propeller shaft. The variable speed electric (AC/AC) drive produces smooth torque over the entire ship's speed range including zero speed. NOTE: In addition to savings in weight, space and construction hours, Azipods eliminate the need for rudders, long shaft lines, steering gear, conventional drive units and stern thrusters, thus occupying less overall space on-board the vessel. They are also designed to make the ship easier to steer and maneuver, while achieving fuel savings through improved hydrodynamic efficiencies.



B

BABBLE JAMMING - A communications jamming technique that superimposes previously recorded signals with existing signals.

BABYLON - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to develop rapid, two-way, natural language speech translation interfaces and platforms for the warfighter for use in field environments for force protection, refugee processing, and medical triage. NOTE: (2002) Babylon will build and deploy palm-sized PDA devices (12 hour battery endurance) that will provide one-way speech translation for four target languages: Pashto, Dari, Arabic, and Mandarin.



BACKBONE - The top level in a hierarchical network. STUB NETWORKS and TRANSIT NETWORKS, which connect to the same backbone are guaranteed to be interconnected.

BACK DOOR - A "hole" in the security of a system which was deliberately left in place by designers or maintenance personnel, thus allowing privileged access by these people. Synonymous with TRAP DOOR and WORMHOLE.

NOTE: A BACK DOOR, of course, is a vulnerability subject to discovery by HACKERS and CRACKERS with danger of exploitation by the latter.

BACK-DOOR COUPLING - Any technique used to access the target system by media other than the one for which the system was designed. Contrast with FRONT-DOOR COUPLING. See also BACK-DOOR SYSTEM PENETRATION.

BACK-DOOR SYSTEM PENETRATION - A DIRECTED ENERGY WEAPON term to indicate energy entering a target system through its apertures and enclosure seams. Back door penetration is most effective at the resonant frequency of the enclosure opening. Contrast with FRONT-DOOR SYSTEM PENETRATION. See also BACK- DOOR COUPLING.

BACKGROUND MATCHING - Blending an object into its background. See also ELECTRO-OPTIC PAINTING, RADAR CAMOUFLAGE, YEHUDI.

BACKLIGHT - In LIQUID CRYSTAL DISPLAYs (LCDs), a lamp positioned behind a transmissive liquid LCD designed for direct viewing, as is the case for virtually all laptop-computer displays. The PIXELs of the LCD have varying degrees of opacity, which controls how much light from the backlight reaches the viewer from each point on the screen. Contrast with FRONTLIGHT.

BACK LOBE - A radiation SIDE LOBE whose axis makes an angle of approximately 180 degrees with respect to the axis of the MAJOR LOBE of an antenna.

BACKSCATTER - Energy reflected in a direction opposite to that of the INCIDENT WAVE. Compare with RETROREFLECTION. Contrast with FORWARD SCATTERING. See also SCATTERING, RADAR SCATTERING.

BACKSCATTERING - Radio wave propagation in which the direction of the incident and scattered WAVES, resolved along a referenced direction (usually horizontal), are oppositely directed. A signal received by backscattering is often referred to as BACKSCATTER. See also SCATTERING, RADAR SCATTERING.

BACKSCATTER RADAR (BSR) - A RADAR that detects BACKSCATTER.

BACKSCATTER SOUNDER (BSS) - A RADAR that measures the characteristics of the ionosphere at the point where refraction of the radar waves occurs.

BACKTRACKING - See WEAPON BACKTRACKING.

BACK TELLING - Transferring information from a higher to a lower echelon of command. See also CROSS TELLING, FORWARD TELLING, OVERLAP TELLING, RELATERAL TELLING, TRACK TELLING.

BAGPIPES - A communications jamming technique consisting of repeated multiple tones. (HEAR the sound of bagpipes at <http://www.milspec.ca/jammers/audio/bagpipes.ra>)

BALACLAVA - A head concealment (hood and face cover), usually for urban snipers, which can be coated with Kevlar, NOMEX[®], or polypropylene for protection against knife cuts and/or fire. Also called NINJA MASK or NOMEX[®] HOOD. See also DRAG BAG, SNIPER FACE VEIL, GHILLIE SUIT.

BALANCED TECHNOLOGY INITIATIVE (BTI) - A program created by Congress to accelerate focused research into innovative ways to maintain conventional defensive capabilities.

BALLISTIC MISSILE DEFENSE (BMD) - A missile defense program shared among the nation's military services and some allies, mainly the United Kingdom and Israel. The concept is a layered approach: Boost-phase defenses, *e.g.*, AIRBORNE LASER; Upper-tier (area) defenses, *e.g.*, THEATER HIGH-ALTITUDE AERIAL DEFENSE (Thaad); and Lower-tier (point) defenses, *e.g.*, Patriot.

BALLISTIC MISSILE DEFENSE COUNTERMEASURES (BMDCM) - Actions taken to alter ballistic missile characteristics with tactics or devices intended to hinder or prevent ballistic missile defense systems from identifying or hitting the incoming missiles.

These include EVASIVE MANEUVERS BMD COUNTERMEASURES, FALSE-TARGET BMD COUNTERMEASURES, SHROUDING BMD COUNTERMEASURES, SUBMUNITION BMD COUNTERMEASURES, TRAJECTORY BMD COUNTERMEASURES.)

BALLOON REFLECTOR - A balloon supported CONFUSION REFLECTOR to produce fraudulent ECHOES.

BALLUTE - Acronym for Balloon + Parachute. Ballutes are deployed from the tail section of certain bombs to permit the launching aircraft to achieve a safe separation before the bomb (*e.g.*, cluster bomb) detonates.

BALUN - (BALanced to UNbalanced transformer) A passive device having distributed electrical constants used to couple a balance system or device to an unbalanced system or device.

BAND PASS (BANDPASS) - The number of cycles per second [Hertz] expressing the difference between the limiting frequencies at which the desired fraction (usually half-power) of the maximal output is obtained. See also BANDWIDTH.

BANDPASS FILTER (BAND PASS FILTER) - (1) A WAVE FILTER with a single transmission band, neither of the cutoff frequencies being zero or infinity. (2) A FILTER that allows a select range of frequencies to pass while attenuating all frequencies outside the range.

BAND STOP FILTER - See FILTER.

BANDWIDTH - The range of frequencies within which performance, with respect to some characteristic, falls within specific limits.

BANDWIDTH EXPANSION - An ECCM technique that enhances a DOPPLER RADAR's ability to quickly reacquire a signal after it is lost through VELOCITY GATE WALK OFF jamming.

BAR CODE - A printed code consisting of a series of dark and light bars organized, according to specific rules, into various patterns, which represent letters, numerals, and other symbols. NOTE: Information conveyed by a bar code is due to the numbers of bars, their spacing, and relative widths of both the bars and spacing between bars.

BARRAGE JAMMING - (1) Simultaneous electronic jamming over a broad band of frequencies. (2) Noise jamming spread in frequency to deny the use of multiple radar frequencies to effectively deny range information. See also BROADBAND CHAFF, CLICK JAMMING, ELECTRONIC JAMMING.

BARRAGE ROUND - A naval gun round encased by sabots, which fall away from the shell as it leaves the muzzle of the gun, thus achieving longer range (*e.g.*, 40 nautical miles from a 5-inch gun). See also ADVANCED GUN SYSTEM (AGS), AUTONOMOUS NAVAL SUPPORT ROUND. NOTE: When a barrage round explodes, it dispenses a large number of small metal arrows.

BARREL-LAUNCHED ADAPTIVE MUNITION (BLAM) - A self-correcting bullet containing a PIEZOELECTRIC ceramic actuator that tilts the round's nose to correct for wind drift and provide sufficient lift to compensate for gravity's pull. Also called SMART BULLET. NOTE: A BLAM round can provide a doubling of range and a 15-fold increase in accuracy.

BASILAGE - The marking of a route by a system of dim beacon lights enabling vehicles to be driven at near daytime speed, under blackout conditions.

BATCH FILE - A computer program consisting of an ASCII text file containing several DOS commands. When the file is run, each line (DOS command) is executed serially. See also DOS.

BATTLE DAMAGE ASSESSMENT (BDA) - A determination, using both active and passive sensors, as to whether a target was destroyed. (See also ELECTRONIC WARFARE EFFECTIVENESS ASSESSMENT.)

BATTLE SPACE - (1) (AAW) Airspace in which enemy aircraft and airborne weapons can be detected, targeted, engaged and destroyed. (2) (General - Joint) The multi-dimensioned space (*e.g.*, air, land surface, sea, subsurface, space) in which military operations are conducted. Also written as BATTLESPACE.

BATTLECUBE - A COPERNICUS term. The battlecube is a conceptual, multi-dimensional area [*sic*] that includes subsurface, surface, air and space as the environment for conducting warfare.

BATTLEFIELD COMBAT IDENTIFICATION SYSTEM (BCIS) -

An all-weather, digitally encrypted question/answer system used as a "friend or foe" system. BCIS includes an interrogator mode and a transponder mode. In the interrogator mode, the device sends an encrypted signal to a targeted vehicle to verify its "friend or foe" status. If the targeted vehicle is equipped with BCIS, the transponder will automatically reply with a coded signal identifying it as a "friend." See also IDENTIFICATION FRIEND OR FOE.



BATTLEFIELD UNIVERSAL GATEWAY EQUIPMENT (BUG-E)

- Equipment used to link dissimilar networks so that they can share data. (NOTE: For example, (2003) an F-16 equipped with Link 16 and an A-10 close support aircraft using the Situational Awareness Datalink (SADL) cannot normally share information. BUG-E can connect both aircraft, so that close air support will be able to access the location of Army units on the battlefield.

BATTLESPACE PREPARATION AUTONOMOUS

UNDERWATER VEHICLE (BPAUV) – An AUTONOMOUS

UNDERWATER VEHICLE (AUV) designed to travel a pre-set course loaded into its program. The ship-crane launched BPAUV is equipped with a side scan sonar, and is able to detect and classify mine-like contacts ahead of the controlling ship. The ten-foot long 21 inches wide BPAUV weighs 800 pounds (1,000 wet). It is powered by lithium polymer batteries, and has an operational speed of 3 knots. NOTE: The

BPAUV is intended (2003) to reduce the vulnerability to critical mine countermeasure ships and help shorten the tactical time-line associated with surface mine-hunting.

BAUD - A unit of measure for data transmission speed. It represents the number of signal elements (typically bits) transmitted per second. (Named after the French engineer and telegrapher, Maurice-Emile Baudot, a baud is unit of signaling speed equal to the number of discrete conditions or signal events per second.)

NOTE: "baud" and "bits per second (bps)" are not synonymous. Typical earlier baud rates are 300, 1200, 2400, 4800, 9600, and 19200.

BAYESIAN NETWORK CLASSIFIER (BNC) - An ARTIFICIAL INTELLIGENCE submarine ID/classification system which uses FUZZY LOGIC to identify and classify various threat families of submarines.

BEACH-ZONE ARRAY (BZA) - An explosive neutralization system used to clear a beach of mines. See also LINE CHARGE (LC), SURF-ZONE ARRAY (SZA)

BEACONING EFFECT - The extending of the surveillance range of a radar due to a target's premature employment of JAMMING.

BEAM-AWAY SHOT - A missile launch at a target from the side opposite to that toward which the target is turning. Contrast With BEAM-TOWARDS SHOT, HEAD SHOT, TAIL SHOT.

BEAM DIAMETER - The distance between two diametrically opposed points at which the irradiance is a specified fraction of the beam's peak irradiance; most commonly applied to beams that are circular or nearly circular in cross section. Synonymous with BEAMWIDTH.

BEAM-PLASMA DEVICE - A broadband high-powered microwave generator that employs the interaction of relativistic electrons and plasma. See also FREE-ELECTRON LASER; GYROTRON; VIRTUAL-CATHODE OSCILLATOR.)
NOTE: Beam-plasma devices have potential for use as DIRECTED ENERGY WEAPONS.

BEAM SQUINT - A phenomenon where the MAIN LOBE of a radiation pattern moves away from the desired angle with changes in operating frequency.

NOTE: BEAM SQUINT limits the array's instantaneous bandwidth and (in 1994) precludes the use of phased arrays in wide band applications such as target-ID radar and spread-spectrum communication systems.

BEAM-TO-BEAM CORRELATION - An ECCM technique used with phase or frequency scan radars employing multiple overlapping beams. Signals that do not correlate with those on adjacent beams are rejected by the radar.

BEAM-TOWARDS SHOT - A missile launch at a target from the side toward which the target is turning. Contrast with BEAM-AWAY SHOT, HEAD SHOT, TAIL SHOT.

BEAMWIDTH (BEAM WIDTH) - The angle between the directions, on either side of the axis, at which the intensity of the radio frequency field drops to one-half the value that it has on the axis. Synonymous with half-power beam width. See also BEAM DIAMETER.

BEAN BAG BATON - A NONLETHAL WEAPON consisting of an aluminum baton which utilizes an air cartridge to fire a bean bag filled with lead shot at 300 ft/sec.

BEARING RESOLUTION - (1) The ability of the radar equipment to separate two reflecting objects at identical ranges, but at different bearings (azimuths) from the antenna. (2) The ability to distinguish between two targets solely by the measurement of their bearings (azimuths from the radar); usually expressed in terms of the minimum angle by which two targets of equal strength at the same range and elevation angles must be spaced to be separately indistinguishable. See also RANGE RESOLUTION, RESOLUTION, TARGET DISCRIMINATION.

BEEPS AND SQUEAKS - A tongue-in-cheek reference to ELECTRONIC WARFARE.

BEHAVIORAL BIOMETRICS - BIOMETRICS which include voiceprints, handwritten signatures and key stroke/signature dynamics.

BENT-PIPE COMMUNICATIONS - Communications via earth-to-space-to-earth relay.

BICONICAL ANTENNA - An antenna consisting of two cones, positioned tip-to-tip, and fed at the apex.

BIFRINGENT FILTER - An optical filter, used in TUNABLE LASERS, that consists of several plates of optical material that exhibits double refraction, or birefringence. The frequency of the outgoing laser beam is determined by the angle of the incoming beam with respect to the optical axis of the filter.

BIG BEE PROJECT - An Advanced Research Projects Agency (ARPA) project (ca 2000) examining the feasibility of employing bees to detect explosives, nerve gas, pesticides and land mines. One concept entails the marking of bees with TNT detecting bacteria. If the marked bee flies in the vicinity of TNT, the bacteria will react by assuming a glow which is detectable when the bee returns to its hive. Other especially-trained bees, marked with RF tags, can then be used to fly and remain at the site, thus marking the location of the TNT and allowing for its disposal.

BINARY-PHASE-CODED CONTINUOUS-WAVE RADAR - A LOW PROBABILITY-OF-INTERCEPT (LPI) RADAR which has a PSEUDORANDOM

phase-coded MODULATION on a transmitted CONTINUOUS-WAVE (CW) SIGNAL.

BIOMATERIALS - That category of MATERIALS TECHNOLOGY which addresses materials that function in biological application (e.g., medical implants) or are derived through biological types of processes (e.g., spider silk).

BIOMETRIC DEVICE - A device, which identifies people through unique body characteristics. NOTE: Biometric devices include those which can identify hand-geometry, fingerprints, retinal patterns, signatures, and voice-prints.

BIOMETRICS - The automatic identification of a person based on his/her physiological or behavioral characteristics. Refer to the table below for a list of biometric technologies. Biometrics fall into two categories: PHYSIOLOGICAL BIOMETRICS and BEHAVIORAL BIOMETRICS. NOTE: The person to be identified is required to be physically present at the point-of-identification.

<u>BIOMETRIC TECHNOLOGIES</u>
Dynamic Signature Verification (DSV)
Face Geometry
Finger Scan
Hand Geometry
Iris Scan
Keystroke Dynamics
Speaker Verification
Retina Scan

BIOMIMETICS - Techniques to develop novel synthetic materials, processes and sensors through advanced understanding and exploitation of design principles found in nature. NOTE: An example includes genetically engineered high-strength silk fibers. These fibers, which are about 5 microns in diameter, are 100-percent tougher than Kevlar aramid fibers. See also NANOSCIENCE

BIO-OPTIC SYNTHETIC SYSTEM (BOSS) - An optical system, which is biologically-inspired, such as a lens with a dynamically controllable field of view (emulating, for example, the crystalline fisheye lens which is remarkably compact and possesses a varying index of refraction for a wide field of view and control of spherical aberration.)

BIORADAR - A RADAR device, which helps in searches for buried persons. It can measure heart frequency and breathing up to 3 meters under snow and rubble. It can also detect persons in buildings from the outside, even through stone walls up to 6 meters thick.

BIO-SURVEILLANCE - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to develop the information technologies and resulting prototype capable of automatically detecting covert releases of biological pathogens.

BIRDNESTING - A term describing poor chaff dispersal caused by adhesion between DIPOLES and entanglement due to lack of stiffness. Contrast with JACKSTRAWING.

BISTATIC CLUTTER JAMMING - A jamming technique that exploits GROUND CLUTTER in the vicinity of the victim radar. High power, generally CONTINUOUS WAVE, generated by the jammer is reflected from multiple points and enters the radar receiver through its antenna SIDE LOBES and BACK LOBE.

BISTATIC INTERCEPT - An intercept technique by which electromagnetic radiation is unintentionally reflected by objects such as missiles in flight, or even the moon, and received by an ELINT receiver.

BISTATIC RADAR - A radar using antennas at different locations for transmission and reception. Contrast with MONOSTATIC RADAR. See also RELOCATABLE OVER-THE-HORIZON RADAR, SPACE TO AIR BISTATIC RADAR.

BISTATIC RADAR ESM - A technique involving the use of an ESM receiver to exploit transmitters of opportunity - both friendly and hostile - for detecting targets.

BISTATIC RADAR INTELLIGENCE GENERATION AND ANALYSIS DEVELOPMENT (BRIGAND) - Forerunner of an ECM technique involving the "stealing" of a victim radar's picture, so that the ECM operator is able to replicate the victim radar's display in REAL TIME.

BIT - A contraction of the term "binary digit," a unit of information represented by either "0" or "1". See also BYTE, DIBIT.

BLACK CHAFF - See ABSORPTIVE CHAFF.

BLACK-HAT HACKER - A HACKER who, for illegal purposes, exploits publicly-exposed (*i.e.*, on the Internet) software security flaws posted by GRAY-HAT HACKERS. See also HONEYPOT.

BLACK LAYER TECHNOLOGY - The use of optical interference using a thin-film structure in display devices to provide contrast in sunlight and a night vision capability, resulting in usability from full sunlight to total darkness.

BLACK NETWORK - A PACKET-SWITCHED NETWORK that carries both the data secured by BLACKER FRONT ENDS (BFEs) and any other unsecured data. [Nortel Networks Technical Documentation Web Site: <http://support.baynetworks.com/library/tpubs/docsrt.htm> 11/2000]

Contrast with RED VIRTUAL NETWORK.

BLACK PROGRAM - A highly classified weapon system acquisition program, generally requiring special security clearances and facilities for contractors and others involved with the program.

BLACKBOARD - A component of an EXPERT SYSTEM. The blackboard records intermediate hypotheses and decisions (*i.e.*, plans, agenda, and solution elements) that the expert system manipulates. NOTE: An expert system containing a blackboard is sometimes called a BLACKBOARD SYSTEM.

BLACKER FRONT END - A classified encryption device used to communicate across unsecured wide area networks (WANs). [Nortel Networks Technical Documentation Web Site: <http://support.baynetworks.com/library/tpubs/docsrt.htm> 11/2000]

See also RED VIRTUAL NETWORK.

BLANKET SHIELD - A set of DECOY devices designed to deny all detailed information about an incoming force. See also CHAFF CORRIDOR, ELECTROMAGNETIC OBSCURANT.

BLANKING - A generic ECCM technique that blanks out part of a jammed radar's received signal on the basis of time, phase, frequency, or direction in order to decrease jammer effectiveness.

BLINDING LASER - A NONLETHAL WARFARE weapon consisting of a laser intended to overload, destroy or degrade optics or target-acquisition electronics from the air, sea or land. See also ANTI-AIR LASER.

BLIND SOURCE SEPARATION (BSS) - An algorithmic method of singling out useful signals from a mix of incoming Internet traffic.

BLINKING - NARROWBAND JAMMING by two sources in the same angular cell of the victim radar. The jamming is alternated between sources causing the radar system to oscillate (between targets). Too high a blinking frequency can allow the tracker to average the data while too low a frequency will cause the missile to home in on one of the jammers.

BLIP - The display of a received pulse on a CATHODE RAY TUBE.

BLIP ENHANCEMENT - The augmentation of a radar signal. **(1)** An ECM technique to make a small target appear much larger to the victim radar. **(2)** An ECCM technique to enhance real targets in the presence of JAMMING or CLUTTER.

BLUE - A term used to indicate friendly. For example, BLUE FORCES, blue systems, BLUE-ON-BLUE. Contrast with GRAY, ORANGE FORCES, PURPLE FORCES, RED FORCES.

BLUE FORCES - Those forces used in a friendly role during NATO exercises.

BLUE-ON-BLUE - Friendly forces engaging other friendly forces.

BLUE SCREEN OF DEATH - On a computer display, a blue screen, sometimes displaying computer code, which appears when the operating system crashes and must be rebooted.

BLUETOOTH™ - A standard for wireless connections among Personal Computers (PCs), mobile phones, Personal Digital Assistants (PDAs), and Personal Area Network (PAN) devices at relatively low data rates over short distances using very little power.

NOTE: Bluetooth™, named after a 10th century Viking king., deals with devices using Frequency Hopping Spread Spectrum (FHSS) in the 2.4 GHz band. Its range is limited to about 10 meters.

BLUNT IMPACT MUNITIONS - NONLETHAL WEAPON munitions consisting of rubber balls, rubber pellets, finned rubber projectiles, bean bags, shot bags (e.g., SOFT RAGS, STINGBAGS), etc. which are fired at low velocity, with a range of 10-50 meters.

BODY BLIND - See GHILLIE SUIT.

BODY VEIL - See GHILLIE SUIT.

BOGEY WHEEL - One of a number of modern tank-tread double-wheels; bogey wheels put traction weight on the tank's tracks. NOTE: On a modern tank, beginning from the rear, the drive wheel is connected to the cross-drive transmission. The next five (double) wheels put traction weight on the tank's track - these are called *Bogey Wheels*. The front-most wheel is the idler wheel, which maintains the tank track's tension, going in and out as the tank goes over objects.

[Thanks to former tank-battalion commander, COL Dick Meyer, USA (Ret) for this insight]

BOL - A Swedish CHAFF countermeasures dispenser for aircraft self-protection. An electromechanical drive mechanism feeds the payload packs towards the rear of the dispenser, where one pack at a time is released into the air stream, creating a large chaff cloud in a very short time. BOL can carry IR (e.g., HOT

CHAFF) or RF chaff, and a boasts a high capacity payload (*e.g.*, 160 packs per dispenser), giving pilots a sustained defensive capability.

BOLO - A NONLETHAL WEAPON consisting of a shotgun round holding three rubber projectiles connected by 5.5 foot high-strength cords. The bolo is designed for use against fleeing target individuals, where a target hit by any of the balls will cause the other balls to wrap the cord around the legs of the individual.

BONDING - In electrical engineering, the process of connecting together metal parts so that they make low resistance electrical contact for direct current and lower frequency alternating currents. See also EARTHING, GROUNDING.

BOOST GLIDE VEHICLE (BGV) - A hypersonic maneuverable aircraft-type weapon delivery system. Launched from an aircraft, the boost glide vehicle rapidly boosts ballistically through rocket assistance to the exoatmosphere, where it porpoises along the top of the atmosphere, gliding to the target area. Upon reaching the target area, it dives, maneuvering as needed to home on the target.

NOTE: The boost glide vehicle is guided by a combination of remote control and terminal homing. Consequently, it is effective against maneuvering targets.

BORESIGHT - (1) The physical direction of the main lobe of an antenna array. (2) To align a directional antenna, using either an optical procedure or a fixed target at a known location.

BOT - A word derived from "robot", signifying a software program designed to independently carry out tasks in unknown networked environments; a more limited AGENT. See also SPIDER.

BOUNCE JAMMING - The use of large flat objects or smooth earth features, such as ice, to act as reflectors for reradiating jamming signals into victim radars. Synonymous with TERRAIN BOUNCE.

BOUNDING NON-LETHAL MUNITION (BNLM) - A NONLETHAL WEAPON tactical area denial munition for site security and perimeter defense. The payloads produce an audible alert signal to friendly forces within a range of 200 meters.

BOUQUET MINE - One of several in a "bouquet" of mines attached to a common sunken mooring site. When one mine is activated or released from its tether, then it is replaced by another liberated (and tethered) from the anchored site.

BOW-TIE ANTENNA - A type of BICONICAL ANTENNA in which the cones are collapsed into two-dimensional triangular dipoles.

BRAGG CELL - A thin slab of transparent crystal (such as tellurium oxide) with one or more piezoelectric transducers attached. A microwave signal excites the transducer to create a sound wave in the crystal at the microwave's frequency. The

PIEZOELECTRIC EFFECT generated by the sound wave changes the crystal's optical index of refraction, also at the microwave frequency. These changes in the optical index diffract a portion of the incident light beam so that two beams emerge from the crystal - an un-diffracted beam exiting at the angle of entry, and a diffracted beam exiting at an angle proportional the frequency of the sound wave. See also ACOUSTO-OPTICS.

BRAIN-COMPUTER INTERFACE (BCI) - A system which allows the user to interact with a VIRTUAL-REALITY environment using brain waves.

BREAK LOCK - In a TERMINAL DEFENSE situation: The condition where a homing sensor or fuze loses the target which it has had a lock-on. If so configured, the sensor will revert to a search mode to regain a lock-on its target. Contrast with BREAK TRACK.

BREAK TRACK - In a situation other than TERMINAL DEFENSE: The condition where a tracking or acquisition sensor loses the target which it has been tracking. If so configured, the sensor will revert to a search mode to re-locate its target. Contrast with BREAK LOCK.

BREATHABLE BANDWIDTH - The dynamic allocation of bandwidth to accommodate voice, video, local, and wide area network traffic streams.

BRIGADE SUBSCRIBER NODE (BSN) - A ground communications system intended to complement the Mobile Subscriber Equipment (MSE). It consists of two high mobility multipurpose-wheeled vehicles and a towed generator. One vehicle houses switches and routers in a shelter on its back, while the second transports the antenna array.

BRILLIANT AMMUNITION - A generic classification of munitions. Brilliant ammunition is autonomous; it is able to recognize (distinguish target type - tank, truck, etc.) and classify (target class - M-60, T-1, etc.) its own target. Contrast with DUMB AMMUNITION, SMART AMMUNITION. See also BRILLIANT MUNITION, BRILLIANT ANTIARMOR MUNITION (BAT.)

BRILLIANT ANTIARMOR MUNITION (BAT) - A weapon which, when released, deploys four wraparound tail fins and four straight cruciform gliding wings near mid-body. The nose of the BAT contains an INFRARED (IR) sensor and the wingtips contain acoustic sensors. After deployment, the BAT glides to a preprogrammed target location with other BATs (in a manner to ensure that they do not attack the same targets.) The BAT uses its acoustic sensors to identify the general location of an armored vehicle after which the IR sensor takes over to direct the BAT to hit the target directly from the top, destroying it with a two-stage penetrating warhead. See also HARD TARGET SMART FUZE (HTSF.)

BRILLIANT MUNITION - A many-on-many munition that operates autonomously to search for, detect, identify, acquire, and attack specific classes of targets. The sensor on each munition acquires and attacks one among the class of

targets, so that in a battlefield situation two munitions may attack the same target leaving others inviolate.

Contrast with GUIDED MUNITION and SMART MUNITION. See also BRILLIANT ANTIARMOR MUNITION (BAT), SENTIENT MUNITION.

BRILLIANT PEBBLES - Space-based interceptors with built-in sensors and navigation systems for intercepting ballistic missiles before they can deploy warheads and DECOYS.

BROACHING UNIVERSAL BUOYANT LAUNCHER (BUBL) - A universal weapon encapsulation launcher that permits any payload - including present and future missile and unmanned aerial vehicles (UAVs) - to be deployed from any submarine under any operating conditions.

BROADBAND CHAFF - CHAFF consisting of DIPOLES cut to various wavelengths. See also BARRAGE JAMMING.

BROADBAND JAMMING - See BARRAGE JAMMING

BROADBAND METROPOLITAN AREA NETWORK (BMAN) - A NETWORK consisting of a high-BANDWIDTH fiber-optic ring encircling a city.

BROADBAND MICROSTRIP ANTENNA - A MICROSTRIP ANTENNA that combines the broadband performance typical of spiral and sinuous antennas with the surface mount capabilities, efficiency and low cost of microstrip antennas.

BROADBAND MICROWAVE ABSORPTION - A decrease in reflection of microwaves, caused by coatings of material whose electrical and magnetic properties have been altered to allow ABSORPTION of microwave energy at multiple frequencies. Contrast with RESONANT MICROWAVE ABSORPTION.

BROADBAND NOISE - In acoustics, the noise generally produced by a ship's motion through the water and the cavitations of its propeller across a wide BANDWIDTH usually in the lower- frequency spectrum. Contrast with NARROWBAND NOISE.

NOTE: Generally, broadband noise provides longer-range detection opportunities than narrowband noise, but is less useful for identification.

BROWSER - A short term for WEB BROWSER.

BRUTE FORCE JAMMING - A collective term, which applies to three following types of noise jamming: BARRAGE JAMMING, NARROWBAND JAMMING, and SWEPT NOISE JAMMING.

BUBBLE MEMORY - A solid-state NON-VOLATILE RAM device. Bubble memories store data in the form of cylindrical magnetic domains, or bubbles, in a thin

film of magnetic material on base, such as a garnet wafer. Bubbles are created from electrical signals by a bubble generator within the memory and reconverted to electrical signals by an internal detector. Unlike other non-volatile magnetic media forms, the memory domain does not wear out.

NOTE: Bubble memories possess the following desirable characteristics: **(1)** Wide operating temperatures; **(2)** resistance to mechanical shock and vibration; **(3)** data retention and reliability; **(4)** immunity to strong magnetic fields and electrostatic discharge; **(5)** inherent radiation hardness; **(6)** immunity to dust and chemical pollutants; and **(7)** secure instant erasure with a single write-over operation.

BUCKMINSTERFULLERENES - A class of materials that stems from the production of substantial quantities of Carbon 60, and used in the design of devices at the molecular level (nanostructures that bring engineering towards the atomic level.) See also FULLERENE.

BUCKY BALL - See FULLERENE.

BUCKY TUBE - A carbon "wire" of molecular diameter designed to connect molecular components, such as ROTAXANES. Bucky tubes possess structural rigidity and demonstrate remarkably consistent electrical behavior. In fact, they exhibit essentially metallic behavior and conduct via well-separated electronic states, remaining coherent over the distances needed to interconnect various molecular computer components. Also called QUANTUM WIRE or CARBON NANOTUBE.

See also FULLERENE, MOLECULAR ELECTRONICS. NOTE: Bucky tubes have 10 to 100 times the strength of steel at a fraction of the weight.

BUFFER MANAGEMENT - See CRITICAL CHAIN SCHEDULING (CCS).

BUOY CAMERA SYSTEM (BCS) - A submarine-launchable device to allow submerged submarines the capability to remotely view the surface while remaining at depth or located some distance from the device. The BCS uses a remotely controlled optical sensor that operates just above the sea surface to acquire optical image data available at the surface. These data are then transmitted through a secure link to a moving submarine not necessarily in the same vicinity.

BURN-IN - The operation of equipment or components prior to their ultimate application; intended to stabilize their characteristics and to identify early failures.

BURN-OUT - Destruction of the junctions of a transistor due to extremely large currents caused by LATCH-UP.

BURN-THROUGH - The point at which the target SKIN ECHO becomes stronger than the received jamming/interference signal. See also BURN-THROUGH RANGE, CROSSOVER, JAM-TO-SIGNAL RATIO.

BURN-THROUGH RANGE - (1) The distance at which the specific radar can discern targets through the external interference being received. See also BURN-THROUGH.

(2) The range where the energy received from a noise jammer is no longer great enough to hide the SKIN ECHO.

BURN TIME - For a FLARE: The length of time that the radiative emission maintains or exceeds a defined level (*e.g.*, 50% of peak). For a ROCKET MOTOR: The length of time that the thrust of the motor is above a defined level.

BURSTING OBSCURANT SMOKE GRENADE - A NONLETHAL WEAPON consisting of a grenade that quickly produces a smoke cloud that can rise to 2-3 stories.

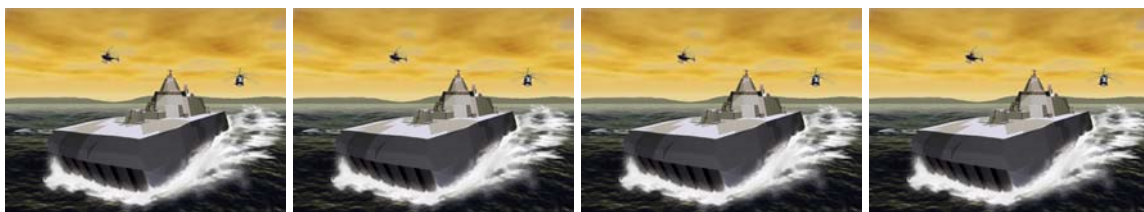
BUS - (1) A signal line or a set of lines used by an interface system to connect a number of devices and to transfer information. (2) A communication network consisting of a parallel data path within the computer system that is shared by many system components. (3) A set of conductors connecting various sections in a computer, or connecting the computer to a peripheral device.

NOTE: A bus is usually described by the "width" of the parallel data lines (conductors) available. Typical micro-computer busses are 8-, 16-, or 32-bits wide.

BUTLER MATRIX - (1) A complex microwave beam-forming network used in antennas. (2) Couplers connected together for the purpose of providing multiple inputs and outputs in an antenna feed array. (3) A phasing system for steering beams in a PHASED ARRAY ANTENNA.

BYEMAN - A compartmented classification system in which in which clearances are granted on a system-by-system basis. NOTE: SIGINT satellites may have BYEMAN compartments (*e.g.*, THYOLITE, AQUACADE, CHALET, VORTEX, JUMPSEAT, MAGNUM) for location, orbit, and other capabilities.

BYTE - A group of eight adjacent bits operated on as a unit.



C

C²-PROTECTION - See COMMAND AND CONTROL PROTECTION.

C²W - See COMMAND AND CONTROL WARFARE.

C³ - See COMMAND, CONTROL, AND COMMUNICATIONS.

C³CM - See COMMAND, CONTROL, AND COMMUNICATIONS COUNTERMEASURES.

C³I - See COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE.

C³I ERASING - See COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE ERASING.

C³-PROTECTION - See COMMAND, CONTROL AND COMMUNICATIONS PROTECTION.

C⁴I - See COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE.

CALMATIVE AGENT - A NONLETHAL WEAPON consisting of a chemical agent, sometimes called a SLEEP AGENT, that is transmitted through the skin and into the bloodstream.

CAMOUFLAGE - The use of natural or artificial material on personnel, objects or tactical positions with the aim of confusing, misleading or evading the enemy.

NOTES: (1) An interesting historical aspect of camouflage - artists and camouflage -- is addressed in the MIT Press Web site: Art and Camouflage: An Annotated Bibliography (2) An online database of camouflage used by USN warships during World War II, along with descriptions of various ship camouflage schemes, are provided in detail by Snyder & Short Enterprises at their web site: http://www.shipcamouflage.com/warship_camouflage.htm.

See also CHAMELEON CAMOUFLAGE.

CANTILEVERED CAVITY - A micromechanical feature, which allows a tunable device (e.g., TUNABLE LASER) to be tuned by moving a cantilever arm to change the dimensions of the (optical) tuning cavity.

CAPTOR - (acronym for "encapsulated torpedo.") CAPTOR is a deep-water mine designed to be laid by aircraft or submarine. When deployed, it is anchored to the ocean floor; upon detection of a hostile submarine, the CAPTOR launches a torpedo

at the target. [Navy CHINFO press release:
<http://www.chinfo.navy.mil/navpalib/factfile/weapons/wep-mine.html>]

See also QUICKSTRIKE and SUBMARINE LAUNCHED MOBILE MINE (SLMM.)

CARABAS - See COHERENT ALL-RADIO BAND SENSOR

CARBON BOMB - See CARBON FILAMENT BOMB

CARBON FILAMENT BOMB - A NONLETHAL WEAPON (NLW) in the form of a LASER GUIDED WEAPON consisting of a bomb that disperses numerous (100 - 200) canisters, each retarded in descent by a small parachute, and which eject spools of carbon which unravel and overlap to form carbon webs that are intended to drape over target power lines to cause a surge of current which will shut down the plant without damaging toxin-filled transformers. Also called CARBON BOMB.

CARBON NANOTUBE - See BUCKY TUBE.

CAREFREE MANEUVERING - A flight-control mode using dynamic coupling of an aircraft's stick-control computer and flight-control computer to provide maximum performance without risking out-of-control situations.

CARRIER WAVE (CW) - A WAVE having at least one characteristic that may be verified from a known reference value by MODULATION. Also called CARRIER.

CARNIVORE - A Federal Bureau of Investigation (FBI) e-mail wiretapping system consisting of a PACKET SNIFFER used to locate records (and only those records) in e-mail messages and INTERNET based telephony for which the FBI has received a court order.

NOTE: (1) The origin of the codename "carnivore" is explained as "Carnivore *chews* all the data on the network, but it actually *eats* the information authorized by a court order." (2) There is (2000) some controversy about the privacy implications of carnivore.

CASED TELESCOPED AMMUNITION - Ammunition in which the individual rounds contain the projectile inside the cartridge case rather than protruding from the case as with most ammunition. Also called TELESCOPED AMMUNITION.

CATHODE - In a VACUUM TUBE, the electrode through which a primary stream of electrons is generated, usually through THERMIONIC EMISSION.

CATHODE RAY TUBE (CRT) - A display device in which controlled electron beams are used to present alphanumeric or graphical data on an electro-luminescent screen. Contrast with FIELD EMISSION DISPLAY (FED.)

CC² - See CYBERSPACE COMMAND AND CONTROL

CD DESTRUCTION SYSTEM - See THIN FILM PYROTECHNICS.

CENTROID HOMING - When applied to ANTI-RADIATION MISSILES: the effect on a missile that has two or more radiation sources in its field of view causing it to home on the centroid of the power from the radiating sources. See also POWER CENTROID.

CENTROID TRACKING - Tracking systems, which discern dimensional extremities of the target and produce guidance information to cause the missile to impact in the center between two extremities.

CEP - See CIRCULAR ERROR PROBABLE

CERES - See CLOUDS and EARTH'S RADIANT ENERGY SYSTEM

CHAD - The confetti-like residue from punched cards and paper tape. To reduce the problems associated with the dust-like chad, some tape systems employed "chadless" tape on which the rectangular holes were punched on only three sides, thus allowing the sensing pins to function while the chads remained fixed to the tape.

CHAFF - (1) (DOD) Radar CONFUSION REFLECTORS, which consist of thin, narrow metallic strips of various lengths and frequency responses, used to reflect ECHOES for confusion purposes. Synonymous with WINDOW. See also ROPE.

(2) (NATO) Strips of frequency- cut metal foil, wire, or metallized glass fiber used to reflect electromagnetic energy, usually dropped from aircraft or expelled from shells or rockets as a radar countermeasure.

(3) An airborne cloud of lightweight reflecting objects typically consisting of strips of aluminum foil or metal-coated fibers, which produce CLUTTER echoes in a region of space.

CHAFF CONFUSION MISSION - A mission intended to overload the radar operator with chaff targets and interference so that he cannot accomplish timely recognition of, or provide reliable target data for, valid targets within those regions subjected to chaff induced CLUTTER.

CHAFF CORRIDOR - A continuous three-dimensional stratum of CHAFF, laid by aircraft, and from 15 to 50 miles in length. One use is to prevent radar tracking or acquisition of aircraft within the corridor.

CHAFF CORRIDOR MISSION - A mission intended to deny information to hostile systems regarding presence or absence of strike aircraft within the corridor and prevent tracking of air-craft entering the corridor. Synonymous with CHAFF SATURATION MISSION.

CHAFF DECEPTION MISSION - A mission intended to generate an appearance of targets and air activity on radars to induce commitment of forces against non-existent strikes.

CHAFF SATURATION MISSION - See CHAFF CORRIDOR MISSION.

CHAMELEON CAMOUFLAGE - Paint or uniforms that can change color to blend with the surrounding terrain. Tiny sensors and NANO-ELECTRONIC devices provide the color-change capability. Although intended to help minimize visibility, chameleon camouflage could also be adapted for application in the near-visual SPECTRUM, masking INFRARED SIGNATURES or other emissions.

CHANNELIZED RECEIVER - A SIGINT receiver, which uses multiple parallel channels to filter, amplify, and detect incoming emitter signals. NOTE: Channelized receivers allow a wide band of the spectrum to be simultaneously monitored for signal activity with excellent probability of intercept of multiple emitters.

CHARGED PARTICLE BEAM (CPB) - A DIRECTED ENERGY WEAPON (DEW) under DoD's WEAPONS SYSTEMS TECHNOLOGIES (WST). The generation, propagation and control of high-intensity electron beams designed to incapacitate the target through shock or thermal effects. [<http://www.dtic.mil>]

See also ANTIMATTER PARTICLE BEAM (APB), GAMMA-RAY LASER (GRASER), HIGH POWER MICROWAVE/RADIO FREQUENCY (HPM/RF), KINETIC ENERGY WEAPON (KEW) and NEUTRAL PARTICLE BEAM (NPB.)

CHAT - The employment of communications via computer keyboard and the Internet, as opposed to voice circuits. Chat is employed to exchange tactical information and provide SITUATIONAL AWARENESS (SA) as well as online help forums for troubleshooting. NOTE: A popular (2003) protocol for chat is the Navy's Internet Relay Chat (IRC.)

CHECKMATE - The USAF Operational Process Improvement Office, a high-level general planning group involved in computer-assisted air battle planning.

CHEMICAL/BIOLOGICAL (CB) WARFARE DEFENSE AND PROTECTION - The capability to detect and evaluate the existence of a manufacturing capability for weapons of mass destruction (WMD), and to identify and assess the weapon capability of alert and launched WMD on the battlefield to permit the appropriate level of counterforce and force protection to be executed promptly. [NAVWAR Joint War-fighting Science and Technology Plan (*circa* 2000)]

CHEMICAL AND BIOLOGICAL INTELLIGENCE (CBINT) - Intelligence pertaining to chemical and biological weapons and hazards.

NOTE: CBINT is a subcategory of MATERIALS INTELLIGENCE, encompassed by MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT.)

CHEMICAL LASER - A GAS-LASER DIRECTED ENERGY WEAPON which provided early lethality demonstrations, but is being supplanted by other laser devices. See also CHEMICAL OXYGENIODINE (COIL) LASER, DEUTERIUM FLUORIDE (DF) LASER, EXCIMER LASER, FREE-ELECTRON LASER HIGH ENERGY LASER, HYDROGEN FLUORIDE (HF) LASER, X-RAY LASER.)

CHEMICAL OXYGEN IODINE (COIL) LASER - The COIL laser differs from the HF LASER and DF LASER in that the excited iodine atom responsible for the lasing radiates only a single line at 1.325 μ m. This short wavelength reduces diffraction effects that limit the utility of other CHEMICAL LASERS. The COIL laser has been chosen for the AIRBORNE LASER (ABL) missile defense system.

CHEMICAL VAPOR DEPOSITION (CVD) DIAMOND - An agglomeration of small single crystals of diamond. The material is often deposited on silicon or molybdenum in the shape of a wafer about 1-mm thick. The diamond wafers then can be laser cut unto final shape. The physical properties of diamond - very high thermal conductivity and very high surface wave velocity of propagation - make it a useful material for thermal and microwave applications.

CHEMIRESISTOR - An array of miniature sensors that can detect volatile organic compounds (VOCs). Each sensor is made by mixing a commercial polymer in a solvent with conductive carbon particles. This fluid is deposited on electrodes that resemble wires that are attached to a micro-fabricated circuit. The polymers absorb VOCs and swell, changing the electrical resistance that the electrodes measure and record. The polymers revert to their original state when the chemicals are removed.

CHIRALITY - The property of a material that enables it to polarize, FILTER, or shield ELECTROMAGNETIC RADIATION. Chiral materials may have use in stealth applications because they are broadband, and are effectively invisible over a wide range of frequencies.

CHIRP - A technique for pulse compression, which uses frequency modulation (usually linear) during the pulse.

CHRISTI - An acronym for Coverage Height Reckoning Integrating Scabrous Terrain Information. CHRISTI is a computer model, which calculates the upper and lower bounds of a radar's line-of-sight coverage - radar coverage volume. It also blends target detection range as a function of cross section, altitude and the probability of detection into a geographical representation of overall radar performance. One application of CHRISTI is to assess U.S. and foreign surveillance system effectiveness.

CINC - See COMMANDER IN CHIEF (CINC).

CIRCULAR ERROR PROBABLE (CEP) - A measure of accuracy at a specific range, expressed in terms of the radius of the circle, centered on the target, in which 50% of the payloads impact. Also called CIRCULAR ERROR PROBABILITY and CIRCLE OF EQUAL PROBABILITY.

CIRCUMVENTION - (1) In electronics, a system protection technique in which detection of the onset of nuclear radiation or an ELECTROMAGNETIC PULSE (EMP) puts a critical portion of the system in a protected condition. (2) A system-level technique using special hardware and software for recovering from a transient upset.

CLASSIFICATION - See TARGET CLASSIFICATION.

CLAUSEN POWER BLADE (CPB) - A device used to clear land mines. It is basically a conveyor belt made from the track of a bulldozer and is used to clear an 11-foot swath of land mines buried up to 10 inches, removing obstacles of up to 4,000 pounds. Mines, obstacles, and the excavated material are stacked in the berm to one side of the vertical conveyor belt. See also WATTENBERG PLOW.

CLICK JAMMING - A type of BARRAGE JAMMING, in which the RF is shifted at a periodic rate called the "click rate". It derives its name from the "click" sound that is heard by the operator of the intercept receiver.

CLICKSTREAM ANALYSIS - The process of collecting, analyzing, and reporting aggregate data about which pages visitors visit on a Web site, and in what order - all determined from the sequence of mouse clicks made by the visitor (*i.e.*, the clickstream). [Information from <http://www.searchcrm.com>] Also called CLICKSTREAM ANALYTICS.

NOTE: There are two levels of clickstream analysis: (1) traffic analysis, which operates at the SERVER level by collecting clickstream data related to the path the user takes when navigating through the site - the number of pages served to the user, length of time taken for pages to load, the frequency of use of the browser's back or stop button, and the amount of data transmitted before a user moves on; and

(2) E-commerce analysis, which is the use of clickstream data to determine the effectiveness of the site as a channel-to-market by quantifying the user's behavior while on the Web site, such as which pages the user lingers on, what the user puts in or takes out of their shopping cart, and what items the user purchases.

CLOSED-LOOP INFRARED COUNTERMEASURES (CLIRCM) - An INFRARED COUNTERMEASURES system, which employs a bright LASER to effectively blind incoming infrared (IR) missiles. The CLIRCM observes the MISSILE APPROACH WARNING SYSTEM (MAWS) and countermeasures-techniques generator, identifies those emitted jamming signals which cause the incoming missile to momentarily break lock on the aircraft, and then calculates the optimal jamming code to continue using so that subsequent missile locks can be broken more quickly and effectively.

CLOSED-LOOP SIMULATION - Simulation in which there is a two-way path between the simulator and the system being tested. Closed-loop simulation allows effectiveness evaluation. Contrast with OPEN-LOOP SIMULATION.

CLOSE-IN JAMMING SUPPORT - An element of TARGET AREA JAMMING SUPPORT in which the aircraft moves closer to enemy air defenses to provide more powerful jamming. Contrast with STAND-OFF JAMMING SUPPORT. See also AREA JAMMING SUPPORT, CLOSE SUPPORT JAMMING, CORRIDOR JAMMING SUPPORT, DIRECT JAMMING SUPPORT.

CLOSE-RANGE UNMANNED AERIAL VEHICLE (CRUAV) - Designed for lower level tactical units that those employing the SHORT-RANGE UNMANNED AERIAL VEHICLE (SRUAV), the CRUAV is relatively inexpensive with a range of 50 km and a minimum endurance of three hours. Its sensor payload would include day/night imaging, EW, meteorology and NBC. See also IMAGERY, IMAGERY INTELLIGENCE, UNMANNED AIR VEHICLE (UAV.)

CLOSE SUPPORT JAMMING - An ECM tactic, most commonly associated with Strike Warfare, in which a dedicated ECM platform maintains COLINEARITY with primary mission platforms to minimum practical range, usually outside threat weapon envelopes. See also STANDOFF JAMMING.

CLOTH KEYBOARD - A 'keyboard' made fabric with indentations in place of keys, which has embedded circuitry so that it can serve as a flexible keyboard. It is lightweight and can be folded for easy storage, as in a pocket or purse.

NOTE: The cloth keyboard can be connected to small hand-held devices, such as palm computers and cellular telephones, and used to enter alpha-numerical data.

CLOUDS and EARTH'S RADIANT ENERGY SYSTEM (CERES) - A satellite-based system which measures the Earth's radiation budget and atmospheric radiation from the top of the atmosphere using a broadband scanning RADIOMETER. [NASA] See also MISR and MOPITT.

CLUSTER - (Computers) See PROCESSOR FARM.

CLUSTER BOMB UNIT (CBU) - A weapon released from an aircraft that falls for a specified time or distance before a dispenser opens, allow submunitions to cover a wide target area. Each submunition contains its own fuze that can be made to detonate above ground, on impact, or after a given delay. The submunitions include antipersonnel, anti soft-skinned vehicle, dart-shaped bomblets for soft targets and armor, random delay fuzing to deny an area, FUEL AIR EXPLOSIVE (FAE), and COMBINED EFFECTS MUNITIONS (CEM).

CLUTTER - Extraneous signals that tend to obscure the reception of desired signals. See also GROUND CLUTTER, RADAR CLUTTER, WAVE CLUTTER.

CNN EFFECT - A term which denotes the leading of public opinion due to quick publicity around the world of a given military action, especially by U.S. forces.

COAMPS - See COUPLED OCEAN/ATMOSPHERE MESOSCALE PREDICTIONS SYSTEM.

COASTAL BATTLEFIELD RECONNAISSANCE AND ANALYSIS (COBRA) - A system carried aboard an UNMANNED AIR VEHICLE (UAV), COBRA consists of three video cameras to acquire imagery of the beach zone and the craft-landing zone before assault operations. The camera group includes one forward-looking unit to deliver terrain video, and two down-looking, spinning-filter wheel, multispectral units, which overlap their imagery to create a wide field-of-view picture. The multispectral units and an ATR system detect mine-sized spectral anomalies.

NOTE: In demonstrations, COBRA detected minefields, as well as camouflaged positions and vehicles.

COHERENT ALL-RADIO BAND SENSOR (CARABAS) - A SYNTHETIC APERTURE RADAR (SAR) in the VHF band (30 - 300 MHz) that possesses good ground-penetrating capability and is able to detect objects under foliage and camouflage.

COHERENT DIRECTED INFRARED COUNTERMEASURES (CDIRCM) - DIRECTED INFRARED COUNTERMEASURES (DIRCM) in which the emitted light is all of the same color/wavelength (i.e., *monochromatic*) for which all of the photons are in wave phase coherence. Consequently, the light can be easily directed and focused with little beam spreading, resulting in intense illumination of a distant target.

COHERENT INFRARED SENSOR - An INFRARED sensor, which uses spatial or temporal coherence properties of the amplitude of incident radiation for detection. Contrast with INCOHERENT INFRARED SENSOR.

COHERENT JAMMING - ELECTRONIC JAMMING which employs a SIGNAL with a fixed-RF phase relationship to the victim signal, or so nearly fixed that a COHERENT RADAR cannot use RF phase to discriminate between the jamming signal and a legitimate signal. See also COHERENT REPEATING.

COHERENT RADAR - A LOW PROBABILITY-OF-INTERCEPT (LPI) RADAR in which the transmitted signals have a constant phase relationship to an oscillator in the transmitter.

COHERENT REPEATING - An ECM technique involving the receiving and subsequent transmitting of a signal that is acceptable to the receiver processor of a victim coherent radar.

COLD CATHODE - A CATHODE that functions without the application of heat.

COLINEARITY - A condition which exists when protected assets are positioned between a dedicated jamming asset and targeted threat radars within the jamming beam width of the dedicated jammer. Contrast with STANDFORWARD JAMMING.

COLINEAR JAMMING - See COLINEARITY.

COMB JAMMING - A jamming technique that produces spectral lines or spots of repeater noise at pre-selected frequencies over a bandwidth up to several hundred megahertz.

COMBAT CINDERS - A full-duplex frequency division multiplexing (FDM) multi-channel Air Force One communications link, via nuclear-hardened antennas at many of the AUTOVON switching centers. Synonymous with AUTOVON WIDEBAND.

NOTE: As a post-nuclear attack communications system, it was sometimes referred to as COMBAT CINDERS.

COMBAT IDENTIFICATION (CID) - The capability to differentiate potential targets as friend, foe, or neutral in sufficient time, with high confidence, and at the requisite range to support weapon release and engagement decisions.

COMBAT IDENTIFICATION FOR DISMOUNTED SOLDIERS

(CIDDS) - The CIDDS consists of two parts: a weapon-mounted laser emitter and a helmet-mounted radio receiver/transmitter system. The laser emitter, which fits on the end of the soldier's weapon, sends out an encrypted signal that can be decoded only by other CIDDS-interoperable equipment. The helmet system receives incoming CIDDS queries and checks their validity. If valid, the CIDDS sends back an encrypted response via the omni-directional antenna mounted on the helmet. CIDDS can identify standing targets at a range of over 110 meters, and prone targets from 900 in daylight and 700 meters at night. See also COMBAT IDENTIFICATION (CID), IDENTIFICATION, FRIEND OR FOE (IFF), and LAND WARRIOR (LS) SYSTEM.

COMBAT NET RADIO (CNR) - A radio operating in a network that **(a)** provides a half-duplex circuit (*i.e.*, transmit or receive, but not simultaneously) and **(b)** uses either a single radio frequency or a discrete set of radio frequencies when in a FREQUENCY HOPPING mode.

NOTE: CNRs are primarily used for push-to-talk-operated radio nets for command and control of combat, combat support, and combat service support operations among ground, sea, and air forces.

COMBAT SURVEILLANCE - A continuous, all-weather, day-and-night, systematic watch over the battle area to provide timely information for tactical combat

operations. See also AIR SURVEILLANCE, SEA SURVEILLANCE, SURVEILLANCE.

COMBATANT CRAFT RETRIEVAL SYSTEM (CCRS) - A shipboard ramp for stowage, launching, and retrieval of fast rigid-inflatable combat assault boats such as the Rigid Hull Inflatable Boat (RHIB).

COMBINED EFFECTS MUNITION (CEM) - An aerial denial weapon for attacking "soft" targets. The CEM consists of more than 200 bomblets, each of which blasts into several hundred fragments.

NOTE: The CEM can be a component of the CLUSTER BOMB UNIT.

COMBUSTION ALTERATION TECHNOLOGY (CAT) - A NONLETHAL WEAPON technology, which develops agents that can change the viscosity or combustion characteristics of fuel to degrade engine performance or effect near instantaneous engine failure. See also COMBUSTION INTERFERENT.

COMBUSTION INTERFERENT - A NONLETHAL WEAPON employing COMBUSTION ALTERATION TECHNOLOGY (CAT) which exposes a diesel engine to a concentration (3% or more) of acetylene, causing severe pre-ignition quickly followed by engine self-destruction.

COMMAND AND CONTROL PROTECTION (C²-PROTECTION) - To maintain effective command and control of own forces by turning to friendly advantage or negating adversary efforts to deny information to, influence, degrade or destroy the friendly C² system.

COMMAND AND CONTROL WARFARE (C²W) - The integrated use of OPERATIONS SECURITY (OPSEC), MILITARY DECEPTION, PSYCHOLOGICAL OPERATIONS (PSYOP), ELECTRONIC WARFARE (EW) and physical destruction, mutually supported by intelligence, to deny information to, influence, degrade, or destroy adversary command and control capabilities, while protecting friendly command and control capabilities against such actions. C²W applied across the operational continuum and all levels of conflict. Also called C²W. C²W is both offensive and defensive: a. *Counter-C²*. To prevent effective C² of adversary forces by denying information to, influencing, degrading or destroying the adversary C² system. b. *C²-Protection*. To maintain effective command and control of own forces by turning to friendly advantage or negating adversary efforts to deny information to, influence, degrade or destroy the friendly C² system.

NOTE: C²W is the military strategy that implements INFORMATION WARFARE, i.e., C²W is the way we apply Information Warfare to the fight.

COMMAND, CONTROL, AND COMMUNICATIONS (C³) - The exercise of authority and direction by a properly designated commander over assigned forces in the accomplishment of the mission. C³ includes the communications employed by a commander in planning, directing, coordination, and controlling forces

and operations in the accomplishment of the mission. NOTE: This definition is adapted from that for "Command and Control" in JCS Pub 1-02.

COMMAND, CONTROL, & COMMUNICATIONS

COUNTERMEASURES (C³CM) - The integrated use of OPERATIONS SECURITY, MILITARY DECEPTION, JAMMING, and physical destruction, supported by intelligence, to deny information to, influence, degrade, or destroy adversary COMMAND, CONTROL, AND COMMUNICATIONS (C³) capabilities and to protect friendly C³ against such actions. C³CM consists of COUNTER- C³ and C³-PROTECTION.

COMMAND, CONTROL, COMMUNICATIONS, AND

INTELLIGENCE (C³I) - The exercise of authority and direction by a properly designated commander over assigned forces in the accomplishment of the mission. C³I includes the communications employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. C³I also includes timely information from intelligence sources and various sensors from which is derived a coherent understanding of the tactical, operational or strategic situation.

COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE (C⁴I) - A SPACE AND ELECTRONIC WARFARE (SEW) warfare support discipline consisting of a technological, organizational, and doctrinal system that provides three functions: the doctrinal delegation of forces (i.e., command and control); information management (i.e., communications and computers); and intelligence dissemination.

COMMAND, CONTROL, AND COMMUNICATIONS ERASING (C³I ERASING) - Detecting, exploiting and/or neutralizing C³I transmissions.

COMMAND, CONTROL, AND COMMUNICATIONS

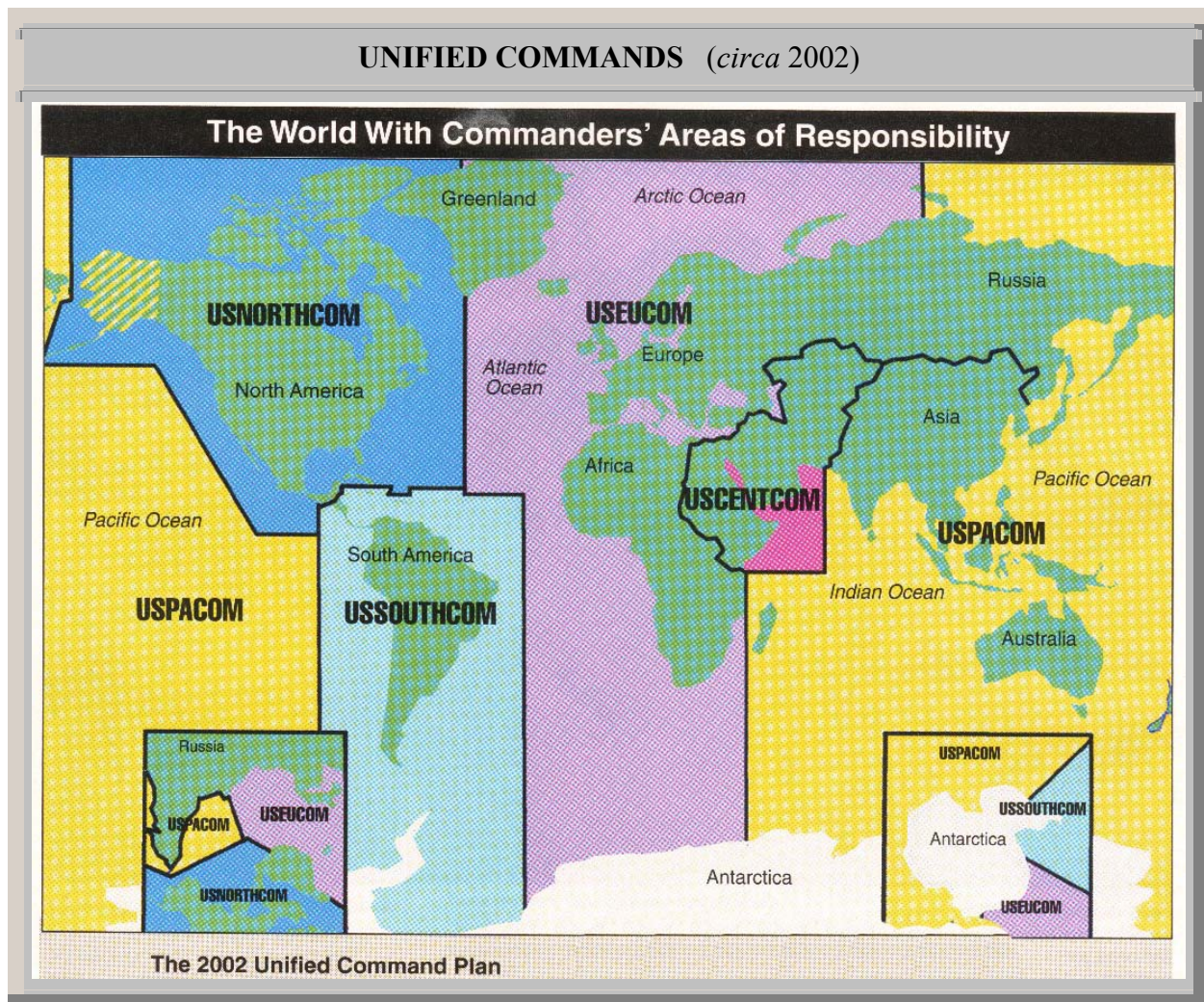
PROTECTION (C³-PROTECTION) - Synonymous with C³-PROTECT. **(1)** That division of C³CM comprising measures taken to maintain the effectiveness of friendly C³ despite both adversary and friendly COUNTER-C³ actions. **(2)** Measures taken to deny adversary decision makers the ability to effectively command and control their forces.

COMMAND JAMMING - JAMMING which is controlled remotely from a command center rather than the jamming platform.

COMMAND-TO-LINE-OF-SIGHT (CLOS) - A guided munitions system in which an operator looks through a sight, searches, detects, and acquires a target, then aims and fires a missile.

COMMANDER IN CHIEF (CINC) - (U.S.) The President of the United States.

NOTE: in a memo dated October 24, 2002, Secretary of Defense Donald H. Rumsfeld directed that the term "commander in chief (CINC) will apply only to the President of the United States. Previous "CINC" designators (*e.g.*, CINCPAC) will be replaced by "Commander." All references to "CINC," such as CINCPACFLT, CINCLANTFLT, CINCUSNAVEUR, were changed to "COM" (*e.g.*, "COMPACFLT"). The new term is simply "commander," as in "Commander, U.S. Northern Command" and "Commander, U.S. Special Operations Command." The memo instructs officials that the changes should be done "without any undue additional cost to taxpayers," and to use old stocks and replace signs only when done in regular maintenance.



COMMON ACCESS CARD (CAC) - A "smart" identification card that features a data-storage chip, magnetic strip and bar codes, allowing for digital identification, encryption and DIGITAL SIGNATURE capabilities through the use of private key infrastructure technology.

COMMONALITY - A quality which applies to materiel or systems: **(a)** possessing like and interchangeable characteristics enabling each to be utilized, or operated and maintained, by personnel trained on the others without additional specialized training; **(b)** having interchangeable repair parts and/or components; or **(c)** applying to consumable items interchangeably equivalent without adjustment.

COMMON GUIDANCE - COMMON SENSE (CG-CS) - The integration of inertial measuring unit (IMU) with anti-jam global positioning system (GPS) for cannon artillery armament. The round's GPS and IMU functions are integrated to enhance performance and reduce susceptibility to GPS jamming.

COMMON INTRUSION SPECIFICATION LANGUAGE (CISL) - A computer language, which allows information about events and attacks from various security intrusion devices to be expressed in a platform-independent manner.

COMMON TACTICAL PICTURE (CTP) - A means for providing enhanced SITUATIONAL AWARENESS (SA) to tactical decision-makers from a common tactical data (CTD) set and other sources and the current depiction of the battlespace for a single operation within a CINC's area of responsibility (AOR). The CTP includes force location, real time and non-real time sensor information and amplifying information.

COMMUNICATION BLOCKING - Denying the enemy the ability to isolate meaningful communications from intercepts by JAMMING his SIGINT/ESM collectors.

COMMUNICATION DECEPTION - (1) Use of devices, operations, and techniques with the intent of confusing or misleading the user of a communications link or a navigation system. (2) The radiation, re-radiation, or reflection of electromagnetic energy in a manner intended to mislead, confuse, or harass communications. See also MEACONING.

COMMUNICATIONS GRID - A SPACE AND ELECTRONIC WARFARE (SEW) concept in which communications form a grid overlaying the tactical area. See also SURVEILLANCE GRID, TACTICAL GRID.

COMMUNICATIONS HIDING - Preventing enemy from locating friendly forces through communications direction finding while maintaining communications capability.

COMMUNICATIONS INTELLIGENCE (COMINT) - Technical and intelligence information derived from foreign communications by other than the intended recipients.

NOTE: COMINT is encompassed under SIGNALS INTELLIGENCE (SIGINT.)

COMMUNICATIONS JAMMING - JAMMING that interrupts the flow of communications from one point to another by radiating ECM power that is on the communication link's frequency into the receiver at either end of the link.

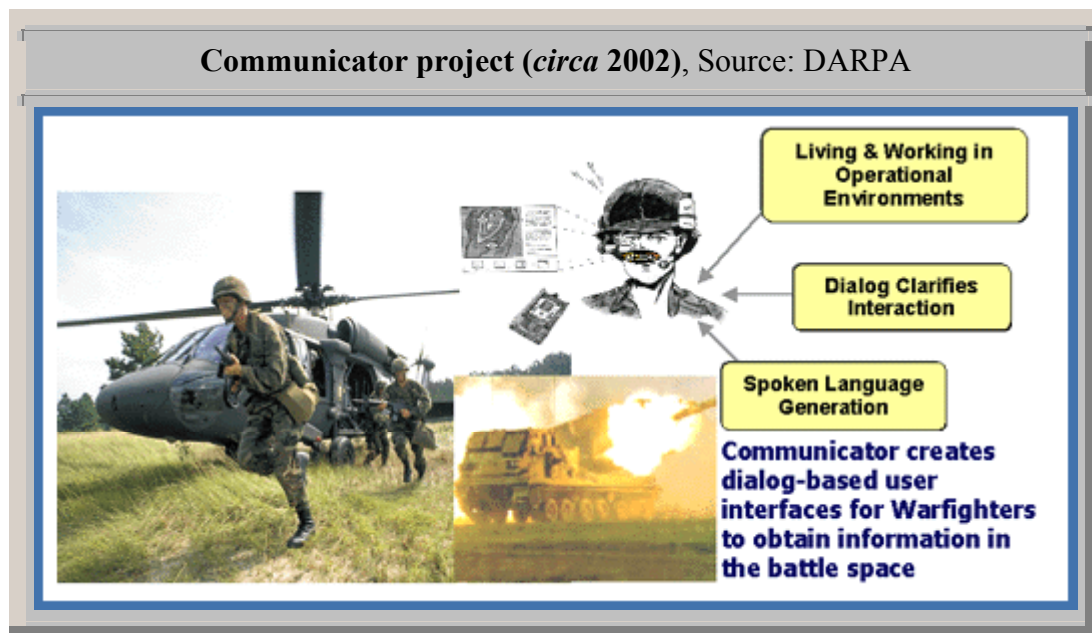
COMMUNICATIONS SECURITY (COMSEC) - The protection resulting from all measures designed to deny unauthorized persons information of value which might be derived from the possession and study of telecommunications, or to mislead

unauthorized persons in their interpretation of the results of such possession and study.

NOTE: Communications security includes **(a)** crypto security; **(b)** transmission security; **(c)** emission security; and **(d)** physical security of communications security materials and information.

COMMUNICATIONS SIGNATURE CHANGE - Hindering enemy attempts at hull-to-emitter correlation of friendly units through intercept and analysis of radio frequency emissions. An example is rotating voice operators on radio circuits.

COMMUNICATOR - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to develop and demonstrate "dialogue interaction" technology that enables warfighters to talk with computers without ever having to touch a keyboard.



COMPANDING - The process of compressing (limiting the dynamic range of) a transmitted signal and then restoring (expanding) it at the receiving end so as to improve overall SIGNAL-TO-NOISE performance.

NOTE: COMPANDING is an acronym for COMPressing and expANDING.

COMPETENT MUNITIONS (CM) - Projectiles containing GPS/INS circuitry controlling nose-mounted canards which enable them to be guided to or inertially navigated to the target. Competent munitions projectiles may also possess antijam capabilities. Contrast with DUMB AMMUNITION. See Also BRILLIANT AMMUNITION, SMART AMMUNITION.

COMPILER - A computer program that converts a high level language, such as Ada, into MACHINE CODE.

COMPOSITE EXHAUST STACK - See LOW OBSERVABLE MULTIFUNCTION STACK

COMPRESSED VIDEO - See VIDEO COMPRESSION.

COMPRESSIVE RECEIVER - See MICROSCAN RECEIVER.

COMPUTER-BASED INTRUSION DETECTION - See HOST-BASED INTRUSION DETECTION.

COMPUTER GENERATED FORCE (CGF) - A computer system that generates AGENTS in a military simulation; it can be used with trainees in simulators fighting virtual battles, or can be run autonomously for planning of tactics. See also AVATAR.

COMPUTER NETWORK ATTACK (CNA) - Operations to disrupt, deny, degrade, or destroy information resident in computers and computer networks, or the computers and networks themselves. See also OFFENSIVE INFORMATION OPERATIONS.

COMPUTER VIRUS - A computer program that can, like biological viruses, both infect another program and, acting through an infected program, reproduce itself and spread within a host computer system.

COMPUTER VIRUS COUNTERMEASURES (CVCM) - An ELECTRONIC WARFARE technique that electronically inserts COMPUTER VIRUS code into a victim electronic system. See also DIRECT COUPLING.

CONCENTRIC CANISTER LAUNCHER (CCL) - A generic and universal lightweight shipboard-missile launching system consisting of an array of concentric cylinders surrounding an inner cylinder. The inner cylinder supports the weapon and guides its initial flight, while the annular space between the inner and outer cylinders provides for gas management during the launch sequence.

NOTE: CCL is capable of handling a variety of shipboard missiles, including Tomahawk and the Standard Missile.

CONCEPT FOR FUTURE JOINT OPERATIONS (CFJO) - An expansion of the concepts contained in Joint Vision 2010, namely, DOMINANT MANEUVER, PRECISION ENGAGEMENT, FULL-DIMENSIONAL PROTECTION, and FOCUSED LOGISTICS, in order to provide a more detailed foundation for follow-on capabilities assessments.

CONFORMAL ANTENNA - An antenna, which conforms to a surface whose shape is determined by considerations other than electromagnetic, for example, aerodynamic or hydrodynamic. See also CONFORMAL ANTENNA ARRAY, DOUBLY-CONFORMAL ANTENNA, MICROSTRIP ANTENNA, SMART SKIN.

CONFORMAL ANTENNA ARRAY (CAA) - A CONFORMAL ANTENNA incorporating a phased array as its radiating structure.

CONFORMAL ARRAY RADAR TECHNOLOGY (CART) - A technology specific follow-on to SMART SKINs. It applies sensors directly to the fuselage of an aircraft to enhance performance of both the aircraft and its sensors. CART involves technology which allows for the tracking and detection of low observable air-breathing targets while reducing the size and power requirements for the next generation of airborne surveillance radar sets. The conformal array radar could be equipped with ELECTRONIC COUNTER-COUNTERMEASURES main beam nulling. In addition to more sensitivity, its larger antenna has a narrower beam leading to more accurate tracking and the ability to distinguish single from multiple targets at a greater distance. Such a system could potentially "see" through the beams of STANDOFF JAMMERS. See also CONFORMAL ANTENNA ARRAY, DOUBLY-CONFORMAL ANTENNA, MICROSTRIP ANTENNA.

CONFORMAL AVIONICS - Avionic elements attached external (but not integral) to the aircraft's skin. See also EMBEDDED AVIONICS, SMART SKIN.

CONFUSION REFLECTION - Reflection of ELECTROMAGNETIC RADIATION used to create ECHOES for confusion purposes. Radar confusion reflectors include such devices as CHAFF, ROPE and CORNER REFLECTOR.

CONFUSION WEAPON - A NONLETHAL WEAPON which modifies the behavior pattern of the targeted individual (TI).

CONSOL - A long-range radio aid to navigation, the emissions of which, by means of their radio frequency modulation characteristics, enable bearings to be determined. See also CONSOLAN. NOTE: Consol uses three radiators (radio transmitters.)

CONSOLAN - A form of CONSOL using two radiators instead of three.

CONSTANT FALSE ALARM RATE (CFAR) - A property of threshold or gain control devices specially designed to suppress FALSE ALARMS caused by NOISE, CLUTTER, or ECM of varying levels.

CONSTANT GAIN MODE - An ECM operating mode, which allocates constant jamming power to each victim radar signal (within the power limitation of the jammer). Contrast with CONSTANT POWER MODE.

CONSTANT POWER MODE - An ECM operating mode which shares a fixed amount of jamming power among all victim radar signals passing through the system. A result is that jamming power becomes diluted as the number of signals increase. Contrast with CONSTANT GAIN MODE.

CONSTRUCTIVE KEY MANAGEMENT (CKM) - A cryptographic key management and distribution process that provides role-based access control

credentials and an authentication process based on standard public-key techniques.
[GovCon Newsletter 7/19/2001]

CONTINGENCY AND LIMITED OBJECTIVE OPERATIONS

(CALO) - See CONTINGENCY AND LIMITED OBJECTIVE WARFARE (CALOW).

CONTINGENCY AND LIMITED OBJECTIVE WARFARE

(CALOW) - A limited struggle to achieve political, military, social, economic and psychological objectives. It often is protracted and ranges from diplomatic, economic and psychological pressures through terrorism to insurgent war. CALOW generally is characterized by the unacceptability of friendly casualties, loss, or damage, and by constraints on the geographic area, weaponry, tactics, violence level, and rules of engagement (ROE). Synonymous with Low Intensity Conflict (LIC).

NOTE: CALOW ranges from CRISIS RESPONSE (CR) to LIMITED WAR (LW). Mission categories in CALOW include FOREIGN INTERNAL DEFENSE (FID), TERRORISM COUNTERACTION, PEACEKEEPING, and SPECIAL MISSIONS. Examples of CALOW threats include political and economic conflict; illegal cartel/alliance operations; propaganda activities; overt/covert guerilla operations; border incidents and reprisals; terrorism; rebellion/resistance; drug smuggling; insurgency; and weapons smuggling.

CONTINUOUS ASSISTED PERFORMANCE (CAP) - A DARPA program (2002) to identify approaches that extend the performance envelope of the warfighter, in particular, by preventing the effects of sleep deprivation over an extended performance of time, nominally set at seven days. See also ENERGY HARVESTING, PERSISTENCE IN COMBAT (PIC), WATER HARVESTING.

CONTINUOUS WAVE (CW) - Waves, the successive oscillations of which are identical under steady state conditions.

CONTINUOUS WAVE RADAR - A radar which transmits continuously (therefore requiring two antennas) and uses frequency shift to resolve moving targets. An example is the DOPPLER RADAR. Synonymous with CW RADAR.

NOTE: The CW radar uses continuous signals rather than pulses, which means that it must have multiple antennas with adequate isolation to keep the transmitter from interfering with its receiver(s.)

CONTROLLED VARIABLE TIME (CVT) - A fuze counter-countermeasure technique universally employed with proximity fuzes. The fuze is not armed until the missile reaches the target vicinity. Electronic fuze countermeasures applied before the fuze is armed have no effect on the fuze.

CONTROL MOMENT GYRO (CMG) - A flywheel device used to control the attitude of spacecraft.

CONTROL OF SPACE - The ability to assure access to space, freedom of operations within the space medium, and the ability to deny others the use of space, if required.

NOTE: CONTROL OF SPACE implies an ability to do the following: **(1) Operate** in the space environment, **(2) Monitor** a given region of space to achieve and maintain SITUATIONAL AWARENESS, **(3) Protect** friendly space systems from hostile action, including unauthorized access to and exploitation of friendly space data or products, and **(4) Inflict** EFFECTIVE DAMAGE to hostile space systems.

COOKIE - A text file placed on a computer by a visited web site. Also called INTERNET COOKIE or MAGIC COOKIE. See also SESSION COOKIE, PERSISTENT COOKIE.

NOTE: Because cookies contain only text, they (supposedly) cannot transmit viruses or otherwise damage a system.

COORDINATED UNIVERSAL TIME (UTC) - A time scale tied to the rotation of the earth. It has the same rate as INTERNATIONAL ATOMIC TIME (TAI), from which it differs by an integral number of seconds, called leap seconds.

COOPERATIVE ANGLE JAMMING (CAJ) - A jamming technique requiring the cooperative use of two or more aircraft to deceive hostile radar-guided missiles. The received signal triggers an appropriate cover pulse, which is retransmitted. See also COVER-PULSE JAMMING.

COOPERATIVE ENGAGEMENT - The sharing among combatants of target data, weapons, and post-launch weapon control. See also FORWARD PASS.

NOTE: Cooperative engagement involves integration and coordination of combat data and action systems at the Battle Force Level across all warfare areas.

COOPERATIVE ENGAGEMENT PROCESSOR (CEP) - That component of the COOPERATIVE ENGAGEMENT SYSTEM (CES), which collects raw information (individual radar dwell returns) from shipboard sensors and weapon systems, reformats it, and sends it to the DATA DISTRIBUTION SYSTEM (DDS). Simultaneously, the CES receives data generated by other cooperative units (CUs), which has been processed by the DDS and combines these data with the unprocessed raw sensor data into an air picture consisting of composite tracks that can be displayed and used by the sensor and engagement systems of each individual platform. See also COOPERATIVE ENGAGEMENT.

COOPERATIVE ENGAGEMENT SYSTEM (CES) - A system which coordinates air-defense sensors and integrates data in such a way that the network of individual systems forms a dispersed but fully interoperable air-defense system. The CES consists of two major components: the COOPERATIVE ENGAGEMENT PROCESSOR (CEP), which processes raw sensor data, and the DATA DISTRIBUTION SYSTEM (DDS), which provides the CEP with data from other cooperating units (CUs). See also COOPERATIVE ENGAGEMENT.

COOPERATIVE TARGET IDENTIFICATION - Target identification, which depends upon the collaboration of the target, such as an IFF response to a transponder signal.

COPERNICUS ARCHITECTURE - (1) A SPACE AND ELECTRONIC WARFARE (SEW) concept within SONATA that describes an architecture that provides a strategy for the Navy to build a command and control, communications and computers, and intelligence (C4I) system. It consists of four "Copernican Pillars": the Global Information Exchange Systems (GLOBIXS), the Commander-in-Chief (CINC) Command Complex (CCC), the Tactical Data Information Exchange Systems (TADIXS), and the Tactical Command Center (TCC), to be constructed as an interactive framework that ties together the command and control process of afloat tactical commanders with the CINCs and supporting shore establishment. See also WELTANSCHAUUNG, and CROESUS STRATEGIES.

(2) Originally conceived as an architecture which structures C3I around four pillars: (2.1) Global Digital Exchange Sub-system (GLOBIXS), (2.2) a consolidated Fleet Command Center (FCC), (2.3) Tactical Digital Exchange Subsystem (TADIXS), and (2.4) Tactical Flag Command Center (TFCC) afloat. Also referred to as GLOBIXS/TADIXS ARCHITECTURE. See also COPERNICUS EFFECT.

COPERNICUS EFFECT - A term referring to the shift in thinking from "technology" per se to "operations".

COPOLARIZED REFLECTION - Identical transmitting and receiving polarizations. See also POLARIZATION SIGNATURE.

CORNER CUBE RETROREFLECTOR (CCR) - An example of SMART DUST, consisting of three gold-coated polysilicon mirrors positioned at right angles. When a laser shines on the mirrors, the light is reflected back to the source. See also MICROELECTROMECHANICAL SYSTEMS (MEMS.)

CORNER REFLECTOR - (1) A device normally consisting of three metallic surfaces or screens perpendicular to one another, designed to act as a radar target or marker. **(2)** Two (dihedral) or three (trihedral) conducting surfaces, mutually intersecting at right angles, designed to return electromagnetic radiation towards its source and used to render a target more conspicuous to radar observations.

CORONA - The first U.S. satellite intelligence photographic reconnaissance system. CORONA operated from August 1960 through May 1972. [National Reconnaissance Office]

CORRELATED HOPPING ENHANCES SPREAD SPECTRUM (CHESS) - A high-speed radio system that can support a LOW PROBABILITY OF INTERCEPT (LPI) and antijamming capabilities. The transmitter changes frequency 5,000 times per second. CHESS provides redundancy into the radio's frequency pattern so that it is possible to recover lost information without having to add redundant data bits. *Correlated hopping* refers to the fact that the pattern itself, in

frequency and time, has redundancy built into it. Using a FAST FOURIER TRANSFORM (FFT) chip, the receiver instantaneously monitors 2 megahertz of BANDWIDTH in the high frequency (HF) spectrum.

CORRIDOR JAMMING SUPPORT - An ECM tactic whereby the jamming aircraft flies closer to the enemy's defense system to jam acquisition radars in a specific sector, creating an electronic hole through which an attack group can pass. Contrast with AREA JAMMING SUPPORT. See also TARGET AREA SUPPORT, CLOSE-IN JAMMING SUPPORT, STAND-OFF JAMMING SUPPORT, DIRECT JAMMING SUPPORT.

COUNTER-C² - The prevention of effective C² of adversary forces by denying information to, influencing, degrading or destroying the adversary C² system.

COUNTER-C³ - That division of C³CM comprising measures taken to deny adversary commanders and other decision makers the ability to command and control their forces effectively.

COUNTER CAMOUFLAGE, CONCEALMENT AND DECEPTION (Counter CC&D) - The ability to detect moving and stationary obscured targets in foliage, under camouflage, or in shallow hide, as well as those utilizing deception techniques.

COUNTER COMMUNICATIONS/DECISION - All efforts to deceive, delay, degrade, and destroy elements of enemy C³ as sensory data leaves the surveillance platforms and prior to the initial arrival of enemy weapons-carrying platforms at a point where the friendly force is detectable by the on-board sensors of the weapons-carriers; similarly, actions against tactical C³ links and nodes, other than those directly involved in a surveillance or targeting activity, are included.

COUNTERDECEPTION - Efforts to negate, neutralize, diminish the effects of, or gain advantage from, a foreign deception operation. Counterdeception does not include the intelligence function of identifying foreign deception operations. See also DECEPTION.

COUNTERDETECTION RANGE - The range from a radar (or missile site) at which a target has a 90% probability of detecting its illumination by the radar (or launch of a missile against it).

COUNTER-FUZING - Measures taken to deceive or degrade fuzing devices.

COUNTER-HOMING - Measures to deceive, degrade, evade, and attack homing devices, especially in missiles. [Patterned after the definition of COUNTER-SURVEILLANCE in NWP 10-1-40]

COUNTERMEASURES - That form of military science that by the employment of devices and/or techniques that has as its objective as the impairment of the operational effectiveness of enemy activity.

COUNTERMEASURES DETECTABILITY - The probability that a radar system subject to a given countermeasure can detect, but not necessarily identify, the countermeasure. Compare with COUNTERMEASURES RECOGNITION.

COUNTERMEASURES RECOGNITION - The probability that a radar system that is being subjected to a countermeasure can correctly identify the kind of countermeasure being directed against it. Compare with COUNTERMEASURES DETECTABILITY.

COUNTERPOISE SYSTEM - (1) *{Lightning protection for overhead power lines}* A conductor or system of conductors, arranged beneath the transmission line, located on, above, or most frequently below the surface of the earth, and connected to the footings of the towers or poles supporting the line.

(2) *{Antennas}* A system of conductors elevated above and insulated from the ground, forming a lower system of conductors of an antenna. NOTE: The purpose of a counterpoise system is to provide a relatively high capacitance and thus a relatively low impedance path to earth.

(3) *{Automatic weapons}* A buffer assembly, drive spring and a counterweight which fits inside the bolt carrier of a rifle or carbine to eliminate muzzle rise and enhance accuracy in automatic and semiautomatic fire. NOTE: The automatic weapon counterpoise system stretches the recoil impulse over the full cycle time.

COUNTER SNIPER SYSTEM - A system that provides real time data, such as azimuth, elevation, range, class (caliber), miss distance and GPS coordinates of the origin of fire. The sniper can be detected by the muzzle blast (infrared flash or acoustic blast), the acoustic shock wave caused by the moving bullet, detection of the muzzle blast vibration, or detection of the bullet by radar or other bullet-tracking systems. Counter sniper systems also include measures for the pre-firing location of the sniper through optical means, which can detect the presence of binoculars, night-vision goggles and riflescopes in any conditions at ranges exceeding 1 km.

NOTE: Examples (1999) of counter sniper systems include AAI Corporation's PDCUE™ Counter Sniper System, and the "PILAR" mobile and portable acoustic gunfire localization system.

COUNTERSPACE OPERATIONS - Operations conducted to attain and maintain a desired degree of space superiority by the destruction or neutralization of enemy forces. Counterspace operations are partitioned into OFFENSIVE COUNTERSPACE OPERATIONS and DEFENSIVE COUNTERSPACE OPERATIONS. [AFDD 2-2 (Draft), 6.]

COUNTER-STEALTH - Measures to reduce the effectiveness of STEALTH technology applications.

COUNTER-SURVEILLANCE - (1) Misdirect enemy surveillance so that the observed location of credible targets is different from the actual location. (2) Efforts to deceive, degrade, evade, and attack active and passive sensors and sensor platforms

used in detection and surveillance of friendly forces. **(3) A SPACE AND ELECTRONIC WARFARE (SEW)** warfare discipline that targets enemy surveillance systems. It is the sum of all active and passive measures to prevent enemy surveillance of a selected area.

NOTE: COUNTER-SURVEILLANCE includes EMISSION CONTROL (EMCON), COMMUNICATIONS SECURITY (COMSEC), and some DECEPTION and JAMMING.

COUNTER-TARGETING - (1) Efforts taken to confuse, delay, degrade, or deceive pre-launch weapons discrimination, designation, and targeting efforts. **(2)** Actions taken to prevent the enemy from obtaining an accurate fire control solution by degrading, denying, delaying, or otherwise disrupting adversary weapons targeting. Counter-targeting actions are directed against weapon carrying platforms, third party targeting systems and missiles themselves prior to valid lock-on.

COUNTER-WARM - Actions taken to reduce the enemy's effectiveness when using WARTIME RESERVE MODE (WARM) techniques.

COUPLED OCEAN/ATMOSPHERE MESOSCALE PREDICTIONS SYSTEM (COAMPS) - A system used to predict changes in ocean and weather conditions in complex coastal areas worldwide.

COVARC VEHICLE DEFENSE - A NONLETHAL WEAPON consisting of a concealed gas dispersal system that emits gas from beneath the vehicle with control from within the vehicle.

COVER - Those measures necessary to give protection to a person, plan, operation, formation or installation from the enemy intelligence effort and leakage of information. Contrast with DECEPTION. See also ELECTRONIC COVER; OPERATIONAL COVER. NOTE: A notion of COVER is to "hide the real".

COVER AND DECEPTION (C&D) - Actions taken to confuse the opposition, dilute his force, delay decisions or generate misinformation. See also OPERATIONAL DECEPTION AND COVER.

COVER-PULSE JAMMING - A jamming technique wherein the jamming pulse is transmitted at the instant the victim-radar pulse is received.

CRACKER - An individual who attempts to access computer systems without authorization. Crackers are often malicious, as opposed to HACKERS, and have many means at their disposal for breaking into a system. See also GRAY-HAT HACKER.

CRAWLER - See SPIDER.

CRITICAL CHAIN SCHEDULING (CCS) - An approach to project management similar to Program Evaluation and Review Technique (PERT) and

Critical Path Method (CPM). In CCS, rather than focusing on task estimates, intermediate milestones, and date-laden schedules for the project's component tasks, the emphasis is placed on the only date that matters: the promised completion date of the project. Thus, individual task due dates are eliminated while focus is always on the project completion due date. Each task in the project is estimated in terms of the 50% confidence level. The difference between the 50% and usual 90% confidence levels for tasks in the critical chain (the longest chain of path and resource dependencies after resolving resource conflicts) are aggregated into a "project buffer." That is, the safety factor is removed from the individual tasks and a buffer of roughly 50% of the chain length is allocated to the entire project. Tasks not in the critical chain (which, therefore, will have "slack" or "float") are also scheduled at the 50% confidence level, and the aggregated buffer is combined with "float" to provide aggregate "float" in each non-critical chain called a "feeder buffer." (Note that this methodology suppresses Parkinson's Law effects, where the work on a task with known "float" will almost surely expand to use up that float). Rather than scheduling resources needed to perform the tasks in the "critical chain," the manager ensures that the resources needed to perform any task are ready when the previous task is completed (*i.e.*, early completion of a task implies early start of the following task). The principal feature of CCS is "Buffer Management," which avoids reaction to changing critical paths characteristic of PERT and CPM; that is, the project manager deals solely with the feeder buffers and project buffer. As tasks are completed, the manager knows how much they have eaten into, or expanded, the buffers. Thus, as long as there is some predetermined portion of buffer remaining, the manager knows that all is well. [Summarized from: Patricof, Francis S., "Critical Chain Scheduling and Buffer Management . . . Getting Out From Between Parkinson's Rock and Murphy's Hard Place," *PM Network*, Project Management Institute.]

Also called BUFFER MANAGEMENT or CRITICAL CHAIN SCHEDULING and BUFFER MANAGEMENT.

CRITICAL TECHNOLOGY - A technology considered by the Department of Defense to be critical to ensuring the long-term qualitative superiority of U.S. weapon systems. See also MILITARILY CRITICAL TECHNOLOGY.

CROESUS STRATEGIES - A SPACE AND ELECTRONIC WARFARE (SEW) concept within SONATA that proposes a new process for fielding information-systems technology molded from **three steps**, intended to be implemented sequentially. **The first** is the notion of "Pyramidal Programming." **The second** is the idea of "Cyclical Production." **The third**, called the "Fleet Assembly Line," brings industrial techniques to bear for Government use. See also WELTANSCHAUUNG, COPERNICUS ARCHITECTURE.

CROSS-EYE ECCM - An ECCM technique used by tracking radars to degrade the effectiveness of Cross-Eye ECM. See also CROSS-EYE JAMMING.

CROSS-EYE JAMMING (X-EYE)- A self-screening ECM technique that produces angular errors in victim radars by phase and amplitude control repeated pulses or other on-frequency signals from multiple spatially-separated antennas on the platform to be protected.

CROSSOVER - The distance from a radar to a target at which the target return power in the receiver equals the received jamming power.

CROSSOVER POINT - That range in the air warfare area at which a target ceases to be an air intercept target and becomes a surface-to-air missile target.

CROSS-POLARIZATION ECCM - A generic ECCM technique for use on search or track radars that will degrade the effectiveness of CROSS-POLARIZATION JAMMING.

CROSS-POLARIZATION JAMMING (X-POL) - (1) A SELF-SCREENING or SUPPORT ECM technique that causes angle errors in tracking radars and sensing errors in jamming suppression ECCM systems of surveillance radars by radiating a signal that is orthogonally polarized to the principal POLARIZATION of the victim radar.

(2) A technique used against MONOPULSE and other passive lobe tracking radars. ... Requires a strong JAM-TO-SIGNAL RATIO or the SKIN ECHO will show up in the pattern nulls.

CROSS-POLARIZED OPERATION - With respect to waveguides or antennas, transmit/receive operation in vertical POLARIZATION (POL) simultaneously with transmit/receive operational in horizontal polarization.

CROSSTALK - (Data transmission) Undesired energy appearing in one signal path as a result of coupling from other signal paths.

CROSS TELLING - Transferring information between facilities at the same operational level. Synonymous with LATERAL TELLING. See also BACK TELLING, FORWARD TELLING, OVERLAP TELLING, RELATERAL TELLING, TRACK TELLING.

CROWD-CONTROL SUIT - Specialized clothing which offers protection to individuals, such as riot police, without presenting an aggressive appearance.

CROWD DISPERSAL ROUNDS - A NONLETHAL WEAPON consisting of a munition that can stun two to three individuals simultaneously without penetrating the body by delivering a strong blow to the body.

CRUISE MISSILE - Guided missile, the major portion of whose flight path to its target is conducted at approximately constant velocity; depends on the dynamic reaction of air for lift and upon propulsion forces to balance drag.

NOTE: The cruise missile always strives to complete its preprogrammed mission, but may alter its course based upon on-board sensor information.

CRYOGENICS - The study and use of devices utilizing properties of materials near absolute-zero temperature. See also MAGNETIC COOLING.

CRYPTOLOGIC ELECTRONIC WARFARE SUPPORT

MEASURES (CESM) - Electronic support measures intended to exploit other than radar systems.

CRYSTAL LASER - A solid-state LASER which employs crystals as a light-emitting source. The neodymium YTTRIUM-ALUMINUM GARNET (Nd:YAG) laser is a single-wavelength laser operating at 1.06 microns, at the edge of the range in which some NIGHT VISION Goggles (NVGs) operate. Other crystal lasers include the titanium sapphire (Ti:SAF) and the chromium-doped lithium strontium aluminum fluoride (Cr:LiSrAlF) laser which emit in a broad spectral range. Through use of other optical elements in the laser system, such as a grating for wavelength selection, these can be made to lase in a narrow band. This allows near-IR color selection (tunability). Such lasers also can be made to scan through a range of output of colors, or even frequency hop, using a piezo-driven grating.

See also DIODE LASER, DYE LASER, GAS LASER.

CRYSTAL VIDEO RECEIVER - A simple and inexpensive SIGINT receiver offering a high probability of intercept (POI) within its frequency range. Receivers based solely upon crystal video detectors have low sensitivity, poor frequency resolution and inferior simultaneous signal performance.

NOTE: Improved frequency selectivity can be achieved, at the cost of decreased POI, with the addition of narrow bandpass filters in the front end. This variation is known as the Tunable RF Receiver.

CUEING - See CUIING.

CUIING - The process of passing data from one system to another to prepare it for action.

CUIING RECEIVER - An ESM receiver consisting of a coarse parameter measurement receiver and one or more fine parameter measurement receivers. The coarse parameter measurement receiver provides high probability of intercept due to its wide frequency and angle coverage, and passes the received signal to the fine parameter measurement receivers to obtain detail information about the input signal.

CURRENT PROGRAM - (system acquisition) An existing program having an initial operational capability (IOC) date that falls within the period covered by the Five Year Defense Program (FYDP).

CUTOFF FREQUENCY - The lowest (or highest) reference frequency of a BANDWIDTH. See also BANDPASS FILTER.

CW - See CONTINUOUS WAVE.

CW INSTANTANEOUS FREQUENCY MEASUREMENT (IFM) RECEIVER SUPPRESSION - An ECCM technique used to prevent strong

CW or NARROWBAND JAMMING signals appearing in the IFM receiver from interfering or jamming the entire IFM receiver bandwidth.

CW JAMMING CARRIER CANCELING - An ECCM technique used by CW semi-active homing missile receivers to cancel slightly off-frequency CW jamming signals.

CYBER ATTACK TOOL PRECURSOR AWARENESS AND WARNING SYSTEM (CATPAWS) - A system which employs a combination of NEURAL NETWORK reasoning, algorithms and ARTIFICIAL INTELLIGENCE (AI) plus visualization and graphical interfaces. CATPAWS displays intrusion patterns from various network sensors for both internal and external intrusions.

NOTE: As the system's artificial intelligence learns these patterns, it can, with the help of a skilled operator, detect an attack in progress in REAL TIME or NEAR REAL TIME.

CYBERSPACE - (1) The notional environment within which electronic communications occurs. (2) The space of VIRTUAL REALITY. (3) The global information environment.

CYBERSPACE COMMAND AND CONTROL (CC²) - The employment of sensors such as distributed packet sniffers, system log files, protocol traps and queries, signature-based intrusion detection systems, user profile databases, system messages, threat databases and operator commands, to observe information flowing in networks and to determine the identity, rate of attacks, threats and targets of both friendly and hostile information objects in CYBERSPACE.

CYBERWAR - Conducting, or preparing to conduct, military operations according to information-related principles. It means disrupting, if not destroying, information and communications systems, broadly defined to include even military culture, on which an adversary relies in order to know itself: who it is; what it can do; when it can do it; why it is fighting; and which threats to counter first. It means trying to know everything about the adversary while keeping the adversary from knowing much about oneself...turning the balance of information and knowledge in one's favor, especially if the balance of forces is not...using knowledge so that less capital and labor may have to be expended. See also INFORMATION WARFARE.

CYCLOSTATIONARITY - A statistical property exhibited by essentially all digital signals and some naturally occurring waveforms. A stationary signal is one whose statistics do not vary with time. Therefore, a stationary signal can be sampled at periodic intervals free from concerns that the signal may be changing over time. A cyclostationary signal is periodically stationary. That is, by delaying the signal by some amount, the statistics do not vary with respect to the signal before the delay.



D

DAEMON - A small program that runs in the background on Unix and other machines while other, higher-priority, programs run in the foreground.

DAMAGE ASSESSMENT - See BATTLE DAMAGE ASSESSMENT

DARPA SYNDROMIC SURVEILLANCE SYSTEM (D-S³) - A subsystem of the ENHANCED CONSEQUENCE MANAGEMENT PLANNING AND SUPPORT SYSTEM (ENCOMPASS), D-S³ provides a biosurveillance capability that tracks patients' signs and symptoms to alert epidemiologists of any new trends, such as the possible release of a bioagent.

See also INCIDENT COMMAND MANAGEMENT SYSTEM (ICMS.)

DATA ARCHEOLOGY - See DATA MINING

DATA ASSOCIATION - The process of correlating new pieces of information with other reports, targets or tracks in the database. See also DATA COMBINATION/ FUSION/ REASONING.

DATA COMBINATION - The (primarily) numerical process, which uses the multiple sensor measurements to classify the target or event into one or more categories (friend-foe-neutral, warhead, decoy, fighter-bomber or specific target type such as the Delta class submarine). See also DATA ASSOCIATION/ FUSION / REASONING.

DATA DISTRIBUTION SYSTEM (DDS) - That component of the COOPERATIVE ENGAGEMENT SYSTEM (CES) that collects data from the COOPERATIVE ENGAGEMENT PROCESSOR (CEP), encrypts it, and transmits it to other cooperating units (CUs). It also accepts data from the CUs and sends it to the local CES. See also COOPERATIVE ENGAGEMENT.

DATA DREDGING - See DATA MINING

DATA DRIVEN ATTACK - A form of attack used by CRACKERS which is characterized by its being encoded inside innocuous data which is then executed by a user or other software to implement the attack. See also E-MAIL BOMB, HACKER NOTE: Data driven attacks may get through the FIREWALL in data form, enabling the attack to be launched behind the firewall.

DATA FUSION - The fully automated method of merging diverse data into a single, coherent representation of the tactical, operational or strategic situation. See also DATA ASSOCIATION, DATA COMBINATION, DATA REASONING.

DATA MINING - (1) The attempt to find patterns, especially those, which are hidden and unexpected, in data. (2) An iterative process of extracting patterns from a

set of data, such as from those in a DATA WAREHOUSE, in order to deduce implicit, previously unknown, and potentially useful information. Data mining uses machine learning, statistical and visualization techniques to discover and present knowledge in a form that can be comprehended easily by humans. (Also called DATA ARCHEOLOGY, DATA DREDGING, DATA PATTERN PROCESSING, INFORMATION DISCOVERY, INFORMATION HARVESTING, KNOWLEDGE DISCOVERY IN DATABASES (KDD), KNOWLEDGE EXTRACTION. See also GENETIC DATA MINING.

NOTE: Methodological approaches to data mining include cluster analysis, linkage analysis, visualization, algorithms, categorization analysis. Technologies used in data mining include NEURAL NETWORKS, decision trees, time series analysis, GENETIC ALGORITHMS, hybrid approaches, FUZZY LOGIC and statistics.

DATA PATTERN PROCESSING - See DATA MINING

DATA REASONING - The primary symbolic process, which combines related measurement and decision data to infer the classification or intent of individual targets or larger target aggregates. See also EXPERT SYSTEM, DATA ASSOCIATION, DATA COMBINATION, DATA FUSION.

DATA WAREHOUSE - A sophisticated database which comprises a complete repository of historical data for an organization. Its design emphasizes data storage efficiency and data reliability, rather than speed of extraction or currency of data. Compare with OPERATIONAL DATA STORE. See also DATA MINING.

NOTE: In a data warehouse, data are stored at the lowest level of detail possible so that they can be searched, collected and re-shaped for any purpose.

DATAGRAM - (1) A data packet traveling through the Internet. (2) A PACKET carrying enough header information to be routed from its source to its destination independent of other packets and without any need to set up an end-to-end connection.

DATUM - In antisubmarine warfare, a datum is the last known position of a submarine, or suspected submarine, after contact has been lost. See also FLAMING DATUM.

DAZZLE - Temporary loss of vision or a temporary reduction in visual acuity. See also FLASH BLINDNESS.

DAZZLING - A COVER technique to hide the real by confusing the observer.

DEAD HAND - A Russian ICBM launch system that, in the event of a U.S. first strike that would decapitate the top leadership in Moscow, provides for an automatic retaliatory launch against the United States. It is code-named *Perimetr*.

DEAD MAN'S SWITCH - See SPECIAL WEAPONS EMERGENCY SEPARATION SYSTEM (SWESS).

DECEPTION - Those measures designed to mislead the enemy by manipulation, distortion, or falsification of evidence to induce him to react in a manner prejudicial to his interests. See also ELECTRONIC DECEPTION.

NOTE: A notion of DECEPTION is to "show the false".

DECEPTION MEANS - Methods, resources, and techniques that can be used to convey information to a foreign power. There are three categories of deception means: physical means, technical means, and administrative means.

DECEPTIVE HOLOGRAPHIC IMAGING - The projection of an array of holographic images about certain locations to deceive the adversary into misallocation of resources, attention, and/or effort around the present operation.

DECEPTIVE JAMMING - The transmission of signals similar to the victim's transmissions but false, causing the enemy to misinterpret or misuse the received signals.

DECEPTIVE NOISE - [ACOUSTIC JAMMING term] The simulating of ship noise, torpedoes, or transient sounds to deceive a submarine.

DECIBEL - One-tenth of a Bel (named after Alexander Graham Bell), the number of decibels denoting the ratio of the two amounts of power being ten times the logarithm to the base 10 of this ratio.

NOTE: the abbreviation dB is commonly used for the term decibel. With P1 and P2 designating two amounts of power and n the number of decibels denoting their ratio, $n = 10 \log_{10} (P1/P2)$ decibel. From this relationship, it can be seen that a 3dB decrease is a 50% reduction in power, approximately.

DECISION TECHNOLOGY SYSTEM - An information system to support all phases of decision making from problem recognition, through problem formulation, analysis, solution, interpretation, and implementation. The system can include management information systems, decision support systems, expert systems, executive information systems, office automation systems, and idea processing systems.

DECONFLICTION - (1) The process of optimizing frequency usage in a tactical environment. See FREQUENCY DECONFLICTION.

(2) The minimization of fratricide through SITUATIONAL AWARENESS (SA) and effective use of weapons.

(3) The control of shipping to prevent interference with military operations.

DECONVOLUTION - Processing of signal parameters to exclude undesirable effects, such as ambient noise and own signals.

DECOUPLING TILE - Foam tiles applied to ships' hulls adjacent to main and auxiliary engine spaces to decouple the sound path between machinery noise and the external environment.

DECOY - An imitation in any sense of a person, object or phenomenon, which is intended to deceive enemy surveillance devices or mislead enemy evaluation. See also CHAFF.

DECOYING - A deception technique which diverts attention to offer misleading or multiple options to the enemy.

NOTE: Examples of DECOYING are the diversionary strike and use of devices to simulate ships or aircraft.

DECOY SHIP - A ship CAMOUFLAGED as a noncombatant ship with its armament and other fighting equipment hidden, and with special provisions for unmasking its weapons quickly. Also called Q-SHIP.

DEEP ATTACK - (1) All actions that can apply force outside the area of close combat. (2) The application of force in adversary space outside the area of close engagement.

DEEP SIREN - A surface-towed batwing-shaped low frequency (less than 2KHz) sonar system, which permits submerged submarines to maintain communications with a task force while remaining on station (*i.e.*, the submarine need not leave station to come to periscope depth to communicate with the task force).

DEFENSE INFORMATION INFRASTRUCTURE (DII) - The worldwide shared or interconnected system of computers, communications, data, applications, security, people, training, and other support structures serving a nation's military's information needs.

DEFENSE SWITCHED NETWORK (DSN) - A component of the Defense Communications System that handles Department of Defense (DoD) voice, data, and video communications. Formerly, the AUTOMATIC VOICE NETWORK (AUTOVON.)

DEFENSIVE COUNTERSPACE OPERATIONS - That part of COUNTERSPACE OPERATIONS that involves active and passive actions to protect space-related capabilities from enemy attack or interference. [Air Force Doctrine Document (AFDD) 1, *Air Force Basic Doctrine*, September 1997, 48]

See also OFFENSIVE COUNTERSPACE OPERATIONS.

DEFERENCE TONES - A NONLETHAL WEAPON consisting of sophisticated arrays that can project a voice, or other sound, to a particular location so that the sound can only be heard at that particular location.

DEFERRED TIME - Operations yielding results than can be manifested, displayed, or printed later. Contrast with REAL TIME.

DEGAUSSING - The neutralization of the strength of the magnetic field, e.g., of a vessel. See also DEPERMING.

DEINTERLEAVING - The process of separating simultaneously-received signals from multiple emitters so that the pulses of a single emitter can be isolated and identified.

DELAYED-ACTION AGENT - A NONLETHAL WEAPON consisting of a non-lethal agent (e.g. CALMATIVE AGENT) that has a controlled delay time before becoming effective.

DELOUSING - The distinguishing of returning Blue (friendly) strike aircraft from tag-along Red (enemy) aircraft so as to (1) avoid firing upon friendly forces, (2) provide assistance in getting them home, and (3) recognize and counter any tag-along Red aircraft.

DELTA JAMMING - A SELF-SCREENING ECM technique that causes angle errors in monopulse radars by transmitting two RF signals whose frequencies are separated in such a way as to cause false intermediate frequency (IF) signals in the victim radar's IF amplifier.

DEMON DIALER - A relatively unsophisticated computer program that dials the same telephone number continually until it detects an answer. Compare with WARDIALER.

DEMPSTER-SHAFER REASONING - A method of DATA REASONING that allows multiple information sources with varying levels of belief to contribute to probabilistic decisions. When used for sensor fusion, each sensor is allowed to contribute information at its own level of detail. See also EXPERT SYSTEM, DATA ASSOCIATION, DATA COMBINATION, DATA FUSION.

NOTE: Other sensor fusion techniques include KALMAN FILTERING, Bayes networks, hidden Markov models, and FUZZY LOGIC.

DENIAL - Preventing an adversary from gaining information on friendly intentions, disposition or capabilities.

DENIAL OF SERVICE (DOS) ATTACK - See E-MAIL BOMB.

DENSE WAVELENGTH DIVISION MULTIPLEXING (DWDM) - A LASER technique which enables a single strand of fiber to carry up to 400 gigabits

per second. It features transmission of very closely spaced wavelengths by dividing the laser light among 80 different channels of varying colors.

DEPARTMENT/SERVICE MILITARY DECEPTION - MILITARY DECEPTION planned and executed by Military Services about military systems, doctrine, tactics, techniques, personnel or service operations, or other activities to result in foreign actions, which increase or maintain the originator's capabilities relative to adversaries. Department/Service Military Deception is a category of Military Deception.

See also DECEPTION, ELECTRONIC DECEPTION, MILITARY DECEPTION.

DEPERMING - To remove, as far as practicable, the permanent magnetic characteristics of a ship's hull by powerful external demagnetizing coils. See also DEGAUSSING.

DESTRUCTIVE ELECTRONIC WARFARE - Those EW actions that are planned to damage or destroy enemy personnel, equipment, or facilities.

DETECTOR - With respect to electromagnetic energy, a detector is a device for the indication of the presence of electromagnetic fields.

DETUNING SKIRT - An electrical attachment to tower structures (*e.g.*, cellular telephone tower) used to prevent the tower from reflecting or reradiating AM signals, which would affect the intended directional characteristics of the AM station.

NOTE: A detuning skirt consists of three or more wires spaced equally about the structure and strung alongside its length at a distance of 18-30 inches. The wires of the skirt are bonded to the tower at the top, and are connected to a wire hoop around its bottom (the 'skirt'). The wires are kept from touching the tower at any place (except the top) by insulators, if required. The hoop is connected to an electrical tuning circuit housed near the tower, which is tuned to the signal of interest. After proper tuning (or 'detuning') the tower presents a high impedance to the signal and, therefore, will not reflect nor reradiate it.

DEUTERIUM FLUORIDE (DF) LASER - The DF laser is chemically the same as the HYDROGEN FLUORIDE (HF) LASER. However, the increased mass of heavy hydrogen deuterium, shifts the laser wavelengths to 3.5 mm to 4 mm. This range is superior to the HF laser range for transmission through the atmosphere. See also MID INFRARED CHEMICAL LASER (MIRACL.)

DEVELOPING CRITICAL TECHNOLOGIES (DCT) - Technologies that will produce increasingly superior performance of military systems or maintain a superior capability more affordably. [<http://www.dtic.mil/mctl>]

See also WEAPONS SYSTEMS TECHNOLOGIES (WST), MILITARILY CRITICAL TECHNOLOGIES LIST (MCTL).

DIBIT - A group of two BITS. See also BYTE.

NOTE: The four possible states for a dibit code are 00, 01, 10, and 11.

DICKE FIX - An ECCM technique used to counter SWEEP JAMMING.

DIFFERENCE ACOUSTIC WAVE GENERATION SYSTEM

(DAWGS) - A NONLETHAL ACOUSTIC WEAPON consisting of electro-pneumatic acoustic generators which produce a high power acoustic beam with precise frequency control.

DIFFERENTIAL GLOBAL POSITIONING SYSTEM (DGPS) - A

system in which on-shore GPS stations measure the difference between their actual position and the GPS measurement, then broadcast a correction signal for navigators aboard nearby ships to use. Positions can be determined to within 3 meters.

DIFFUSE REFLECTION - Reflection from a rough surface. Contrast with SPECULAR REFLECTION.

DIGITAL BATTLEFIELD - A combination of automated position location, communications, information, targeting, and sensor systems that provides a common operational picture.

DIGITAL DUST - See SMART DUST

DIGITAL MICRO-MIRROR DEVICE (DMD) - A space-and-cost-effective alternative to the CATHODE RAY TUBE (CRT). A DMD creates images using millions of tiny mirrors, each a PIXEL. The DMD projects light with a grid-like series of pixels and the light reflected from the pixels creates detailed pictures. Each micro-mirror element is suspended at two corners, enabling it to turn on microscopic torsion hinges. Computer-driven electrical impulses to a pad beneath the matrix of mirrors causes the pixels to tilt and direct light toward or away from an imaging lens and onto a viewing screen. Optical resolution is improved by increasing the number of mirrors used. DMDs may have from 440,000 to more than two million mirrors.

DIGITAL MODULAR RADIO (DMR) - A reprogrammable radio that permits the operator to instantly change the device's bandwidth, modulation and security waveforms with software commands. The digital modular radio can also function as a router, moving voice, data and video over a wide variety of wireline and wireless paths. Users can reprogram the radio through a Windows-like interface from a personal computer, or remotely over wireless and wireline, or over Internet pathways. Also called SOFTWARE REPROGRAMMABLE RADIO.

DIGITAL NAUTICAL CHART (DNC) - A relational, vector-based digital database containing selected maritime features collected and attributed individually to support worldwide marine navigation and Geographic Information Systems (GIS). [Source: NIMA]

NOTES: (1) DNC is a registered trademark owned by the National Imagery and Mapping Agency (NIMA), (2) The database is a replication of the feature content of

NIMA's portfolio of hard copy Harbor, Approach, Coastal, and General charts (about 5,000 charts), (3) Currently (2002), only the U.S. Navy, U.S. Coast Guard, DoD government agencies, and authorized DoD contractors are authorized to use DNC.

DIGITAL RADAR - A radar in which system control and signal processing are effected by digital computer systems. Contrast with ANALOG RADAR.

DIGITAL RADIO FREQUENCY MEMORY (DRFM) - An electronic device consisting of a random access memory, analog-to-digital converters, digital-to-analog converters, and associated circuitry which provides the ability to capture threat emissions and to generate precise replicas for transmission at a later time.

DIGITAL RADIO FREQUENCY TAGS (DRaFT) - Lightweight RF tags worn by personnel and placed on unattended ground sensors and other units that will permit sensors such as radars to track the identification and location of friendly units.

DIGITAL SIGNATURE - A method for providing proof of the identity of the sender of a message and verification that the message has not been altered in transit.

DIGITAL TECHNICAL CONTROL (DTC) - A component of the Marine Corps digital communication network (other components include, the Unit Level Circuit Switch (ULCS), Tactical Data Network (TDN), Tactical Communications Central (TCC), and various multi-channel radios) which acts as a central management facility for the installation, operation, restoration, and management of digital trunk groups consisting of multiplexed and individual circuits. [Extracted from a USMC Web page].

NOTES: DTC provides the primary interface between subscriber systems and LOCAL AREA NETWORKS (LANs) with the long-haul multi-channel transmission systems to transport voice, message, data, and imagery traffic. It can add, drop, and insert digital circuits into multiplexed groups, provide a source of stable timing to connected equipment or conditioned circuits, and perform analog/digital, 2-wire/4-wire, and signaling conversions. It contains the monitoring, testing, and patching equipment required by technical controllers to troubleshoot and restore faulty circuits and links.

DILUTION CHAFF - See DISTRACTION CHAFF.

DIODE - (1) A VACUUM TUBE containing two elements: CATHODE and ANODE (plate). (2) A semiconductor device having two terminals and exhibiting a non-linear voltage-current characteristic.

DIODE LASER (DL) - A LASER in which a semiconductor is used as the light-emitting source. The choice of semiconductor material determines the wavelength of the output light, with very little tunability permitted for a given semiconductor material. See also CRYSTAL LASER, DYE LASER, GAS LASER.

NOTE: Unlike other lasers, DIODE LASERS have no energy storage states, but they can be made very small, yet powerful.

DIPLEXING - The use of a single antenna to transmit on two separate frequencies simultaneously.

DIPOLE - (1) A metal radiating structure of one-half wave-length in length so that the current has a node at each end of the element (2) A strip of metal cut to one-half wavelength. Synonymous with HALF-WAVE ANTENNA.

DIRECT COUPLING - (1) The coupling or conduction of signals or noise from one conductor to another by means of direct hardwire contact (as opposed to inductive or capacitance coupling) or an optical fiber to fiber direct interface (as opposed to, say, a lens interface). (2) The injection of a virus directly into the target system. See also COMPUTER VIRUS COUNTERMEASURES.

NOTE: Direct coupling could be accomplished by a continuous transmission of the virus code at the same time that the victim is receiving a valid transmission.

DIRECT FINGER READER (DFR) - A BIOMETRIC DEVICE, placed on a peripheral (e.g., keyboard or mouse), which will allow usage of the peripheral only by users whose fingerprints are on file in the system's database of authorized users.

DIRECT JAMMING SUPPORT - A type of TARGET AREA JAMMING SUPPORT in which the jamming aircraft flies directly through hostile territory, sometimes with the strike package it will support. See also AREA JAMMING SUPPORT, CLOSE-IN JAMMING SUPPORT, CORRIDOR JAMMING SUPPORT, STAND-OFF JAMMING SUPPORT.

DIRECT SEQUENCE SPREADING - A SPREAD SPECTRUM technique, which employs a code-carrier to multiply a signal containing the information to be transmitted. Direct Sequence Spreading uses the entire spread bandwidth as an instantaneous bandwidth. Contrast with FREQUENCY HOPPING, TIME HOPPING.

DIRECT (FREQUENCY) SYNTHESIS (DS) - FREQUENCY SYNTHESIS where generation of desired frequencies is achieved by using a stable oscillator to generate a single reference frequency. Contrast with INDIRECT SYNTHESIS (IS).

DIRECT VIEW OPTICS (DVO) - A generic term for any set of optics designed to enhance the human eye, which is the sensor in such a system. NOTE: An example of DVO is a pair of binoculars.

DIRECTED ENERGY (DE) - An umbrella term covering technologies that relate to the production of a beam of concentrated electromagnetic energy or atomic or subatomic particles. [CJCS MOP 6, APPENDIX B]

NOTE: Directed energy is one of DoD's WEAPONS SYSTEMS TECHNOLOGIES, and, with Kinetic Energy (KE) Systems Technology, comprises the following:

DIRECTED ENERGY (DE) AND KINETIC ENERGY (KE) SYSTEMS TECHNOLOGY

CHARGED PARTICLE BEAM (CPB)

NEUTRAL PARTICLE BEAM (NPB)

ANTIMATTER PARTICLE BEAM (APB)

GAMMA-RAY LASER (GRASER)

KINETIC ENERGY WEAPON (KEW)

HIGH POWER MICROWAVE/RADIO FREQUENCY
(HPM/RF)

DIRECTED ENERGY DEVICE - A system using DIRECTED ENERGY (DE) primarily for a purpose other than as a weapon. Directed energy devices may produce effects that could allow the device to be used as a weapon against certain threats, for example, laser rangefinders and designators used against sensors that are sensitive to light.

DIRECTED ENERGY WARFARE (DEW) - Military action involving the use of DE weapons, devices, and countermeasures to either cause direct damage or destruction of enemy equipment, facilities, and personnel, or to prevent hostile use of the electromagnetic spectrum through damage, destruction, and disruption. It also includes actions taken to protect friendly equipment, facilities, and personnel and retain friendly use of the electromagnetic spectrum.

DIRECTED ENERGY WEAPON (DEW) - (1) A system using DIRECTED ENERGY (DE) primarily as a direct means to damage or destroy enemy equipment, facilities, and personnel. (2) A HARD-KILL ECM weapon employing directed energy, such as PARTICLE BEAM, HIGH ENERGY LASER, LASER ZAPPER, high powered microwaves, etc.

DIRECTED ENERGY WEAPON INTELLIGENCE (DEWINT) - Intelligence derived from the collection and analysis of DIRECTED ENERGY WEAPONS (DEW) or directed-weapon-related radio frequency/HIGH POWERED RF, ELECTROMAGNETIC PULSES (EMP), LASERS, and PARTICLE BEAMS (PB).

NOTE: DEWINT is a component of MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT).

DIRECTED STICK RADIATOR (DSR) - A portable battery-operated NONLETHAL WEAPON that uses a highly focused and intense acoustic pressure wave to disorient and disable targeted individuals up to 100 yards away. [*American Technology Corp. press release 10/30/2001*]

NOTES: (1) The DSR causes no lasting effects and can be safely used in aircraft without fear of puncturing the fuselage. (2) The DSR could also be used for animal control. (3) The DSR also has application in secure communications and

psychological warfare. In secure communications, the DSR would work as a directional loudspeaker, whereby messages could be sent to individuals in a crowd without disturbing or alerting others.

DIRECT EW SUPPORT - Mission support in which EW platforms accompany protected units, e.g., strike aircraft. See also ACCOMPANYING JAMMING. Contrast with STAND-IN EW SUPPORT, STAND-OFF EW SUPPORT.

DIRECTIONAL INFRARED COUNTERMEASURES (DIRCM) - The use of high-powered directional infrared jamming. See also INFRARED COUNTERMEASURES.

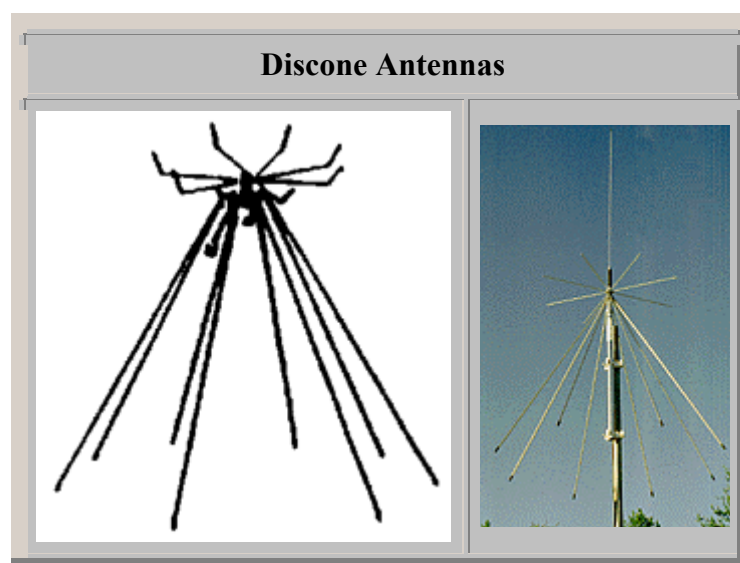
NOTE: A DIRCM engagement consists of four phases: **(1) Detect** - in which the missile warning system (MWS) detects a missile plume and sends a signal to the processor, **(2) Handoff** - in which the processor sends threat information to the DIRCM transmitter, **(3) Track** - in which the transmitter slews to the location of the threat and the flexible turret system (FTS) acquires the signal, locks on to the threat and tracks the target, and **(4) Jam** - wherein the transmitter sends a modulated beam of infrared (IR) energy to the missile seeker and jams its guidance signal.

DIRECTION FINDING (DF) - See RADIO DIRECTION FINDING.

DIRECTIVITY - **(1)** The ratio of the radiation intensity in a given direction from the antenna to the radiation intensity averaged over all directions. **(2)** The ratio of the power scattered back in the radar's direction to the power that would have been BACKSCATTERED had the scattering been uniform in all directions.

DISCONE - A biconical antenna (two conical conductors that have a common axis and vertex and are excited (or connected to the receiver) at the vertex) for which one of the cones has a vertex angle of 180 degrees.

NOTE: Discone antennas have wide BANDWIDTH characteristics and are omnidirectional.



DISK OPERATING SYSTEM (DOS) - A popular microcomputer operating system.

DISORIENTATION DEVICE - NONLETHAL WEAPON ammunition which, upon impact, inflicts an electric shock that potentially causes disorientation of the target individual.

DISSIMILAR SOURCE INTEGRATION - The integration of information or data from diverse sources, *e.g.*, RADAR, IDENTIFICATION, FRIEND OR FOE (IFF), ELECTRONIC WARFARE (EW), acoustic, visual, etc.

DISTRACTION - The successful lock-on-before-launch (LOBL) of weapons to be launched at false targets or decoys, or lock-on-after-launch (LOAL) of weapons to initially acquire and home on false targets or decoy. See also SEDUCTION.

DISTRACTION CHAFF - CHAFF which presents a credible decoy to a missile before it acquires track on the target ship or after it has been subjected to angle or range gate stealing. Synonymous with DILUTION CHAFF. Contrast with SEDUCTION CHAFF.

See also LOCK-ON METHOD OF CHAFF DEPLOYMENT and DUMP METHOD OF CHAFF DEPLOYMENT. NOTE: Distraction chaff need not have as great a RADAR CROSS SECTION as the target ship, but should be deployed at some distance away to effectively "distract" the missile.

DISTRIBUTED COMMON GROUND SYSTEM (DCGS) - A system which allows remote exploitation of multiple sensors by ground stations in the continental United States (CONUS).

DISTRIBUTED INTERACTIVE SIMULATION (DIS) - A protocol for DISTRIBUTED VIRTUAL ENVIRONMENTs developed by the U.S. military so that COMPUTER GENERATED FORCEs and manned simulators might interact on a large scale, now an IEEE standard.

DISTRIBUTED POWER (DP) - Modular electric generation or storage located near its point of use.

NOTE: In addition to providing stand-alone power for isolated sites, distributed power ensures electricity during system outages and allows customers to save money by switching to distributed generation during high-cost peak periods.

DISTRIBUTED SENSING - See MULTISENSOR DATA FUSION

DISTRIBUTED VIRTUAL ENVIRONMENT (DVE) - A VIRTUAL ENVIRONMENT in which several users may interact and whose elements exist on two or more platforms.

DISTRIBUTIVE EXPLOSIVE TECHNOLOGY (DET) - A surf mine-clearing system consisting of a dual-rocket-deployed system that fires an explosive array (or net) charge from a Landing Craft, Air Cushion (LCAC) to destroy mines in the shallow-water zone from three feet up to the beach. Compare with SHALLOW-WATER ASSAULT BREACHING (SABRE) SYSTEM.

See also AIRBORNE MINE-NEUTRALIZATION SYSTEM (AMNS), RAPID AIRBORNE MINE-CLEARANCE SYSTEM (RAMICS), and SHALLOW WATER INFLUENCE MINE SWEEP (SWIMS) SYSTEM.

DNA CRYPTOGRAPHY - A cryptographic technique in which each letter of the alphabet is converted into a different combination of the four bases that make up the human deoxyribonucleic acid (DNA). A piece of DNA spelling out the message to be encrypted is then synthesized, and the strand is slipped into a normal fragment of human DNA of similar length. The end result is dried out on paper and cut into small dots. As only one DNA strand in about 30 billion will contain the message, the detection of even the existence of the encrypted message is most unlikely.

DNS SPOOFING - See MALICIOUS CACHE POISONING.

DOMAIN - A set of interconnected networks, GATEWAYs, and hosts.

DOMAIN NAME SYSTEM (DNS) - The DOMAIN NAME SYSTEM (DNS) is used on the Internet and other UNIX-based networks to map computer names to Internet Protocol (IP) addresses.

NOTE: The generic top-level domains and the organizations which operate them are listed below:

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Generic Top-Level Domains

- The .biz domain is restricted to businesses and is operated by NeuLevel, Inc.
- The .com domain is operated by VeriSign Global Registry Services.
- The .coop domain is reserved for cooperative associations and is sponsored by Dot Cooperation LLC.
- The .info domain is operated by Afilias Limited.
- The .museum domain is reserved for museums and is sponsored by the Museum Domain Management Association.
- The .name domain is reserved for individuals and will be operated by Global Name Registry.
- The .net domain is operated by VeriSign Global Registry Services.
- The .org domain is operated by VeriSign Global Registry Services.

Registrations in the domains listed above may be made through dozens of competitive registrars. For a list of the currently operating accredited registrars, go to the InterNIC site. Information about becoming an accredited registrar is available on the ICANN site.

- The .gov domain is reserved exclusively for the United States Government. It is operated by the US General Services Administration.
- The .edu domain is reserved for educational institutions in the United States granting four-year degrees and is registered only through Educause.
- The .mil domain is reserved exclusively for the United States Military. It is operated by the US DoD Network Information Center.
- The .int domain is used only for registering organizations established by international treaties between governments. It is operated by the IANA .int Domain Registry

DOMAIN NAME SYSTEM SPOOFING - See MALICIOUS CACHE POISONING.

DOMINANT MANEUVER - The multidimensional application of information, engagement, and mobility capabilities to position and employ widely dispersed joint air, sea, land, and space forces to accomplish assigned operational tasks.

NOTE: The term "FORCE PROJECTION/DOMINANT MANEUVER is sometimes used, and is defined in the NAVWAR Joint Warfighting Science and Technology Plan (circa 2000) as "Fast deployment and timely employment and maneuver of joint forces to rapidly dominate the full range of military operations."

DONGLE - A small security device that attaches to a computer port to control access to a specific software application. NOTE: A dongle-protected program will run only when its dongle is attached to the computer.

DOPPLER EFFECT - The effective change of frequency of a received signal due to the relative velocity of a transmitter with respect to a receiver.

DOPPLER RADAR - A radar which utilizes the Doppler effect to determine the radial component of relative radar target velocity or to select targets having particular radial velocities.

DOPPLER RESOLUTION - The minimum difference in Doppler that permits target resolution among multiple contacts.

DOPPLER SHIFT - The magnitude of the change in the observed frequency of a WAVE due to the DOPPLER EFFECT. The unit is the HERTZ.

DOPPLER SONAR VELOCITY LOG (DSVL) SYSTEM - A speed-measuring device, which functions by transmitting acoustic energy at a specific frequency and receives returns from the reflection medium. The shift in frequency (Doppler shift) of the returned signal is determined and used to calculate the ships speed.

DOUBLE-DIAPHRAGM RADOME - A RADOME possessing a second diaphragm, perforated with holes about 3.8mm in diameter, positioned outside the conventional diaphragm-type radome, forming a plenum with the inner diaphragm. Air forced into the plenum flows out through the holes, floating raindrops away from the outer surface. Also called RAIN-BLOWING PLENUM.

NOTE: A double-diaphragm radome drives raindrops away from the antenna feed horn. It thus nearly eliminates the increase in noise temperature that occurs when water covers a radome. This design is particularly useful for X-band and higher frequencies, which are especially susceptible to the effects of water.

DOUBLE PULL - An ECM technique involving coordinated use of VELOCITY GATE PULL OFF (VGPO) and RANGE GATE PULL OFF (RGPO).

DOUBLE PULSING - An ECCM technique used by tracking radars against SELF-SCREENING ECM pulse repeaters by exploiting the ECM equipment's dead time which occurs after an ECM pulse transmission.

DOUBLER - With respect to LASERS, certain non-linear crystals which oscillate at the frequency of the input laser and also at a harmonic of twice that of the input laser's frequency. For example, with the input of a 10.6-micron laser light (FAR INFRARED), the output of a doubler will also include a 5.3 micron (MID INFRARED) See also OPTICAL PARAMETRIC OSCILLATOR, TRIPLER.

DOUBLY-CONFORMAL ANTENNA - A CONFORMAL ANTENNA which does not protrude from the vehicle surface nor intrude into the vehicle support structure. See also MICROSTRIP ANTENNA, CONFORMAL ANTENNA ARRAY, SHARED-APERTURE ANTENNA.

DRAG BAG - A padded abrasion-resistant enclosure designed to meet the needs of the tactical shooter. The drag bag is used for carrying a rifle (generally a sniper's weapon) and other gear as a back pack, and can be removed and dragged quietly behind as the stalker moves into position. Numerous pockets provide storage for binoculars, range finder, spotting scope and ammunition. Pockets are provided to hold cleaning rods and retaining straps for the rifle. The back-pack shoulder straps may be removed and stored in a pocket. The drag bag may be opened fully to serve as a ground pad. See also GHILLIE SUIT, BALACLAVA, SNIPER FACE VEIL.

NOTE: Drag bags are also used in rescue missions for carrying air, rope, hose and other tools a rescuer might need during rapid intervention and rescue. A thick nylon material with foam padding provides the strength and shock resistance for the most hazardous rescues. Internal compartments hold the air cylinder, regulator assembly, air mask, radio, man-down alarm, rope and other required rescue supplies.

DRIFT SPACE - In a VACUUM TUBE, A region substantially free of externally applied alternating fields, in which a relative repositioning of the electrons takes place. See also KLYSTRON.

DRIVER'S VISION ENHANCER (DVE) - A device which provides the driver of a vehicle with the ability to drive at night and under obscured conditions.

DRONE - (1) A land, sea, or air vehicle that is remotely or automatically controlled. (2) A pilotless air vehicle pre-programmed prior to launch to accomplish a set of functions with no further human intervention. The drone may use on-board sensors to autonomously make mission adjustments.

See also REMOTELY PILOTED VEHICLE, UNMANNED AIR VEHICLE.

DRY-ICE WEAPON - A NONLETHAL WEAPON consisting of a dry-ice bomb that incapacitates subjects by overwhelming them with CO₂ at concentrations above 15% by volume.

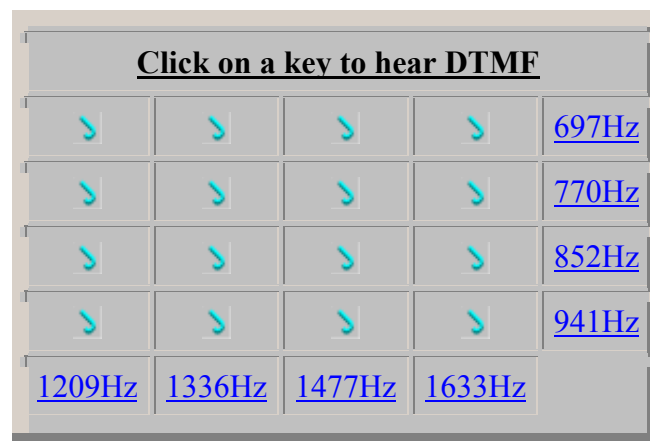
NOTE: Because high concentrations of CO₂ can be lethal, oxygen must be available to treat the affected individuals as soon as possible.

DUAL ANAMORPHIC REFLECTOR TELESCOPE (DART) - A low-mass membrane telescope for use in earth-orbiting and deep space applications. DART uses a thin membrane for the reflective surfaces, which allows for greater aperture size without increasing the telescope's overall mass. DART consists of two parabolic-cylindrical trough-shaped reflectors aligned with each other to produce a point focus. The mirrors are formed by tensioning a reflective foil over a frame with a parabolic contour along one axis.

NOTE: As the aperture of a DART device increases, the mass ratio of structure to reflector decreases - the opposite of traditional telescopes.

DUAL-MODE EXPENDABLE - See FLAMING RECEIVER.

DUAL TONE MULTI FREQUENCY (DTMF) - Also known as Touch Tone™, DTMf, or dual tone multi frequency, uses two tones to represent each key on the telephone touch pad. (The *A*, *B*, *C*, and *D* keys were used for the U.S. military's Autovon phone system).



(Sampled at 8Khz)

When any key is pressed, the tone of the column and the tone of the row are generated, hence dual tone. As an example, pressing the '5' button generates the tones 770Hz and 1336Hz.

DUAL-USE TECHNOLOGY - Technology which is usable in both military and civilian applications.

DUAL WARNING PHENOMENOLOGY - Deriving warning information from two systems observing separate physical phenomena (e.g., radar/infrared or visible light/X-ray) associated with the same events to attain high credibility while being less susceptible to false reports or SPOOFING.

DUCTING - A phenomenon in which radio waves are bent to conform to the curvature of the Earth (e.g., in the troposphere), rather than traveling in a straight line, thus extending the range of propagation.

NOTE: Ducting of sound waves can occur within temperature inversion layers in water, as well.

DUMB AMMUNITION - A generic classification. Dumb ammunition follows a purely ballistic trajectory with spin stabilization. There is no guidance, and errors in delivery are due primarily to pointing, propellant burn, and meteorological factors. Contrast with BRILLIANT AMMUNITION, SMART AMMUNITION.

NOTE: An example of dumb ammunition is the CLUSTER BOMB UNIT.

DUMB MINE - A mine which has no self-destruct capability, and therefore remains a threat while implanted. Contrast with SMART MINE.

DUMMY LOAD - A dissipative but essentially non-radiating substitute device having impedance characteristics simulating those of the substituted device.

DUMP METHOD OF CHAFF DEPLOYMENT - An EW technique whereby the seeker of an inbound missile is first seduced by a jammer using angle or range-gate stealing and forced to lock on to the already deployed DISTRACTION CHAFF decoy. Contrast with LOCK-ON METHOD OF CHAFF DEPLOYMENT.

DUTY CYCLE - See DUTY FACTOR.

DUTY FACTOR - With respect to radar, the ratio of the active, or "ON," time within a specified period to the duration of the specified period. NOTE: This is sometimes called DUTY CYCLE.

DWELL TIME - (1) A measure of the signal-handling rate of a receiver. Specifically, dwell time is the difference in acceptance time of two signals spaced in frequency. (2) In ECCM, DWELL TIME is the length of time that a sensor looks at an emitter.

NOTE: A receiver is not always ready to accept a new signal because it may be "dwelling" on a different signal at that instant.

DWELL WALK PROGRAMMING - An ECM technique to deceive the tracking gate of a victim radar. The ECM receiver first captures the angle-gate, range-gate, or velocity-gate of the victim radar and repeats the parameters for a short time (dwell) so that the victim radar locks on to the ECM signal. Slowly - to maintain inside the tracking limits of the victim radar - the ECM set varies (walks) the angle, range, or velocity of the jamming signal to simulate a movement away from the actual ECM platform's position. After walking ten or more times the width of the victim radar's tracking gate, the ECM set stops radiating, leaving the victim radar with no target, thus breaking the lock-on. This process is repeatable, and can be used in conjunction with other complementary ECM techniques.

DYE LASER - A LASER in which the emitting element is a liquid. See also CRYSTAL LASER, DIODE LASER, GAS LASER. NOTE: Dyes can be toxic and combustible and have a relatively short operating life.

DYNAMIC HYPERTEXT MARKUP LANGUAGE (DHTML) - An extension of HYPERTEXT MARKUP LANGUAGE, providing more control over the appearance and position of elements on a Web page. DHTML is considered 'dynamic' because it provides a way to include elements on a Web page that download to a user's Web browser along with the page but do not become visible until the user interacts with them. This means that when the user interacts with the elements, they activate without requiring any action from the Web site's server.

DYNAMIC MEMORY ACCESS (DMA) - Direct data transfer between memory and peripherals, without going through the CPU.

DYNAMIC RANGE - The difference, in decibels, between the overload level and the minimum acceptable signal level in a system or transducer.



E

E-BOAT - Enemy war motorboat (British, *circa* World War II)

E-LAYER - See IONOSPHERE.

E-MAIL BOMB - An automated script, which generates a chain of e-mail messages intended to overload the resources of the victim server processor, or Mail Transfer Agent (MTA). Also called DENIAL OF SERVICE (DOS) ATTACK.

NOTE: E-mail bombs include chain bombs, error-message bombs, covert distribution, and mail exploder exploitation, among other techniques.

E-M CHART - See ENERGY-MANEUVERABILITY DIAGRAM.

EARLY WARNING AND CONTROL SYSTEM (EWCS) - A ballistic defense radar system that can maintain constant surveillance of the threat horizon and rapidly detect ballistic missiles at launch distances of more than 1,500 kilometers (930 miles), automatically initiating and maintaining target tracking. It produces a high-resolution image of targets down to less than 1 meter in size, facilitating identification of the threat and discrimination of the warhead. Jam resistant, the EWACS can track multiple threats simultaneously while maintaining full surveillance. In addition, radar data identifies the launch point, predicts the flight track and evaluates the impact point.

EARTHING - The process of making a satisfactory electrical connection between the structure, including metal skin, of an object or vehicle, and the mass of the earth, to insure a common potential with the earth. See also BONDING, GROUNDING.

EAVESDROPPING - See PROMISCUOUS MODE.

ECHELON - An intelligence global surveillance network for intercepting and processing the world's communications using numerous satellites, microwave listening stations and subsurface assets.

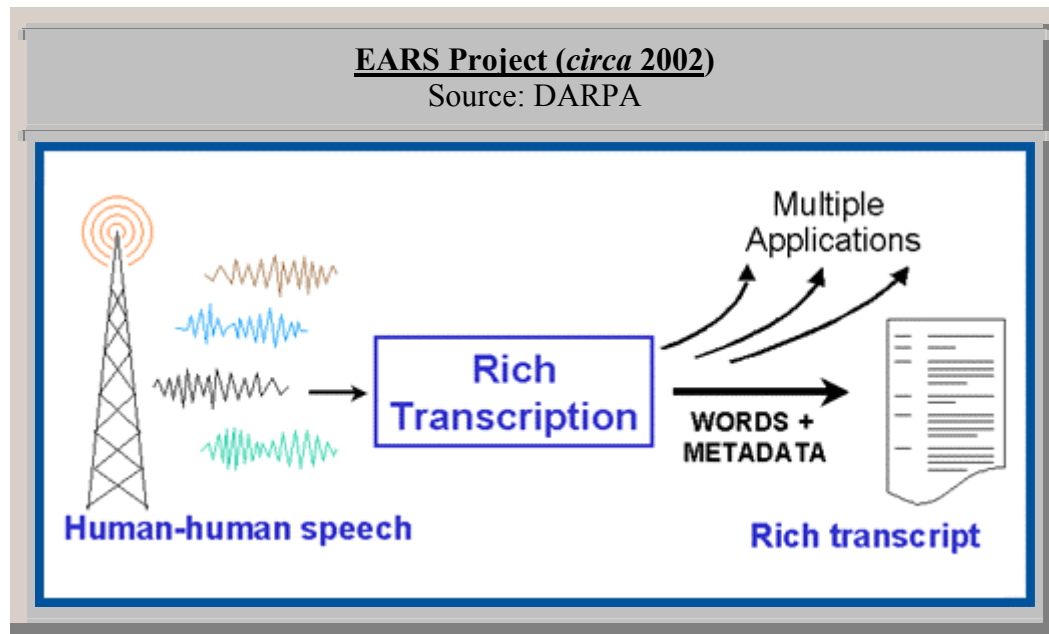
ECHO - In radar, the portion of energy of the transmitted pulse that is reflected to a receiver. See also RADAR ECHO.

ECM INTERROGATION - The use of RF transmissions that closely simulate friendly weapons system RF transmissions in order to generate adversary ECM responses.

NOTE: Information from ECM interrogation is used by designers of ECCM systems.

EDGE TRACKING - An ECCM technique, which uses only the leading (or trailing) edge of the target pulse for range tracking.

EFFECTIVE, AFFORDABLE, REUSABLE SPEECH-TO-TEXT (EARS) - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to develop speech-to-text automatic transcription technology.



EFFECTIVE DAMAGE - That damage necessary to render a target element inoperative, unserviceable, nonproductive, or uninhabitable.

EFFECTIVE RADIATED POWER (ERP) - In a given direction, the relative gain of a transmitting antenna with respect to the maximum directivity of a half-wave dipole multiplied by the net power accepted by the antenna from the connected transmitter.

EFFECTS BASED OPERATIONS (EBO) - The use of advanced technologies to help understand the enemy as a "system of systems."

NOTE: Effects based operations involves the examination of an adversary's military might as well as political, economic, cultural and decision-making factors in order to find weaknesses that can be exploited to defeat an enemy's ability to make war.

EFFLUENT/DEBRIS COLLECTION - Intelligence gathered from atmospheric effluents and debris.

NOTE: Effluent/debris collection is a subcategory of MATERIALS INTELLIGENCE, a component of MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT).

EJECTION INTERVAL - The time between the dispensing of individual decoys within a salvo or burst. Contrast with SALVO INTERVAL.

ELASTOMER - A silicon strip of alternating conductors and insulators used in printed circuit boards.

E-LAYER - See IONOSPHERE.

ELECTRIC ARMOR - A means of protecting an object from projectile collision. SHAPE MEMORY ALLOYS (SMA) are heated with pulsed electrical power at the instant of collision, augmenting the effective thickness of the shield, thereby increasing its resistance to penetration. Also called PULSED POWER SYSTEM. See also ELECTROMAGNETIC ARMOR.

NOTES: **(1)** NASA is considering using electric armor to shield the new International Space Station from potentially dangerous collisions with space debris. **(2)** Charged capacitors electrify the armor with several thousand volts. When a shaped-charge hits the armor, its jet of hot copper is dispersed by thousands of amperes of current surging through the metal plates. The warhead's remaining metal fragments are absorbed by the armor plating.

ELECTRICAL MATERIALS - That category of MATERIALS TECHNOLOGY, which addresses superconducting electrical materials that provide the capability for lightweight, compact, high-power motors, magnets, and energy storage systems.

ELECTRICAL STUN DEVICE - A NONLETHAL WEAPON which stuns target individuals with a high voltage, very low current, short duration electric shock that incapacitates the individual.

ELECTRODYNAMIC TETHER - A space-based current-carrying wire that harnesses the Earth's magnetic field to provide propulsive force.

ELECTROEXPLOSIVE DEVICE (EED) - Tiny explosive charges used to trigger weapon systems, ejection seats, or to jettison bombs and fuel tanks.

ELECTROLUMINESCENCE - **(1)** The emission of light from a phosphor excited by an electromagnetic field. **(2)** Nonthermal conversion of electrical energy into light, such as in a light-emitting diode.

ELECTROLUMINESCENT (EL) DISPLAY - An optoelectronic device with a multiplicity of electric ports, each capable of independently producing an optic output from an associated electroluminator element.

ELECTROMAGNETIC AIRCRAFT LAUNCHING SYSTEM (EMALS) - An electrically-powered catapult system intended to replace the steam-powered catapult.

NOTE: Although EMALS will require increased electrical capacity in aircraft carriers, the system will increase safety by eliminating steam lines, and reducing weight, maintenance, and personnel requirements.

ELECTROMAGNETIC ARMOR - A form of ACTIVE ARMOR that is an application of SMART ARMOR which offers protection as follows: **(1)** The penetrating jet of a shaped charge (SC) is detected, **(2)** an intense electrical discharge is created between electrically conductive plates, creating a powerful magnetic field, **(3)** the magnetic field interacts with the charged particles of the penetrating jet, and **(4)** magnetohydrodynamic instabilities occur, disrupting the jet.

See also ELECTRIC ARMOR, REACTIVE ARMOR.

ELECTROMAGNETIC BOMB - See ELECTROMAGNETIC WEAPON.

ELECTROMAGNETIC COMPATIBILITY (EMC) - **(1)** The ability of a device to function satisfactorily in its ELECTROMAGNETIC ENVIRONMENT without introducing intolerable disturbance to that environment (or to other devices). **(2)** The ability of systems, equipment, and devices that utilize the electromagnetic spectrum to operate in their intended operational environments without suffering unacceptable degradation or causing unintentional degradation of electromagnetic radiation or response. It involves the application of sound electromagnetic spectrum management; system, equipment, and device design configuration that ensures interference-free operation; and clear concepts and doctrines that maximize operational effectiveness.

ELECTROMAGNETIC DECEPTION - The deliberate radiation, re-radiation, alteration, suppression, absorption, denial, enhancement, or reflection of electromagnetic energy in a manner intended to convey misleading information to an enemy or to enemy electromagnetic-dependent weapons, thereby degrading or neutralizing the enemy's combat capability.

Among the types of electromagnetic deception are:

- a. **Manipulative Electromagnetic Deception** - Actions to eliminate revealing, or convey misleading, electromagnetic telltale indicators that may be used by hostile forces.
- b. **Simulative Electromagnetic Deception** - Actions to simulate friendly, notional, or actual capabilities to mislead hostile forces.
- c. **Imitative Electromagnetic Deception** - The introduction of electromagnetic energy into enemy systems that imitates enemy emissions.

ELECTROMAGNETIC ENVIRONMENT - The resulting product of the power and time distribution, in various frequency ranges, of the radiated or conducted electromagnetic emission levels that may be encountered by a military force, system, or platform when performing its assigned mission in its intended operational environment. It is the sum of ELECTROMAGNETIC INTERFERENCE; ELECTROMAGNETIC PULSE; HAZARDS OF ELECTROMAGNETIC RADIATION TO PERSONNEL, ORDNANCE, AND VOLATILE MATERIALS; and natural phenomena effects, such as lightning and aurora.

ELECTROMAGNETIC ENVIRONMENT ALLOCATION - The process of assigning spectral regions to sensors, active radiation devices, and

reflectors in order to regulate emissions, minimize mutual interference, and carry out the force EMISSION CONTROL (EMCON) plan.

ELECTROMAGNETIC ENVIRONMENTAL EFFECTS (E3) - The impact of the ELECTROMAGNETIC ENVIRONMENT upon the operational capability of military forces, equipment, systems, and platforms. It encompasses all electromagnetic disciplines, including ELECTROMAGNETIC COMPATIBILITY/ELECTROMAGNETIC INTERFERENCE; ELECTROMAGNETIC VULNERABILITY; ELECTROMAGNETIC PULSE; ELECTRONIC COUNTER-COUNTERMEASURES; HAZARDS OF ELECTROMAGNETIC RADIATION TO PERSONNEL, ORDNANCE AND VOLATILE MATERIALS; and natural phenomena effects of lightning and PRECIPITATION STATIC.

ELECTROMAGNETIC INDUCTION DETECTOR - A fast-response device used to locate mines and other metallic objects by determining the time constant rate of decay of induced electromagnetic radiation.

ELECTROMAGNETIC INTERFERENCE (EMI) - Any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics/electrical equipment. It can be induced intentionally, as in some forms of electronic warfare, or unintentionally, as a result of spurious emissions and responses, intermodulation products, and the like.

ELECTROMAGNETIC INTERFERENCE (EMI) GASKET - A monel mesh gasket, impregnated with silicone gel, to seal a surface on contact and keep the electrolyte away from the metal-to-metal interface, which is otherwise subject to galvanic corrosion due to conductive metal powders used in the gasket.

ELECTROMAGNETIC INTRUSION - The intentional insertion of electromagnetic energy into transmission paths in any manner, with the objective of deceiving operators or of causing confusion. See also INTRUSION.

ELECTROMAGNETIC JAMMING - The deliberate radiation, re-radiation, or reflection of electromagnetic energy for the purpose of preventing or reducing an enemy's effective use of the ELECTROMAGNETIC SPECTRUM, and with the intent of degrading or neutralizing the enemy's combat capability. See also ELECTRONIC JAMMING.

Listen to various electronic jamming signals: Bagpipes; Crypto Spoofing; FSK Spoofing; Modulated White Noise; Random Tones; Sine Wave (1 kHz); Square Wave (500 Hz); Stepped Tones; Swept Tones; Tone Jamming; White Noise.

ELECTROMAGNETIC OBSCURANT - Smoke, dust, mist, and other particular material deliberately generated to degrade the enemy's sensors and deny detailed information about the protected unit(s). See also AEROSOL.

ELECTROMAGNETIC PULSE (EMP) - The electromagnetic radiation from a nuclear explosion caused by Compton-recoil electrons and photoelectrons

from photons scattered in the materials of the nuclear device or in a surrounding medium. The resulting electric and magnetic fields may couple with electrical/electronic systems to produce damaging current and voltage surges. May also be caused by non-nuclear means. Also called NUCLEAR MAGNETIC PULSE (NEMP).

See also NEMP COUNTERMEASURES, INDUCED ELECTROMAGNETIC PULSE (IEMP), SYSTEM-GENERATED ELECTROMAGNETIC PULSE (SGEMP).

NOTE: A single high-altitude nuclear burst of 10 or more megatons at the geographic center of North America would, within 3 to 5 NANoseconds, disable virtually every kind of unprotected electronic and electrical circuit. Damage to crucial weapons control systems could be irreversible within the limited time available to respond.

ELECTROMAGNETIC RADIATION - Radiation made up of oscillating electric and magnetic fields and propagated with the speed of light. Includes gamma radiation, X-rays, ultraviolet, visible, and infrared radiation, and radar and radio waves.

ELECTROMAGNETIC RADIATION ABSORPTION - See ABSORPTION.

ELECTROMAGNETIC RADIATION HAZARDS (RADHAZ) - Hazards caused by a transmitter/antenna installation that generates ELECTROMAGNETIC RADIATION in the vicinity of ordnance, personnel, or fueling operations in excess of established safe levels or increases the existing levels to a hazardous level.

These hazards will exist when an electromagnetic field of sufficient intensity is generated to: **(a)** Induce or otherwise couple currents and/or voltages of magnitudes large enough to initiate electro-explosive devices or other sensitive explosive components of weapon systems, ordnance, or explosive devices. **(b)** Cause harmful or injurious effects to humans and wildlife. **(c)** Create sparks having sufficient magnitude to ignite flammable mixtures of materials that must be handled in the affected areas.

Synonymous with EMR Hazards, and HAZARDS OF ELECTROMAGNETIC RADIATION TO PERSONNEL, ORDNANCE, AND VOLATILE MATERIAL (HERO).

ELECTROMAGNETIC RADIATION REFLECTION - The abrupt change in direction of an electromagnetic WAVE at an interface between two dissimilar media so that the wave returns into the medium from which it originated. See also SKIN ECHO.

ELECTROMAGNETIC RADIATION SHIELDING - The protection of a device from electromagnetic radiation by an electromagnetic shield. The shield consists of a screen, housing, or other object, usually conducting that substantially

reduces the effect of electric or magnetic fields on one side thereof, upon devices or circuits on the other side.

ELECTROMAGNETIC RADIATION SIGNATURE - (1) As applied to a radar, its specific radiation parameters that may allow it to be distinguished from all others, even of the same type. (2) Radiated signals clearly indicating the system mode of operation, purpose, and to a certain extent the variety of countermeasure action likely to prove most profitable. (3) Characteristics associated with an emitter such as Carrier frequency, Pulse repetition frequency (PRF), Pulse width (PW), Antenna scan rate; Antenna scan pattern, Antenna SIDE LOBE structure, and Message contents (AM, FM, digital, etc.).

ELECTROMAGNETIC RAIL GUN (EMR) - A kinetic-kill weapon comprising two Teflon-coated rails which both accelerate and guide the projectile, typically housed in a "sabot" like structure that splits apart and sheds itself from the projectile after leaving the rail gun. The projectile itself may be a ten-pound needle-shape about 1 foot and half long and 1.5 inches in diameter. The pulsed electric current passed along the two rails via a connecting armature forms a magnetic field, which accelerates the projectile along the gun 'barrel', each pulse adding increased energy so that the projectile's target velocity may reach nearly 2500 kilometers per second. At this speed the projectile superheats to a point that exceeds the ability of steel or other armor to withstand it, and thus passes through the armor as if it were butter. Once inside the protected area, the projectile delivers a shock wave and heat wave, destroying the contents of the interior of the vehicle or building. See also KINETIC KILL VEHICLE (KKV).

NOTES: Although huge amounts of power are required to accelerate projectiles to such speeds, the rail gun has advantages, among which: (1) It is easier to maintain, (2) because its rounds are basically inert, they are relatively safe to store, (3) its speed makes it hard to counter, and (4) it is both light and accurate.

ELECTROMAGNETIC REFLECTION - Electromagnetic energy diverted back from the interface of two media. The reflection may be specular (*i.e.*, direct) or diffuse according to the nature of the contact surfaces.

ELECTROMAGNETIC RERADIATION - See RERADIATION.

ELECTROMAGNETIC SPECTRUM - The range of frequencies of electromagnetic radiation from zero to infinity. Also called FREQUENCY SPECTRUM. It is divided into 11 radio-wave propagation frequency ranges.

<u>RADIO SPECTRUM</u> (radio-wave propagation)	
ULF	lower than 3 Hz
ELF	3 Hz – 3 kHz
VLF	3 - 30 kHz
LF	30 – 300 kHz
MF	300 kHz - 3 MHz
HF	3 – 30 MHz
VHF	30 - 300 MHz
UHF	300 MHz - 3 GHz
SHF	3 - 30 GHz
EHF	30 - 300 GHz
Submillimeter	300 GHz – 1 THz

Alternatively, it is divided into 26 alphabetically designated bands. ECM Bands *A* through *M* are listed below: NOTE: X-Band radars operate in the range 8-12 GHz.

Band	Low-End Freq (GHz)
A	0.0
B	0.25
C	0.5
D	1

E	2
F	3
G	4
H	6
I	8
J	10
K	20
L	40
M	60

[Source: International Countermeasures Handbook]

ELECTROMAGNETIC VULNERABILITY (EMV) - The characteristics of a system that cause it to suffer a definite degradation (incapability to perform the designated mission) as a result of having been subjected to a certain level of ELECTROMAGNETIC ENVIRONMENTAL EFFECTS.

ELECTROMAGNETIC WEAPON - Any device which can produce an electromagnetic field of such intensity that targeted items of electronic equipment experience either a SOFT KILL or a HARD KILL.

ELECTROMAGNETICALLY INDUCED TRANSPARENCY (EIT)
- A technique that makes normally opaque substances transparent to light by applying another source of light, such as a laser beam, that interferes with the opaque substance's absorption of light.

NOTE: This property was first demonstrated (*ca* 2000) by Harvard physicist Lene Hau. A pulse of light was stopped, stored briefly within a substance, and then released on command.

ELECTRONIC ATTACK (EA) - That division of ELECTRONIC WARFARE involving the use of electromagnetic or directed energy to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability.

Electronic Attack (EA) includes: **(1)** Actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum, such as jamming and electromagnetic deception, and **(2)** Employment of weapons that use either electromagnetic or DIRECTED ENERGY (DE) as their primary destructive mechanism (LASER, RF weapons, PARTICLE BEAMS).

Also called ELECTRONIC COUNTERMEASURES (ECM).

ELECTRONIC CAMERA - A camera which records the image on a floppy diskette. The diskette may then be played back into a video imaging terminal where the recorded image is digitized, compressed and prepared for radio transmission.

ELECTRONIC CHART DISPLAY AND INFORMATION

SYSTEM (ECDIS) - A system which allows civilian ships to navigate safely without paper charts.

ELECTRONIC CHART DISPLAY AND INFORMATION

SYSTEM (ECDIS-N) - A system which allows naval ships to navigate safely without paper charts. One difference between ECDIS and ECDIS-N is that ECDIS-N requires use of DIGITAL NAUTICAL CHARTs (DNC⁹) produced by the National Mapping and Imagery Agency (NIMA).

ELECTRONIC COMBAT (EC) –

(1) THE ELECTRONIC WARFARE MISSION AREA involving the integrated use of military action to preserve friendly access to the electromagnetic spectrum and to exploit and disrupt enemy military objectives.

(2) A SPACE AND ELECTRONIC WARFARE (SEW) warfare discipline that targets enemy weapons and weapons systems. It includes the coordination of all measures to provide counter-targeting, counter-weapon, and terminal phase protection to the force.

NOTE: Electronic Combat is described as having the core elements "Detect, Disrupt, and Defend".

ELECTRONIC COUNTER-COUNTERMEASURES (ECCM) - That division of ELECTRONIC WARFARE involving actions taken to insure friendly effective use of the ELECTROMAGNETIC SPECTRUM despite the enemy's use of electronic warfare. Synonymous with ELECTRONIC PROTECTION.

ELECTRONIC COUNTERMEASURES (ECM) - That division of ELECTRONIC WARFARE (EW) involving actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum. Synonymous with ELECTRONIC ATTACK (EA).

ELECTRONIC COVER - Protection measures employing electronic means. See also COVER, OPERATIONAL COVER.

ELECTRONIC DECEPTION - An electronic countermeasure that is the deliberate radiation, re-radiation, alteration, suppression, absorption, denial, enhancement, or reflection of electromagnetic energy in a manner intended to convey misleading information and to deny valid information to an enemy or to enemy electronics-dependent weapons. See also DECEPTION.

ELECTRONIC IMAGERY DISSEMINATION - The transmission of imagery or imagery products by any electronic means.

This includes the following four categories:

- a. **Primary imagery dissemination system:** The equipment and procedures used in the electronic transmission and receipt of unexploited original or near-original quality imagery in NEAR REAL TIME.
- b. **Primary imagery dissemination:** The electronic transmission and receipt of unexploited original or near-original quality imagery in near-real time through a primary imagery dissemination system.
- c. **Secondary imagery dissemination system:** The equipment and procedures used in the electronic transmission and receipt of exploited non-original quality imagery and imagery products in other than real or near-real time.
- d. **Secondary imagery transmission:** The electronic transmission and receipt of exploited non-original quality imagery and imagery products in other than real or near-real time through a secondary imagery dissemination system.

ELECTRONIC INFORMATION SECURITY - Electronic information security is a collection of disciplines, which encompass a wide range of applications and environments. These disciplines are tailored to one or more areas of protection, such as COMMUNICATIONS SECURITY (COMSEC), and computer security.

Electronic information security involves: *cryptography*, which consists of encryption and decryption process; *keys*, which are variables used to periodically change the encryption algorithm so that even if an adversary captures the encrypted information and possesses the algorithm they cannot easily decrypt the information without the key; *key distribution*, which is the method of placing periodic keys where they are needed (electronically or physically); *access control*, by which the person attempting electronic access to information is validated as being the person claimed to be (authentication), and the electronic restrictions by which only authorized persons are granted access to specified information; *tamper protection*, a series of processes, both electronic and physical, established to detect attempts to physically intrude on electronic information or tamper with the security parameters (tamper protection also includes protective measures taken in the event of intrusion); and *recovery*, which is the restoration of operations after a system failure, and includes fail-safe features to prevent information loss or compromise from detectable forms of failure.

ELECTRONIC INTELLIGENCE - See ELECTRONICS INTELLIGENCE (ELINT).

ELECTRONIC JAMMING - An electronic countermeasure that is the deliberate radiation, reradiation, or reflection of electromagnetic energy for the purpose of disrupting enemy use of electronic devices, equipment, or systems. See also ELECTROMAGNETIC JAMMING, RERADIATION.

Listen to various electronic jamming signals: Bagpipes; Crypto Spoofing; FSK Spoofing; Modulated White Noise; Random Tones; Sine Wave (1 kHz); Square Wave (500 Hz); Stepped Tones; Swept Tones; Tone Jamming; White Noise.

ELECTRONIC LINE OF SIGHT - The path traversed by electromagnetic waves that is not subject to reflection or refraction by the atmosphere.

ELECTRONIC MAIL (E-MAIL) - A system whereby a computer user can exchange messages with other computer users (or groups of users) via a communications NETWORK.

NOTE: Electronic mail is one of the most popular uses of the Internet.

ELECTRONIC MASKING - The controlled radiation of electromagnetic energy on friendly frequencies in a manner to protect the emissions of friendly communications and electronic systems against enemy ES/SIGINT (electronic warfare support measures/signals intelligence), without significantly degrading the operation of friendly systems.

ELECTRONIC NOTARY - An organization which provides electronic time-stamping services. See also ELECTRONIC TIME STAMP.

ELECTRONIC ORDER OF BATTLE (EOB) - The identification, location, and disposition of electronic systems of a military organization. [] NOTE: When the electronic systems of interest are limited to radar systems, the corresponding term is RADAR ORDER OF BATTLE.

ELECTRONIC POSTMARK (EPM) - A form of digital certification that appends to an e-mail message or a date-time group that would be legally valid in a court.

NOTE: E-mail messages which have electronic postmarks are accompanied by a special icon which, if clicked, will reveal the date-time group of the message.

ELECTRONIC PROTECTION (EP) - (1) That division of ELECTRONIC WARFARE involving actions taken to protect personnel, facilities, and equipment from any effects of friendly or enemy employment of electronic warfare that degrade, neutralize, or destroy friendly combat capability. (2) That division of INFORMATION WARFARE (IW) involving measures used to defeat ELECTRONIC ATTACK (EA). (3) The protection of forces against any friendly or enemy employment of Electronic Warfare that would degrade or deny friendly force combat capabilities. Electronic Protection addresses the EW problem of electronic interference and electronic fratricide. Formerly and synonymous with ELECTRONIC COUNTER-COUNTERMEASURES.

ELECTRONIC RECONNAISSANCE - The detection, identification, evaluation, and location of foreign electromagnetic radiation emanating from other than nuclear detonations or radioactive sources.

ELECTRONIC SUPPORT MEASURES - See ELECTRONIC WARFARE SUPPORT MEASURES.

ELECTRONIC TAGGING - A system consisting of a lightweight wrist strap data tag, both waterproof and protected against electrostatic discharge, containing miniature non-volatile memory modules, which is secured on a person (say, a prisoner). Data describing the person is then loaded into the wrist-strap data tag where it remains until no longer needed (e.g., the prisoner's release). The other part of this system uses a PC-based handheld reader for reading and writing of the data tag. Data are then uploaded to a remote PC. The data tags can hold up to 100 times more data than the average bar code. Electronic tagging may also be used for hospital patients, inventory control, and security marking of property.

ELECTRONIC TIME STAMP - The marking of a digital document (data file, audio track, video track, photograph, etc.) with a digital time-of-receipt fingerprint unique to the document to subsequently establish chronology and prove authenticity. In order to prevent backward or forward dating by the time-stamping service, each digital signature is linked to the preceding time stamp. See also ELECTRONIC NOTARY.

ELECTRONIC WARFARE (EW) –

(1) Military action involving the use of electromagnetic energy to determine, exploit, reduce or prevent hostile use of the electromagnetic spectrum and action which retains friendly use of the electromagnetic spectrum. Also called EW. There are three divisions within electronic warfare: **(a) ELECTRONIC COUNTERMEASURES**, **(b) ELECTRONIC COUNTER-COUNTERMEASURES**, and **(c) ELECTRONIC WARFARE SUPPORT MEASURES**.

(2) Any military action involving the use of electromagnetic and directed energy to control the electromagnetic spectrum or to attack the enemy. The three major subdivisions within electronic warfare are *electronic attack*, *electronic protection*, and *electronic warfare support*. **(2a) Electronic Attack (EA):** That division of electronic warfare involving the use of electromagnetic or directed energy to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability. Electronic Attack includes: 1) Actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum, such as jamming and electromagnetic deception; and 2) Employment of weapons that use either electromagnetic or directed energy as their primary destructive mechanism (laser, RF weapons, particle beams). **(2b) Electronic Protection (EP):** That division of electronic warfare involving actions taken to protect personnel, facilities, and equipment from any effects of friendly or enemy employment of electronic warfare that degrade, neutralize, or destroy friendly combat capability. **(2c) Electronic Warfare Support (ES):** That division of electronic warfare involving actions tasked by, or under direct control of, an operational commander to search for, intercept, identify, and locate sources of intentional and unintentional radiated electromagnetic energy for the purpose of immediate threat recognition. Thus, electronic warfare support provides information required for immediate decisions involving electronic warfare operations and other tactical actions such as threat avoidance, targeting, and homing. Electronic warfare support data can be used to produce signals intelligence (SIGINT), both COMMUNICATIONS INTELLIGENCE (COMINT) and ELECTRONICS INTELLIGENCE (ELINT). [7:CJCS MOP 6, APPENDIX B]

See also NAVIGATION WARFARE (NAVWAR).

NOTES: **(1)** Electronic warfare is a part of offensive information operations. **(2)** The NAVWAR Joint Warfighting Science and Technology Plan (*circa* 2000) defines ELECTRONIC WARFARE as "The capability for DECEIVING, disrupting, and destroying the SURVEILLANCE and COMMAND AND CONTROL (C²) systems as well as the weapons of an enemy's integrated air defense network and the capability for recognizing attempts by hostile systems to track and engage."

ELECTRONIC WARFARE BATTLE TIMELINE - The sequence of events relating to a naval engagement are pre-timeline planning, surveillance/reconnaissance; acquisition; targeting, weapons direction and guidance, homing and fuzing, and post-timeline assessment.

NOTE: The sequence may cycle through the first two, three, or four events indefinitely in non-weapon exchange situations.

ELECTRONIC WARFARE COMMAND AND CONTROL (EWC2)

- The exercise of authority and direction by a properly designated EW commander over assigned forces in the accomplishment of the EW mission. EW command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the EW mission. [Adapted from the definition of Command and Control in reference]

ELECTRONIC WARFARE EFFECTIVENESS ASSESSMENT - The determination of the degree to which EW action achieved the desired result. See also BATTLE DAMAGE ASSESSMENT.

NOTE: This measure may be estimated through analysis of data collected by both active and passive means - for example, by using radar or visual systems to detect changes in enemy weapons flight and trajectory profiles; or by using ESM to detect changes in the mode of radiated signals, communications volume, and other transmitted signal characteristics.

ELECTRONIC WARFARE EXPENDABLES - Non-recoverable EW devices such as CHAFF, flares, unmanned vehicles, DECOYs, and HAND-EMPLACED JAMMERS.

ELECTRONIC WARFARE FREQUENCY DECONFLICTION -

Actions taken to integrate those frequencies used by electronic warfare systems into the overall FREQUENCY DECONFLICTION process.

ELECTRONIC WARFARE MISSION - The task, together with the purpose, which clearly indicates the EW action to be taken, the spectral region to be covered, and the reason therefore.

ELECTRONIC WARFARE MISSION AREA - A level in the EW classification hierarchy. The EW Mission Areas are: ASSESSMENT, C3 PROTECTION, COUNTER-C3, COVER AND DECEPTION, CRYPTOLOGIC SUPPORT, ELECTRONIC COMBAT (EC), EW BATTLE MANAGEMENT, EW DIRECTION & COORDINATION, EW LOGISTICS; INDICATIONS & WARNING (I&W), INTELLIGENCE SUPPORT, SURVIVABILITY ENHANCEMENT, TACTICAL SUPPORT, and TARGETING.

ELECTRONIC WARFARE REPROGRAMMABLE LIBRARY (EWRL) - A machine-retrievable EW database used by reprogrammable EW systems.

NOTE: The mission of the U.S. Navy EWRL Support Program is "to produce, manage, and maintain tactical electronic warfare reprogrammable libraries for automated EW systems to ensure that operational forces can employ full capabilities of reprogrammable EW systems".

ELECTRONIC WARFARE REQUIRED OPERATIONAL CAPABILITY (EW ROC) - Qualitative and quantitative system performance parameters, proposed by the user, and approved by the DON, that are primary indicators of a system's capability to accomplish its mission (operational effectiveness) and to be supported (operational suitability).

ELECTRONIC WARFARE REQUIRED OPERATIONAL FUNCTION (EW ROF) - A mission-related function that a unit is required to perform in the face of a postulated threat at a specified level of conflict.

ELECTRONIC WARFARE STRATEGY - The art and science of developing and using Electronic Warfare as necessary during peace and war, to afford the maximum support to policies, in order to enhance friendly usage of and impede the adversary's usage of the ELECTROMAGNETIC SPECTRUM. [Patterned after the definition of "Strategy" in reference 1]

ELECTRONIC WARFARE SUPPORT (ES or EWS) - (1) (ES) That division of electronic warfare involving actions tasked by, or under direct control of, an operational commander to search for, intercept, identify, and locate sources of intentional and unintentional radiated electromagnetic energy for the purpose of immediate threat recognition. Thus, electronic warfare support provides information required for immediate decisions involving electronic warfare operations and other tactical actions such as threat avoidance, targeting, and homing. Electronic warfare support data can be used to produce SIGNALS INTELLIGENCE (SIGINT), both COMMUNICATIONS INTELLIGENCE (COMINT) and ELECTRONICS INTELLIGENCE (ELINT). (2) **Those collection actions** tasked by, and under the direct control of, an operational commander, primarily geared toward tactical support of the joint commander. Formerly ELECTRONIC SUPPORT MEASURES.

ELECTRONIC WARFARE SUPPORT MEASURES (ESM) - That division of electronic warfare involving actions taken under direct control of an

operational commander to search for, intercept, identify, and locate sources of radiated electromagnetic energy for the purpose of immediate threat recognition. Thus, electronic warfare support measures (ESM) provide a source of information required for immediate decisions involving Electronic Countermeasures (ECM), Electronic Counter-Countermeasures (ECCM), avoidance, targeting, and other tactical employment of forces. Electronic warfare support measures data can be used to produce signals intelligence (SIGINT), both communications intelligence (COMINT) and electronics intelligence (ELINT). Also called ESM. Increasingly replaced by ELECTRONIC WARFARE SUPPORT, sometimes called ELECTRONIC SUPPORT MEASURES.

See also CRYPTOLOGIC ESM, FERRET RECEIVER.

NOTE: In Frequency Hopping, the total available bandwidth is the spread bandwidth; however, the instantaneous bandwidth is less than the spread bandwidth. This technique is used in communications, radar, jamming, and other applications.

ELECTRONIC WARFARE TOP LEVEL WARFARE

REQUIREMENT (EW TLWR) - A statement of needed electronic warfare capability in the mid (10 year) and far (20 year) term to counter an anticipated threat in a particular spectral region. See also ELECTRONIC WARFARE REQUIRED OPERATIONAL CAPABILITY; ELECTRONIC WARFARE REQUIRED OPERATIONAL FUNCTION; TOP LEVEL WARFARE REQUIREMENT. NOTE: EW TLWRs contribute to EW system architectural design and system acquisition planning, and justify the timely allocation of resources to accomplish specific EW missions.

ELECTRONICS INTELLIGENCE (ELINT) - Technical and intelligence information derived from foreign non-communications electromagnetic radiation emanating from other than nuclear detonations or radioactive sources. NOTE: ELINT is encompassed under SIGNALS INTELLIGENCE (SIGINT).

ELECTRONICS SECURITY (ELSEC) - The protection resulting from all measures designed to deny unauthorized persons information of value that might be derived from their interception and study of non-communications electromagnetic radiation, e.g., radar.

ELECTRO-OPTIC (EO) - The portion of the ELECTROMAGNETIC SPECTRUM that ranges from ULTRAVIOLET through EXTREME INFRARED. The ELECTRO-OPTIC spectrum is subdivided into the following bands:

<u>ELECTRO-OPTIC SPECTRUM</u>	
ULTRAVIOLET	0.01 - 0.4 microns
VISIBLE LIGHT	0.4 - 0.75 microns
NEAR INFRARED	0.75 - 3.00 microns

MID INFRARED	3.00 - 6.00 microns
FAR INFRARED	6.00 - 15.00 microns
EXTREME INFRARED	15.00 - 1,000.00 microns

ELECTRO-OPTICAL INTELLIGENCE (ELECTRO-OPTINT) -

Intelligence information, other than signals intelligence, derived from the optical monitoring of the electromagnetic spectrum from ultraviolet (0.01 micrometers) through far infrared (1,000 micrometers).

NOTES: (1) ELECTRO-OPTINT is a component of MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT). (2) ELECTRO-OPTINT encompasses INFRARED INTELLIGENCE (IRINT).

ELECTRO-OPTIC PAINTING - The covering of a surface with light-wave absorbing, reflecting, or otherwise optically confusing material. An example is camouflage painting. See also BACKGROUND MATCHING, ELECTROLUMINESCENCE, RADAR CAMOUFLAGE and YEHUDI.

ELECTRO-OPTIC TEXTILE - Textile material in which fiber optics and wires are integrated. See also NANOTECHNOLOGY-ENHANCED CLOTHING, OBJECTIVE FORCE WARRIOR (OFW).

NOTE: An example of a use for electro-optic textile is a multi-frequency antenna vest that would eliminate the need to carry a bulky antenna kit. The antenna would provide coverage in the 30-500 MHz and 300-1000 MKz ranges using an ultrawideband antenna with no visible signature.

ELECTRO-OPTICS - The technology associated with those components, devices and systems, which are designed to interact between the electromagnetic (optical) and the electric (electronic) state. Examples: Television, fiber optics. See also KERR EFFECT.

ELECTROPHONIC EFFECT - A buzzing or clicking sound in the back of the head experienced by a person subjected to pulsed microwave radiation, such as from a SKULL TO VOICE (V2K) DEVICE. The absorbed energy produces a thermoelastic expansion of the brain tissue causing an acoustic pressure wave, which is detected by the hair cells of the organ of Corti (a spiral structure within the cochlea containing hair cells that are stimulated by sound vibrations. The hair cells convert the vibrations into nerve impulses that are transmitted to the brain.)

ELECTROTHERMAL GUN - A gun which uses electric energy and liquid propellant to achieve very high projectile velocities.

ELIPTON - See MRX.

EMBEDDED AVIONICS - Avionic sensors and processors, covering the electromagnetic spectrum, within the skin of an aircraft. Also known as SMART SKIN.

EMERALD - Acronym for *Event Monitoring Enabling Responses to Anomalous Live Disturbances*. EMERALD is a cyberdefense tool designed to detect computer HACKERS and other intruders. Because it is "anomaly-based", EMERALD is able to detect novel attacks to which no computer system has ever been exposed before.

NOTE: While EMERALD is able to detect attacks, it is not designed to respond to them.

EMERGENCY ROCKET COMMUNICATIONS SYSTEM (ERCS) - A 1960s-era system to provide emergency UHF communications by launching a rocket that would transmit pre-recorded force messages to all units within line of sight of the carrying rocket's apogee flight. NOTE: The ERCS was inactivated in the 1990s.

EMERGENCY WAR ORDER (EWO) - An order, issued by the President of the United States (POTUS), Secretary of Defense (SECDEF), or some other authorized command authority, which initiates the employment of US nuclear weapon resources.

EMISSION CONTROL (EMCON) - The selective and controlled use of electromagnetic, acoustic, or other emitters to optimize command and control capabilities while minimizing, for operations security (OPSEC), detection by enemy sensors; to minimize mutual interference among friendly systems; and/or to execute a military deception plan. See also RADAR SILENCE, RADIO SILENCE.

EMISSION SECURITY (EMSEC) - Protection that results from all measures designed to deny unauthorized persons information of value that might be derived from intercept and analysis of compromising emanations.

EMISSIVE CHAFF - CHAFF that also emits infrared (IR) radiation to deceive both RF and IR sensors on weapons.

EMP HARDENING - Measures taken to reduce the effects of ELECTROMAGNETIC PULSE on equipment and systems.

EMP/T BOMB - See HIGH ENERGY RADIO FREQUENCY (HERF)

EMPENNAGE - The tail assembly of an aircraft (*i.e.*, horizontal and vertical stabilizers, elevators, and rudder).

ENCOMPASS - See ENHANCED CONSEQUENCE MANAGEMENT PLANNING AND SUPPORT SYSTEM.

END GAME - The period of military engagement 3-5 seconds before missile impact. Also called ENDGAME.

ENABLER - Any sector of logistics that will help achieve a new or enhanced capability. NOTE: These sectors include materiel, automation, communications, business changes, and organizational redesigns.

ENDGAME COUNTERMEASURES (EGCM) - The detection of IR missiles launched at the host aircraft and automatic deployment of flares to decoy them. NOTE: Examples of endgame countermeasures include FORWARD-BIAS COUNTERMEASURES and the FLY-ALONG FLARE.

ENERGETIC ARMOR - See REACTIVE ARMOR.

ENERGETIC MATERIALS - A collective term for military high explosives, propellants and pyrotechnics that can sustain a steady state burning rate. Synonymous with MILITARY EXPLOSIVES.

ENERGY HARVESTING - The extraction and storage of electrical energy from ambient sources such as solar wind, thermal sources (*e.g.*, ground-air and water-air interfaces), wave action, chemical gradients (*e.g.*, in ocean sediments), water currents (*e.g.*, deep ocean, stream, river), and human activities such as heel strike and back-pack motions. Also, the extraction and employment of naturally occurring fuels (*e.g.*, cellulose and sugars) as a source of hydrogen for small fuel cells.

NOTE: Energy harvesting will extract energy from the environment to provide enhanced endurance for soldiers or robotic vehicles and indefinite power for "place and forget" sensors.

See also CONTINUOUS ASSISTED PERFORMANCE (CAP), ENERGY HARVESTING, PERSISTENCE IN COMBAT (PIC), WATER HARVESTING.

ENERGY-MANEUVERABILITY DIAGRAM - A tool used by fighter pilots to analyze an aircraft's performance. The diagram shows a plane's turn and energy characteristics for a specific load and configuration. It shows the relationship between an airplane's current speed, G-load, turn rate and turn radius as well as revealing the changes in the airplane's energy state due to a maneuver. Also called E-M CHART.

ENGINEER AND MINE WARFARE (EMW) - A military operations mission area consisting of five major battlefield functions: mobility, countermobility, survivability, sustainment engineering, and topographic engineering.

ENHANCED CONSEQUENCE MANAGEMENT PLANNING AND SUPPORT SYSTEM (ENCOMPASS) - A suite of integrated software for collection and distribution among multiple points in near REAL TIME dynamic data relating to medical surveillance and disaster or crisis events. ENCOMPASS is comprised of the INCIDENT COMMAND MANAGEMENT SYSTEM (ICMS) and the DARPA SYNDROMIC SURVEILLANCE SYSTEM (D-S³).

ENHANCED FIBER OPTIC GUIDED MISSILE (EFOG-M) - A multi-purpose precision kill weapon system. It enables a gunner in defilade to engage and defeat threat armored combat vehicles, other high value ground targets, and hovering or moving rotary wing aircraft that may be masked from line-of-sight direct fire weapon systems.

ENHANCED HYPERVELOCITY LAUNCHER (EHVL) - A 60-foot long multi-stage light gas gun that creates pressures of up to a million atmospheres. It has (reported in 1994) accelerated a 10 mm diameter titanium alloy flyer plate to 13.5 km/s (about 25 times the speed of a high-powered rifle bullet).

ENGINE-DISABLING DEVICE - (1) A NONLETHAL WEAPON for disabling an engine such as that of a fleeing car by means of a high voltage discharge that perturbs or destroys the electrical circuits. (2) A NONLETHAL WEAPON consisting of airborne agents to choke engines or cause them to stall out.

ENTANGLEMENT - See QUANTUM IMAGING.

ENTANGLEMENT MUNITIONS - NONLETHAL WEAPON munitions designed to disable propellers, rotor-blades, axles, etc.

ENTANGLEMENTS - NONLETHAL WEAPON anti-personnel devices consisting of submunitions, which release wire intended to entangle target individuals, or sticky nets intended to entangle fleeing individuals.

ENVIS - See EVADER'S NIGHT VISION IMAGING SYSTEM

ERASING - See C3I ERASING.

ERIEYE - A Swedish-developed Airborne Early Warning & Control (AEW&C) Doppler-based radar capable of detecting fast-moving targets against surface backgrounds. It can track more than 200 tracks simultaneously, and can discriminate individual aircraft in a multiple-aircraft target track. [Ericsson Erieye announcement]

ERLANG - A unit of communications link traffic intensity equivalent to the fraction of time that the link is occupied.

ERROR BUDGET - The accounting for all elements, which contribute to error in, say, emitter locating, to achieve location accuracy.

ERROR CONTROL CODE - See ERROR CORRECTING CODE.

ERROR CORRECTING CODE (ECC) - A Code in which each data signal conforms to specific rules of construction so that departures from this construction in the received signals can be automatically detected, and permits automatic correction, at the received terminal, of some or all of the errors.

ESCORT JAMMING - See STANDOFF JAMMING.

ESCROWED ENCRYPTION - An encryption strategy wherein a third party is appointed by the state to keep a copy of the decryption keys, *i.e.*, in escrow, for the state to use to decrypt any file sent to or by any user.

ESM INTERCEPT RANGE - A range roughly equal to one-and-a-half times the theoretical radar range.

NOTE: This is a rule of thumb. Actual intercept range is affected by many factors, including propagation anomalies, transmission paths, background noise, etc.

ETHERNET - A passive baseband (digital transmission of data up to 10 million bits per second) local area network (LAN).

NOTE: Ethernet conforms to IEEE 802.3 Standard for Carrier Sense Multiple Access with Collision Detect (CSMA/CD).

EVADER'S NIGHT VISION IMAGING SYSTEM (ENVIS) - A portable night vision imaging system carried in the pocket of a survival vest. [Information from a Night Vision Equipment Company product description]

EVASIVE MANEUVERS BMD COUNTERMEASURES - A high-altitude countermeasure to make it difficult for the defender's missile to hit the part of the target that actually contains the warhead. A small rocket motor on the assembly containing the warhead starts the entire assembly tumbling. Another tactic is to deploy inflated balloons to make the entire tumbling assembly appear to be longer to the homing interceptor. Additional tethered balloons would present a complex target to the interceptor, making it impossible to determine the location of the warhead.

See also FALSE-TARGET BMD COUNTERMEASURES, SHROUDING BMD COUNTERMEASURES, SUBMUNITION BMD COUNTERMEASURES, TRAJECTORY BMD COUNTERMEASURES.

EVIDENCE EXTRACTION AND LINK DISCOVERY (EELD) - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to develop technologies and tools for automated discovery, extraction and linking of sparse evidence contained in large amounts of classified and unclassified data sources.

EVOLUTIONARY COMPUTING (EC) - An approach to computing, which is based on analogues of natural selection. EC may employ GENETIC ALGORITHMS, genetic programming, evolutionary strategies, and artificial life.

EXCIMER LASER - A laser designed to damage targets either by thermal kill, or through impact of high-energy photons. See also CHEMICAL LASER, FREE-ELECTRON LASER, X-RAY LASER, HIGH-ENERGY LASER.

EXFILTRATION ROCKET (ER) - A system which quickly extracts special operations forces (SOF) teams from the mission area. [USAF 2025 study]

EXPANDED MEMORY - Additional RANDOM ACCESS MEMORY (RAM) which is swapped in and out of the 1Mb memory address of an 8088-class (i.e., original PC) computer through the use of special boards and software called *expanded memory managers* (EMM) which create the effect of having up to 32 Mb of memory. Compare with EXTENDED MEMORY.

EXPEDITIONARY UNDERWATER SENSOR SYSTEM (EUSS) - A mobile SOUND SURVEILLANCE SYSTEM (SOSUS) intended for use at the flanks of littoral areas.

EXPENDABLE ACOUSTIC REMOTE SENSOR (EARS) - A gun-emplaced passive acoustic sensor, which autonomously detects and classifies vehicles by their acoustic signature and reports the results via telemetry.

EXPERT SYSTEM (ES) - (1) A **computer program** that embodies the expertise of one or more experts in some domain and applies this knowledge to make useful inferences for the user of the system. (2) A **program** that solves problems competently at an expert level in a particular domain. The system uses a knowledge base, which is separate from the part of the program that does the inference using the knowledge base. An expert system is capable of dealing with incomplete knowledge and is able to explain its reasoning and conclusions.

Synonymous with KNOWLEDGE-BASED SYSTEM.

NOTE: One feature of expert systems that distinguishes them from conventional computer programs is that of the "explanation facility" which provides easy access by the user to the chain of reasoning that produced a given result (i.e., the user can ask "Why?" at any point).

EXPLOSIVE FLUX COMPRESSION GENERATOR (FCG) - See EXPLOSIVE MAGNETIC FLUX COMPRESSOR.

EXPLOSIVE MAGNETIC FLUX COMPRESSOR - A device in which energy from a capacitor charges an inductor, which is then compressed rapidly by detonating an explosive. To conserve magnetic flux in the inductor, the inductor current increases as its area and inductance decreases. The result is a large pulse of current that can be employed in DIRECTED ENERGY WEAPONS. Also called EXPLOSIVE FLUX COMPRESSION GENERATOR.

NOTE: With delivered power levels of terawatts or tens of terawatts, a large flux generator can produce electrical currents which are three orders of magnitude greater than those produced by a typical lightning stroke.

EXPLOSIVE SPLICING - A process of splicing wires by enclosing and metallurgically bonding the wires within copper sheets through use of explosive ribbons.

NOTE: This process is especially useful for joining small diameter conductor wires with results superior to solder joints. Explosively-spliced wires display stability at

high temperature, and show no susceptibility to corrosion in contacts between dissimilar metals.

EXPLOSIVE STANDOFF MINE CLEARER (ESMC) - An explosive counter-mine system that creates a vehicle-wide lane by explosively neutralizing all surface and buried anti-tank (AT) mines from a position outside their lethal radii. The ESMC consists of a rocket-propelled explosive neutralization system (ENS) with shaped-charge munitions embedded in an oblong net. See also EXPLOSIVE STAND-OFF MINEFIELD BREACHER.

NOTE: The ESMC attacks the explosive components of the mines, not their firing mechanisms.

EXPLOSIVE STAND-OFF MINEFIELD BREACHER (ESMB) - An explosive system designed for in-stride clearing of mine fields in the path of an advancing tank force. The system consists of the mesh webbing, 5 meters wide and 145 meters long, containing more than 25,000 closely-spaced shaped explosive charges. The web is rocket-launched onto a suspected minefield ahead of an advancing tank column. Mines are destroyed by plasma jets produced by the detonation of the shaped charges.

EXTENDED HYPERTEXT MARKUP LANGUAGE (XHMTL) - An extension of HTML that makes it compatible with the EXTENSIBLE MARKUP LANGUAGE (XML).

EXTENDED MEMORY - RANDOM ACCESS MEMORY (RAM) that can be addressed by 8026-class (AT) and 8036-class computers. Compare with EXPANDED MEMORY.

EXTENSIBLE MARKUP LANGUAGE (XML) - A data format that facilitates defining types of documents, authors and manages documents for sharing over the Web. It is a simplified version of the STANDARD GENERALIZED MARKUP LANGUAGE.

See also DYNAMIC HYPERTEXT MARKUP LANGUAGE, HYPERTEXT MARKUP LANGUAGE, JAVA.

EXTRANET - A private network that uses the INTERNET PROTOCOL and the public telecommunication system to securely share part of the using business's information or operations with suppliers, vendors, partners, customers, or other businesses. It is a Web site developed for customers, rather than the general public, providing access to research, current inventories and internal databases, and virtually any other private or proprietary information. [Information from: Computer Desktop Encyclopedia.Computer Language Company, Inc., 2003]

NOTE: An extranet uses the public Internet as its transmission system, but requires passwords to gain entrance. Access to the site may be free or require payment for some or all of the services offered. The extranet can be viewed as part of a company's INTRANET that is extended to users outside the company. It has also been described

as a "state of mind" in which the Internet is perceived as a way to do business with other companies as well as to sell products to customers. Because of the need for security and privacy, extranets employ FIREWALLS, server management, digital certificates, user authentication, encryption of messages, and VIRTUAL PRIVATE NETWORKS (VPN) are employed.

EXTRAORDINARY MAGNETORESISTANCE (EMR) - A physics effect manifested by a huge change in the resistance to the flow of current in certain nonmagnetic hybrid materials when they are subjected to magnetic fields. See also GIANT MAGNETORESISTANCE (GMR).

EXTREME INFRARED - The portion of the infrared spectrum band between 15 and 1,000 microns. See also ELECTRO-OPTIC, INFRARED, NEAR INFRARED, MID INFRARED, FAR INFRARED.

EXTREMELY LOW FREQUENCY (ELF) - A communications system for transmitting short messages from operating authorities in the Continental United States (CONUS) at extremely low frequencies to submerged submarines, which are at operating depths and speeds. [SPAWAR] See also FIXED VERY LOW FREQUENCY (FVLF).

NOTE: ELF operates in the 40 - 80 Hz region using antennas between 45 and more than 200 km in length. It employs the phenomenon of ionospheric refraction.

EYE-SAFE - Pertains to laser devices such as laser rangefinders. If human eyes are inadvertently lased by the device, there is no risk of retinal damage. See also LOW ENERGY LASER WEAPON.



F

F-POLE - The distance between a missile-firing platform and its target at the instant the missile reaches the target. Contrast with A-POLE.

FADE CHART - A plot of the field strengths at various ranges and altitudes. Also called a VERTICAL COVERAGE DIAGRAM. See also FADE ZONE.

FADE ZONE - An area in space where the reflected energy of a radar effectively cancels the direct-path energy of the radar. The degree of cancellation is affected by many variables, including antenna height, radar frequency, polarization of the signal, reflection coefficient of the earth at the point of reflection, angle of incidence at the point of reflection, etc. See also FADING.

NOTE: This phenomenon has been exploited both by pilots in attempts to approach a radar site undetected as long as possible, and by radar operators who employed a "fade chart" consisting of a plot of the theoretical lobes and fade zones to estimate the altitude of approaching aircraft by noting the ranges at which the radar echo faded and reappeared.

FADING - The reduction in intensity or propagated power due to changes in parameters of the transmission media. See also FADE ZONE.

FAIL-OPERATIONAL SYSTEM - A system designed for continued safe operation in the event of a malfunction.

FAIL-SAFE - A designed property of an item, which prevents its failures being critical failures.

FAILURE - A FAULT TOLERANCE term. A failure occurs when the delivered service of a system deviates from conditions stated in the service specifications. See also SYSTEM ERROR, FAULT, FAULT LATENCY.

FAKER - A strike force aircraft simulating a hostile aircraft during an air defense exercise and while in the strike route portion of the mission.

FALSE ALARM - An erroneous target detection decision caused by noise or other interfering signal exceeding the detection threshold. [Patterned after false alarm (radar) in 3]

FALSE DOPPLER TARGET (FDT) JAMMING - The use of a coherent repeater that produces a signal at a number of frequencies, spaced around the frequency of the target echo. Also called MULTIPLE FREQUENCY REPEATER (MFR) JAMMING.

FALSE ECHO RETURN - [ACOUSTIC JAMMING term] The use of off-board decoys to generate false echo returns in order to defend against torpedo attack.

FALSE-TARGET BMD COUNTERMEASURES - Actions taken to overwhelm ballistic missile defenses with large numbers of false targets and decoys, such as balloons. The false targets and decoys could be designed to resemble the actual warhead, or be painted different colors so that uneven heating by the sun would generate a number of different INFRARED signatures to confuse defensive sensors and seekers. See also EVASIVE MANEUVERS BMD COUNTERMEASURES, SHROUDING BMD COUNTERMEASURES, SUBMUNITION BMD COUNTERMEASURES, TRAJECTORY BMD COUNTERMEASURES.

FALSE TRACK CONTENT - The number of tracks that do not correlate to real objects that are contained in the radar's local track file.

FAR INFRARED - The portion of the infrared spectrum band between 6.00 and 15.00 microns. Synonymous with LONG WAVE INFRARED. See also ELECTRO-OPTIC, NEAR INFRARED, MID INFRARED, EXTREME INFRARED.

NOTE: Far infrared sensors can detect "warm" airframes (contrasted with the sky).

FAST FEATURE-RECOGNIZING OPTOELECTRONIC SYSTEM - A NEURAL NETWORK-based system, which recognizes features and classifies images by processing the outputs of photo-sensors.

FAST FOURIER TRANSFORM (FFT) - Efficient algorithms, which solve Fourier Transforms of large bandwidth signals in near real time. See also WAVELET.

FAST INFRARED SNIPER TRACKER (FIRST) - An INFRARED LASER based system for detecting and tracking bullets in three dimensions at up to a range of 1000 meters. It includes a computer-generated sniper location feature with an accuracy of less than three meters.

FAST SEQUENTIAL JAMMING - The ELECTRONIC JAMMING of predefined spot frequencies in an arbitrary sequence or in a continuous, band-like sequence called SWEEP JAMMING.

FAST-TIME CONSTANT (FTC) CIRCUIT - A circuit with short time-constant used to emphasize signals of short duration to produce discrimination against extended clutter, long-pulse jamming, or noise.

FAST TRANSISTOR - A super fast (switching rate of 74 billion times per second at room temperature), ultra-small (channel length of 80 nanometers) silicon-on-insulator transistor that operates at 1.5 volts.

FAST WALKER - A military space mission to detect orbiting spacecraft by sensing sunlight reflected from their solar arrays and external surfaces. See also JOGGER, SLOW WALKER.

FATSAT - A low-cost satellite payload characterized by minimal expensive miniaturization, making it heavier and larger. See also LIGHTSAT.

FAULT - A FAULT TOLERANCE term. The judged or hypothesized phenomenological cause of an ERROR. See also FAILURE, FAULT LATENCY.

FAULT LATENCY - A FAULT TOLERANCE term. The elapsed time between the occurrence of the FAULT and the first ERROR.

FAULT TOLERANCE - The built-in capability of a system to provide continued correct execution in the presence of a limited number of hardware or software FAULTS. Fault tolerant techniques include...

<u>FAULT TOLERANT TECHNIQUES</u>	
Fault Containment	Prevents propagation of erroneous or damaged information in the system after a fault occurs and before it is detected.
Fault Detection	Use of hardware and software mechanisms to determine the occurrence of a failure. Fault detection mechanisms include concurrent fault detection, stepwise comparison, and periodic testing to determine whether computers or communication links are operating correctly.
Fault Diagnosis	Locates and identifies the faulty module responsible for a detected error.
Fault Masking	Concurrent masking and correction of generated errors.
Fault Recovery	Corrects the system to a state acceptable for continued operation.
Repair/reconfiguration	Eliminates or replaces the faulty module, or provides means to bypass it.

FEDERATED ARCHITECTURE - A hierarchical system architecture involving a master computer and asynchronously operated slave computers and satellite microprocessors to control the sub-elements of the system.

FEED-THRU (FEED-THROUGH) - See VIA.

FERRET - An aircraft, ship, or vehicle especially equipped for the detection, location, recording, and analyzing of electromagnetic radiation.

FERRET RECEIVER - A receiver used to receive specific systems with great detail, or used to explore new sections of the electromagnetic spectrum previously unused for military purposes in order to discover emerging enemy capabilities. See also ELECTRONIC WARFARE SUPPORT MEASURES.

FERROELECTRIC RANDOM ACCESS MEMORY (FRAM) - A non-volatile random access memory (RAM), FRAM uses a ferroelectric storage capacitor having hysteresis states corresponding to logic states where there are no half-selects for "read" and "write" addressing. The FRAM is a modification of the dynamic random access memory (DRAM). It takes less power than a DRAM, has comparable density, can be made radiation-hardened, and can be turned off without loss of data.

FERROMAGNET - A magnetic material having the property of becoming hot when magnetized and cool when demagnetized.

FIBER OPTIC GUIDED MISSILE (FOG-M) - A guided missile connected to its controlling source with as much as 60 kilometers of fiber optic cable with which the weapon transmits target images to the operator, and the operator is able to transmit commands to the weapon.

NOTE: Fiber optic guided missiles are said to be accurate to within 10 centimeters, and are relatively impervious to jamming and interference because signals are carried by light waves, rather than radio frequencies.

FIBER OPTICS - The branch of optical technology concerned with the transmission of radiant power through fibers made of transparent materials such as glass, fused silica, or plastic.

FIELD EFFECT DETECTOR - A handheld device used to find human beings hiding behind barriers such as concrete walls and dense foliage, even at hundreds of feet distant. The unit employs a passive detection system not vulnerable to types of countermeasures that might spoof INFRARED or THERMAL IMAGERS. The device detects the electrostatic field given off by a human being and, like a divining rod, pulls the device in the user's hand and points toward the strongest field rather than providing an audio or video indication.

FIELD EMISSION DISPLAY (FED) –

- (1) A **display** that depends, not on THERMIONIC EMISSION from a CATHODE, as in CATHODE RAY TUBES (CRTs), but on an array of millions of microscopic field emitters which propel electrons directly to the screen.
- (2) A **display** composed of an array of carbon NANOTUBE-based emitters. A cluster of nanotubes at each emitter acts as a cathode to produce electrons via field emission. Each pixel is composed of three (red, green, and blue)

subpixels. A gate electrode in each subpixel creates the electric field for emission. Emitted electrons are swept through a vacuum toward a phosphor by an anode placed between the phosphor and the glass surface of the display.

NOTES: **(1)** As no beam deflection is needed, the distance between the cathodes and the screen need be only a millimeter or so. **(2)** Field emission displays are flat-panel displays that consume less power than a flat-panel plasma display (almost by two orders of magnitude).

FIELD OF REGARD - The angular area within which the sensor can detect targets for a specified search rate.

FIELD OF VIEW (FOV) - The maximum solid angle visible by an electro-optic system.

FIFTH GENERATION LANGUAGE (5GL) - A computer language that incorporates the concepts of EXPERT SYSTEMs, inference engines, and natural language processing.

See also FIRST GENERATION LANGUAGE, SECOND GENERATION LANGUAGE, THIRD GENERATION LANGUAGE, FOURTH GENERATION LANGUAGE.

FILM-FORMING POLYMERS - A cohesive surfactant mixed with an evaporation reducer, one use of which is to produce a detectable area on the surface of a body of water. See OCEAN MARKING.

FILTER - In electronics, a device which transmits only part of the incident energy and may thereby change the spectral distribution of energy: **a. High pass filters** transmit energy above a certain frequency, **b. Low pass filters** transmit energy below a certain frequency, **c. Band pass filters** transmit energy of a certain BANDWIDTH, **d. Band stop filters** transmit energy outside a specified frequency band.

FINGER - A simple Internet protocol used to retrieve information about a web site. Finger can be used to retrieve information about a user on a specific host (the provider). Typical results from the use of finger are: last login time, whether the user is currently logged on and, if so, which terminal, etc. See also PACKET INTERNET GROPER (PING).

NOTE: Finger works only if the specified host supports it. Results can differ from host to host, inasmuch as a user can change the information.

FINGER-MOUNTED LASER - A finger-mounted LASER spotlight consisting of a nine-volt battery, a power supply, a laser diode, a focusing element and connecting cables. The device can project up to a 10-foot-wide laser beam as far as 300 feet. The beam is invisible to the naked eye and can be seen only with NIGHT-VISION equipment.

FINGERPRINT - The human fingerprint is comprised of various types of ridge patterns, traditionally classified according to the decades-old Henry system: left loop, right loop, arch, whorl, and tented arch. Loops make up nearly 2/3 of all fingerprints, whorls are nearly 1/3, and perhaps 5-10% are arches. These classifications are relevant in many large-scale forensic applications, but are rarely used in biometric authentication. The fingerprint shown in Figure 1 below is a right loop.

FINGERPRINT CHARACTERISTICS

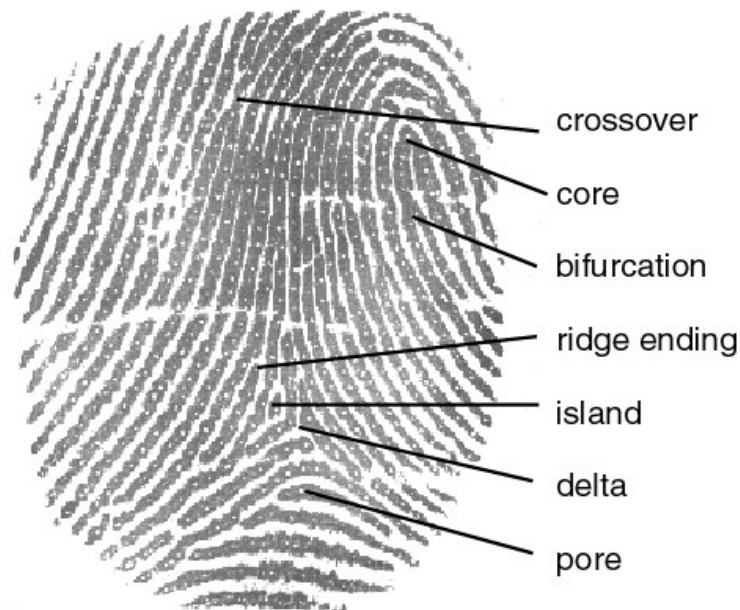


Figure 1

Referring to Figure 1, the discontinuities that interrupt the otherwise smooth flow of ridges, are the basis for most finger-scan authentication. Codified in the late 1800's as Galton features, minutiae are at their most rudimentary ridge endings, the points at which a ridge stops, and bifurcations, the point at which one ridge divides into two. Many types of minutiae exist, including dots (very small ridges), islands (ridges slightly longer than dots, occupying a middle space between two temporarily divergent ridges), ponds or lakes (empty spaces between two temporarily divergent ridges), spurs (a notch protruding from a ridge), bridges (small ridges joining two longer adjacent ridges), and crossovers (two ridges which cross each other).

Other features are essential to finger-scan authentication. The core is the inner point, normally in the middle of the print, around which swirls, loops, or arches center. It is frequently characterized by a ridge ending and several acutely curved ridges. Deltas are the points, normally at the lower left and right hand of the fingerprint, around which a triangular series of ridges center.

The ridges are also marked by pores, which appear at steady intervals. Some initial attempts have been made to use the location and distribution of the pores as a

means of authentication, but the resolution required to capture pores consistently is very high.

FINGERPRINT IDENTIFICATION UNIT (FIU) - A device which can independently enroll, compare, and verify the fingerprint of a finger placed at its sensor. The FIU contains a biometric sensor that can reject phony fingers, duplicate fingerprint images, or other ersatz digits. The system can be used for security applications, such as access control to files and machinery.

FIN-LINE ANTENNA - An antenna consisting of a printed circuit inserted into an open-ended wave-guide. The printed circuit contains a fin line that extends a quarter wavelength beyond the wave-guide aperture and feeds a pair of dipole-like elements. The dipole antenna thus maintains a wide and nearly constant beam width, low voltage standing wave ratio (VSWR), and a circular symmetric radiation pattern for use in electronic warfare direction finding and surveillance applications.

FIRE-AND-FORGET (F&F) - A weapon capability due to its having an on-board active terminal seeker that can guide the weapon to a target. Also called LAUNCH-AND-LEAVE.

NOTE: A fire-and-forget weapon does not need monitoring nor course guidance by the launching platform, thus allowing the launching platform to maneuver or depart the area after weapon launch.

FIREWALL - A security product designed to prevent access by hackers, crackers, or other unauthorized entities. It is a collection of components placed between two NETWORKS. All traffic from inside to outside, or outside to inside, must pass through this security mechanism. Only authorized traffic as defined by a security policy, is allowed to pass. A firewall guards and isolates an inside (private) network - an intranet - from its WILD SIDE, an outside (hence un-trusted) network - the INTERNET, for instance. A firewall may also guard some parts of an internal network from other parts.

NOTE: A firewall can be set up to allow only two-way communications, blocking only dangerous commands. It also can be customized to allow only outward-bound communications, with no inward-bound access. Another option is to set up the firewall to allow only incoming communications with no outgoing access. Functions also can be customized within these general configurations.

FIREWIRE - An extremely fast electronic serial bus, described by IEEE Standard 1394, with rates about 400 Mb/s. Firewire can carry independent streams of digital video and digital audio.

FIRM KILL - Infliction of EFFECTIVE DAMAGE, short of physical destruction, on an inbound missile through the employment of electronic counter- measures techniques. Contrast with HARD KILL, SOFT KILL.

See also FRONT-DOOR SYSTEM PENETRATION, BACK-DOOR SYSTEM PENETRATION, DIRECTED ENERGY WEAPON.

NOTE: An example of a FIRM KILL is the destruction of a missile's guidance electronics.

FIRST GENERATION LANGUAGE (1GL) - A language that can be recognized by the processing unit of a computer. Such a language usually consists of patterns of 1s and 0s, with no symbolic naming of operations or addresses. Synonymous with MACHINE LANGUAGE.

FIRST GENERATION RADAR SIGNAL - A generic classification of radar signal sophistication. First generation radar signals have rudimentary features such as simple pulsed radio frequency, constant pulse repetition interval, mechanical beam scanning, frequencies in the A to I bands of the ELECTROMAGNETIC SPECTRUM, and numerous MINOR LOBES in the radiation pattern.

See also SECOND GENERATION RADAR SIGNAL, THIRD GENERATION RADAR SIGNAL, and FOURTH GENERATION RADAR SIGNAL.

FIXED VERY LOW FREQUENCY (FVLF) - A submarine broadcast system, which is (2001) the primary command and control link to the submarine force. It allows submarines to remain submerged and still receive operational communications. [SPAWAR] See also EXTREMELY LOW FREQUENCY (ELF).

NOTE: The high power FVLF transmitter systems operate at 14.0 to 30.0 kHz, providing long-range ocean area coverage.

FLAMELESS EXPULSION GRENADE - A NONLETHAL WEAPON consisting of a rubber ball grenade body that contains pulverized chemical agents (CN or CS). No pyrotechnics are involved - a CO₂ cartridge at the center of the grenade disperses the irritant through ports at the sides of the grenades.

FLAMING - Expressing strongly-held opinions with emotion, usually on the INTERNET.

FLAMING DATUM - A DATUM whose location is the target damaged by a submarine attack.

FLAMING RECEIVER - An expendable combination infrared and RF decoy.

FLARE - In countermeasures, a PYROTECHNIC device launched from ships and aircraft to serve as a target and lure infrared homing and optical devices away from their true targets.

NOTE: Pyrotechnic flares may be characterized by the following parameters:

<u>FLARE PARAMETERS</u>
Flare Size (volume)
Peak Intensity
Spectral Energy Distribution
Altitude Dependence (Performance at high altitudes)
Strong: Degraded Performance
Slight: Satisfactory Performance
Rise Time (time before which flare becomes the preferred target)
Burn Time
IGNITION SPIKE
Trajectory
Spatial Extent (apparent emitting area in the IR SPECTRAL REGION)

FLARE REJECTION - The ability of a missile to recognize and disregard PYROTECHNIC countermeasures.

FLASH BLINDNESS - Impairment of vision resulting from an intense flash of light. It includes temporary or permanent loss of visual functions and may be associated with retinal burns. See also DAZZLE.

FLASH MEMORY - High-density non-volatile computer memory designed for rugged applications. The advantages of flash memory are non-volatility and a simple and inexpensive cell structure. The major disadvantages are that individual bytes cannot be erased and overwritten, but instead, sections of the device or the entire device are erased. Also, erase/write cycles are much slower than read operations and may require complex erase and write algorithms to insure the device is not damaged during these operations.

FLEX-CUFFS - Lightweight disposable restraints (hand-cuffs) to immobilize individuals. They can be carried in large quantities by soldiers.

FLEX TARGETING - The ability (*e.g.*, of bombers) to change targets while en route.

FLEXIBLE LIGHT ELECTRONIC ATTACK SYSTEM (FLEAS) -

An advanced mobile jamming system intended to provide a SOFT-KILL response against handheld radios and cellular telephones. FLEAS acquires and analyzes signals and can either perform high-power directional JAMMING, INTRUSION or long-range DECEPTION.

NOTE: FLEAS is designed for use by a variety of forces, including police and border guard units.

FLOATPLANE - A seaplane (*i.e.*, an airplane designed to take off and touch down on water) whose fuselage is supported by struts attached to two or more pontoon floats. Contrast with the **flying boat**, a seaplane with its fuselage formed into a boat hull (with possibly wing-support pontoons), having the buoyancy and strength necessary to take off, touch down, and float on water.

FLOPTICAL DISK - A very high-density floppy disk, which uses an optical servo system to position the magnetic read-write head with great accuracy.

FLUENCE - A measure of microwave energy strength. Specifically, a time-integrated power density.

FLUIDICS - A control technology that uses a fluid medium - liquid or gas - to perform sensing, amplification, logic, and control functions based on the medium's internal fluid dynamics.

NOTE: Fluidic controls employ streams of fluid to deflect other streams and make sensing, controlling and computing devices operable under conditions where others may fail. Fluidic controls have been found to be extremely reliable, easy to maintain and highly resistant to radiation and dust.

FLUORESCENT NANOCLUSTER - A binary storage technique that provides 3-dimensional storage, creating a dense storage medium that can be written to or read in parallel. NOTE: A compact disk currently holding 650 megabytes of data could, using fluorescent nanocluster techniques, hold 650 megabytes squared of data.

FLY-ALONG FLARE - An infrared countermeasures (IRCM) flare which, after launch, will fly along at a distance from the launching aircraft to act as a decoy against the IR seeker of an incoming missile equipped with a FORWARD-BIAS COUNTERMEASURES. Also called KINEMATIC FLARE.

FLY-BY-LIGHT (FBL) - An aircraft control technology designed to replace electronic data transmission, mechanical control linkages, and electronic sensors with optical components and subsystems. Fly-by-light systems are inherently lightweight and impervious to electromagnetic radiation. See also POWER-BY-WIRE. NOTE: FBL is the use of optical components and subsystems to control flight. FBL technology will replace electronic data transmission, mechanical control linkages, and electronic sensors.

FLY-BY-WIRE (FBW) CONTROL - Electronic control of aircraft control surfaces using redundant channels having dissimilar computer algorithms and communications, so that each channel operates independently of the others.

NOTE: FBW control replaces the mechanical cable/quadrant/pushrod system on aircraft.

FLYING PEANUT - A remote-control unmanned vertical take-off and landing reconnaissance vehicle capable of real-time transmission of infrared imagery.

FLYING RADAR TARGET (FLYRT) - A chaff-launcher ejected flying decoy that emulates the radar cross-section and motion of a ship. [Information from: JED "Washington Report 5/93]

FLY ON THE WALL - A MICRO AIR VEHICLE (MAV) with bulging hex-covered "eyes" which can fly to and place itself on a target and emit a low energy code, allowing a homing weapon to guide in on its position. Also called ROBO-BUG. See also MICROMECHANICAL FLYING INSECT (MFI).

NOTE: The fly would be operated via remote control by on-site special operations personnel to the designated mean point of impact (DMPI).

FLYWHEEL BATTERY - A system consisting of a flywheel, a motor-generator (MG), and control electronics. Input power, say from a solar array, powers the motor which converts electrical energy to mechanical energy by spinning the flywheel (which speeds up as it accumulates energy). When the connected load requires electrical energy, the flywheel drives the generator, converting mechanical to electrical energy (the flywheel slows down as energy is expended to the load).

NOTES: **(1)** The flywheels are designed to rotate at speeds ranging from 10,000 to over 50,000 revolutions per minute (rpm), and must be constructed of extremely strong material such as carbon fiber, to keep from flying apart. Friction losses are minimal because the flywheels are supported by magnetic bearings. Windage losses are handled by mounting the flywheels in air-evacuated housings. **(2)** Although currently (2002) more expensive (price per kilowatt-hour) than lead-acid batteries, flywheel batteries have important advantages, such as high efficiency (> 95%) and long service life (>20 years compared to a few years for lead-acid batteries); thus, they have promising potential for use in space applications. **(3)** The gyroscopic aspects of the flywheel battery can be exploited in space for attitude control, etc.

FOCAL PLANE - In an optical system, a plane through the focal point perpendicular to the principal axis of the system, such as a lens or mirror.

FOCAL PLANE ARRAY (FPA) - See STARING DETECTOR.

FOCUSED LOGISTICS - The fusion of information, logistics, and transportation technologies to provide rapid crisis response, to track and shift assets even while enroute, and to deliver tailored logistics packages and sustainment directly at the strategic, operational, and tactical level of operations.

FOE-AS-FRIEND IDENTIFICATIONS - The percentage of friendly tracks in the system that correlate with hostile real objects. Contrast with FRIEND-AS-FOE IDENTIFICATIONS.

FORCE PROJECTION (FP) - The employment of military ground forces and combat power. [Information from: U.S. Army field manual *FM 55-10*]

NOTES:

A. Field Manual *FM 100-5* describes force-projection operations in eight stages: **(1)** mobilization, **(2)** predeployment activity, **(3)** deployment, **(4)** entry operations, **(5)** operations, **(6)** war termination and post-conflict operations, **(7)** pre-deployment and reconstitution, and **(8)** demobilization.

B. The term "**FORCE PROJECTION/DOMINANT MANEUVER** is sometimes used, and is defined in the *NAVMAR Joint Warfighting Science and Technology Plan* (circa 2000) as "Fast deployment and timely employment and maneuver of joint forces to rapidly dominate the full range of military operations."

FORCE STRUCTURE - The component of MILITARY CAPABILITY that relates to numbers, size, and composition of the units that comprise the force; e.g., divisions, ships, air wings.

FORCIBLE ENTRY OPERATIONS (FEO) - An "enabling concept" that sets the conditions for a major contested invasion of enemy territory that will help achieve decisive strategic victory. Forcible Entry Operations may be an element of or the follow-on to RAPID DECISIVE OPERATIONS (RDO). Like RDO, Forcible Entry Operations require elements of all the other supporting concepts to be successful: Focused Logistics, Enabling Early Decisive Operations (FEEDO), Attack Operations Against Critical Mobile Targets, Joint Interactive Planning, Common Relevant Operational Picture (CROP), and Adaptive Joint Command and Control, Strategic Deployment, and Information Operations. [U.S. Army manual *FM 100-15*]

NOTE: The Forcible Entry Operations concept differs from the Rapid Decisive Operations concept in that RDO is an end-to-end concept that results in decisive operational-level victory.

FORCENET - An operational construct and architectural framework that integrates the SEA POWER 21 concepts of Sea Strike, Sea Shield and Sea Basing by connecting warriors, SENSORS, NETWORKS, command and control, platforms, and weapons; providing accelerated speed and accuracy of decision; and integrating knowledge to dominate the BATTLE SPACE. Forcenet provides the following capabilities: Expeditionary, multi-tiered, sensor and weapon grids; Distributed, collaborative command and control; Dynamic, multi-path survivable networks; Adaptive/automated decision aids; and Human-centric integration.

FOREIGN INSTRUMENTATION AND SIGNALS

INTELLIGENCE (FISINT) - Technical information and intelligence information derived from the intercept of foreign instrumentation signals by other

than intended recipients. Foreign instrumentation and signals intelligence is a category of SIGNALS INTELLIGENCE (SIGINT). See also TELEMETRY INTELLIGENCE.

NOTE: Foreign instrumentation signals include but are not limited to signals from telemetry, beaconary, electronic interrogators, tracking/fusing/arming/firing command systems, and video data links.

FORWARD-BIAS COUNTERMEASURES - An infrared counter-countermeasures (IRCCM) technique used by an infrared-homing missile against a decoy infrared countermeasures (IRCM) flare in which the IR missile seeker is turned off momentarily allowing the IRCM flare to fall away from the seeker's field of view (FOV). Also called PUSH-AHEAD COUNTERMEASURES. See also FLY-ALONG FLARE.

FORWARD ERROR CORRECTION (FEC) - A coding technique designed to clean up signals damaged by channel CROSSTALK, noise, and other interference common to space communication links. FEC codes detect and correct data errors at the receiver (forward) end of the transmission.

FORWARD LOOKING INFRARED (FLIR) - INFRARED sensors used aboard fixed wing aircraft and helicopters for intelligence gathering and to provide real-time sensors for pilots to improve their ability to fly at night and in inclement weather conditions.

FORWARD PASS - Transferring control of a fired weapon to another platform. This is a facet of COOPERATIVE ENGAGEMENT.

FORWARD SCATTERING - SCATTERING of an electromagnetic wave into directions that are at acute angles to the direction of propagation of the incident wave.

FORWARD TELLING - Transferring information to a higher level of command. See also BACK TELLING, CROSS TELLING, OVERLAP TELLING, RELATERAL TELLING, TRACK TELLING.

FOTOFIGHTER - A highly maneuverable plane (conceptual) equipped with an array of diode lasers that would allow the plane to engage multiple targets simultaneously. At low powers, the arrays can function as transmitters and receivers for LPI communications.

FOURTH GENERATION LANGUAGE (4GL) - Fourth generation productivity tool. A programming tool characterized by a reduction of numbers of instructions required by THIRD GENERATION LANGUAGEs by a factor of 10 (or provides an equivalent improvement in productivity if its interface with the programmer is not a language per se). Additions in the 4GL include direct manipulation of databases, and screen-manipulation ability, including windowing.

See also FIRST GENERATION LANGUAGE, SECOND GENERATION LANGUAGE, FIFTH GENERATION LANGUAGE.

FOURTH GENERATION PROGRAMMING - See **FOURTH GENERATION LANGUAGE**.

FOURTH GENERATION RADAR SIGNAL - A generic classification of radar signal sophistication. Fourth generation radar signals have sophisticated features reflecting the most modern technology available. See also **FIRST**, **SECOND**, and **THIRD GENERATION RADAR SIGNAL**.

FRACTAL - Formally, a curve whose Hausdorff-Besicovitch dimension is larger than its Euclidean dimension. Fractals are a natural way of representing many of the shapes in nature. One application of fractals is in simulation systems.

NOTE: A fractal is any image or object that can be constructed using an iterative mathematical formula. A fractal is characterized as a curve having a fractional, versus integral, dimension. Fractals are sometimes referred to as "visual representations of chaos". Examples of fractal curves are the Phoenix Curve, Mandelbrot Set, Julia Set, Hilbert Curves, Von Koch Snowflake, and Gosper Curve.

FRACTAL ANTENNA - An antenna comprised of elements patterned after self-similar designs (i.e., any arbitrarily small region of a fractal looks like the entire fractal). It is capable of many resonances, depending upon the iterations. See also **GENETIC ANTENNA**.

FRACTIONAL BANDWIDTH (FBW) - The ratio of the instantaneous bandwidth to the carrier bandwidth.

NOTE: For example, the S-band radar operating at 3 GHz with a bandwidth of 300 MHz would have a fractional bandwidth of $0.3/3 = 0.1$.

FRAGILITY - The inherent inability of a force or organization to respond to changes in external conditions. NOTE: Fragility may be affected by overt actions of the adversary or by natural occurrences, which sap energy and resources.

FRAGMENTARY ORDER (FRAGO) - An abbreviated form of an **OPERATION ORDER (OPORD)**, usually issued on a day-to-day basis, that eliminates the need for restating information contained in a basic operation order. It may be issued in sections.

FRAME FREQUENCY - The inverse of **FRAME TIME**.

FRAME TIME - The time required by a **SCANNING** sensor (active or passive) to execute one complete search scan. See also **SCANNING DETECTOR**.

FRANGIBLE PROJECTILE - A **NONLETHAL WEAPON** projectile, which disintegrates (e.g., turns to iron dust) upon striking a hard object. The usual purpose is to limit collateral damage, such as behind a door or wall struck by the projectile.

FREE-ELECTRON LASER (FEL) - A directed energy weapon, which employs accelerator technologies known as induction accelerators and radio frequency accelerators. See also BEAM-PLASMA DEVICE; VIRTUAL-CATHODE OSCILLATOR, CHEMICAL LASER; EXCIMER LASER, HIGH ENERGY LASER, X-RAY LASER.

NOTE: Free-electron lasers work by first depositing large amounts of energy in gases and then extracting some fraction of that energy in a collimated beam.

FREQUENCY - The number of periods per unit time. Specifically, the number of identical cycles per second. See also HERTZ.

FREQUENCY AGILE RADAR - A pulse radar in which the transmitter carrier frequency is changed between pulses or groups of pulses by an amount comparable to or greater than the pulse bandwidth.

NOTE: The frequency agile radar is considered to be a LOW PROBABILITY-OF-INTERCEPT (LPI) RADAR.

FREQUENCY AGILITY - The ability of an electronic transmitting system to quickly change operating frequencies, generally on a pulse-to-pulse basis while the frequency remains stable during the pulse. These frequencies are automatically selected and successive transmissions may be random or determined according to some programmed algorithm. See also SNIFFING.

FREQUENCY DECONFLICTION - A systematic management procedure to coordinate the use of the electromagnetic spectrum for operations, communications, and intelligence functions. Frequency de-confliction is one element of electromagnetic spectrum management.

FREQUENCY DOMAIN REFLECTOMETRY (FDR) - A REFLECTOMETRY technique using sine waves. FDR directly measures the phase difference between the incident and reflected waves; any faults in the line will generate resonances between the two signals, which are detected by the frequency domain reflectometer.

See also SMART WIRE, STANDING WAVE REFLECTOMETRY (SWR) and TIME-DOMAIN REFLECTOMETRY (TDR).

FREQUENCY HOPPING (FH) - A SPREAD SPECTRUM technique in which the transmitted frequency is pseudorandomly changed at a rate called the "hopping rate". Contrast with DIRECT SEQUENCE SPREADING, TIME HOPPING.

NOTE: In Frequency Hopping, the total available bandwidth is the spread bandwidth; however, the instantaneous bandwidth is less than the spread bandwidth. This technique is used in communications, radar, jamming, and other applications.

FREQUENCY MODULATION (FM) - A form of ANGLE MODULATION in which the instantaneous frequency of a sine-wave CARRIER is caused to depart from the carrier frequency by an amount proportional to the instantaneous value of the modulating wave. See also AMPLITUDE MODULATION (AM), PHASE MODULATION (PM).

FREQUENCY REUSE - The simultaneous use of a frequency for two or more purposes.

FREQUENCY SEARCH-AND-LOOK JAMMING - The employment of NARROWBAND JAMMING that is tuned automatically over a broad frequency band and automatically locked onto a particular frequency.

FREQUENCY SELECTIVE SURFACE (FSS) - (1) An adjustable plastic screen used in RADOMEs or ADVANCED ENCLOSED MASTs (AEMs) that allows certain frequencies to pass while blocking others. (2) FSS consists of low-cost engineered electromagnetic material used to control surface currents in antenna applications; it features an array printed inductors and capacitors on a planar surface on the antenna. Two advantages of FSS are the size reduction of the physical antenna (by nearly a factor of 2) and the reduction of detuning effects by objects in the antenna's near field. [Information from: Etenna FSS Info Sheet IS002-A 5/23/2003]

NOTES: (1) The Ohio State University Center for Intelligent Transportation Research (CITR) used an FSS embedded in a road stripe as a lane locator for an autonomous vehicle demonstration system. [The OSU Autonomous Vehicle Website, Ohio State University Center for Intelligent Traffic Research (CITR), www.eng.ohio-state.edu/citr/Demo97/osu-av.html] (2) In addition to RADAR CROSS-SECTION (RCS) augmentation, recent applications of FSS include: Radio Frequency Identification (RFID) tags; Collision avoidance; RCS augmentation; robotic guided paths; ELECTROMAGNETIC INTERFERENCE (EMI) protection; PHOTONIC BAND-GAP structures; wave-guide or cavity controlled coupling; LOW PROBABILITY OF INTERCEPT (LPI) systems (*e.g.*, "stealth")

[See Ansoft Corporation Presentation #4 at:
http://www.ansoft.com/Empower/Frequency_Selective_Surfaces.pdf].

FREQUENCY SHIFT KEYING (FSK) - A form of FREQUENCY MODULATION (FM) in which the modulating signal shifts the output frequency between predetermined values, and the output WAVE has no discontinuities. [LISTEN to a Frequency Shift Keying (FSK) signal, visit website: <http://www.milspec.ca/jammers/audio/rtty755.ra>].

FREQUENCY SPECIFIC JAMMING - [ACOUSTIC JAMMING term]
Acoustic jamming of a defined acoustic sensor.

FREQUENCY SPECTRUM - See ELECTROMAGNETIC SPECTRUM

FREQUENCY SYNTHESIZER - A device which translates the stable frequency of a precision frequency standard, such as a crystal-controlled oscillator,

into a number of frequencies over a spectrum range. There are two types of frequency synthesis: DIRECT SYNTHESIS (DS) and INDIRECT SYNTHESIS (IS).

FRIEND-AS-FOE IDENTIFICATIONS - The percentage of hostile tracks in the system that correlate with friendly real objects. Contrast with FOE-AS-FRIEND IDENTIFICATIONS.

FRONT-DOOR COUPLING - See FRONT-DOOR SYSTEM PENETRATION.

FRONT-DOOR SYSTEM PENETRATION - A DIRECTED ENERGY WEAPON term for energy entering a target system through its antenna. Synonymous with FRONT-DOOR COUPLING. Contrast with BACK-DOOR SYSTEM PENETRATION.

NOTE: Front-door system penetration is most effective at the target system's antenna design frequency.

FRONTLIGHT - A lamp that reflects off the front surface of a reflective display. It is used when ambient light is insufficient or, in the case of a reflective field-sequential color display, to sequentially illuminate the display with red, green, and blue light. Contrast with BACKLIGHT.

FUEL AIR EXPLOSIVE (FAE) - A THERMOBARIC WEAPON that dispenses an aerosol fuel cloud, which ignites as descends (assuming that it is a submunition launched from a CLUSTER BOMB UNIT (CBU)). The overpressure from the explosion flattens objects underneath the cloud.

NOTES: (1) FAEs may also be delivered by other means, such as a planted aerosol dispenser with a delayed fuze, *etc.* (2) The so-called "daisy cutter" bomb is a large (15,000 lbs) FAE device. It consists of an aerated watery mixture of ammonium nitrate and aluminum that creates a mist prior to detonation. The resulting explosion of the aerosol incinerates everything within a 600-yard radius and generates a shock wave that can be felt miles away. The "daisy cutter" was first used during the Vietnam War to quickly clear-jungle landing zones, and also was used against Iraqi troops during the Gulf War.

FULL AUTHORITY DIGITAL ENGINE CONTROL (FADEC) - The regulation of engine power and efficiency by integrating, in REAL TIME, the flight control computer with the variables (sensed parameters, specified schedules, control logic, etc.) coupled with mission requirements.

FULL-DIMENSIONAL PROTECTION - Protecting our own forces from the very technology we are exploiting.

FULLERENE - A NANOMETER material composed of 60 carbon items and a third form of carbon after graphite and diamond. Also called BUCKY BALL. See also BUCKMINSTERFULLERENES, BUCKY TUBE.

NOTES: **(1)** The term "bucky ball" refers to the resemblance of fullerenes to the geodesic domes of architect R. Buckminster Fuller. **(2)** FULLERENE, when formed into a flat sheet and rolled into a cylinder, becomes an extremely strong material of nanoscale dimensions: a carbon NANOTUBE.

FULL SPECTRUM INFORMATION OPERATIONS - A U.S. Army integrating strategy merging the following disciplines:

<u>FULL SPECTRUM INFORMATION OPERATIONS</u>	
Deception	Psychological Operations (PSYOPS)
Operations Security (OPSEC)	Electronic Warfare (EW)
Physical Strikes	Civil Affairs
Counterdeception	Counterpropaganda
Counterintelligence	Computer Network Defense
Computer Network Attack	Public Affairs

FUNCTIONALLY SIGNIFICANT ITEM (FSI) - A shipboard item, which performs a function and is significant to the performance of the system of which it is a part. A functionally significant item can be a system, subsystem, equipment, component, or any combination of these.

FUTUREMAP - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to develop market-based techniques to avoid surprise and predict future events of world futures markets.

NOTE: FUTUREMAP received severe congressional criticism (July 2003) when Senator Ron Wyden (D-Oregon) lambasted it as a "Tax-Funded 'Terror Market' Scheme Defense Program" and "terrorism lottery."

FUZE JAMMING - A generic term relating to fuze countermeasures that will pre-detonate missile fuzes.

FUZE SERRODYNE MODULATION - A fuze jamming technique employed to produce the Doppler shift that will trigger a Doppler fuze.

FUZZY LOGIC - An approach to computing based on "degrees of truth" rather than the usual "true or false" (1 or 0) Boolean logic on which the modern computer is based. Fuzzy logic includes 0 and 1 as extreme cases of truth, but also includes various states of truth in between.

G

GALILEO - European satellite navigation system. Under civil control, Galileo will be (2001) a global navigation infrastructure consisting of 30 satellites, the associated ground infrastructure and regional/local augmentations [Source: Galileo Web site, http://europa.eu.int/comm/energy_transport/en/gal_en.html] View an artist's concept of GALILEO.

NOTE: Galileo will be inter-operable with the GLOBAL POSITIONING SYSTEM (GPS) and GLOBAL NAVIGATION SATELLITE SYSTEM (GLONASS).

GALLIUM ARSENIDE (GaAs) - A compound used in integrated circuits (ICs).

NOTE: GaAs provides a speed of electron mobility about five times that of silicon, and lower power dissipation at the same speed than silicon of the same feature size. Potential GaAs advantages include increased radiation hardness and operation at higher temperatures than can be achieved with silicon. Additionally, the band structure of GaAs allows light-emitting devices to be made, not previously possible with silicon (Recently, etched silicon has also been made to emit light by applying a voltage or a "pumping" light).

GALLIUM NITRIDE LIGHT-EMITTING DIODE (GALLIUM NITRIDE LED) - A white-light emitting diode with potential to produce, efficiently, light roughly 100 times as bright as an incandescent bulb and will last 100 times as long.

GAMMA-RAY LASER (GRASER) - A DIRECTED ENERGY WEAPON (DEW) under DoD's WEAPONS SYSTEMS TECHNOLOGIES (WST). The projection of coherent electromagnetic (EM) energy to a distant target at the speed of light. [See more details at: <http://www.dtic.mil>] Also called Gamma X-ray laser.

NOTES: (1) Grasers can be small-size devices. (2) GRASERs penetrate deeply into targets and can produce a range of lethality from SOFT KILL to HARD KILL. (3) GRASERs are being considered (*circa* 1999) for space application against missiles and satellites. (4) Propagation through the atmosphere is attenuated, but a GRASER could attack targets from space to as far down as 40 km above the ground. (5) Countermeasures against GRASERs are difficult because of the deep penetration of its beam. See also ANTIMATTER PARTICLE BEAM (APB), CHARGED PARTICLE BEAM (CPB), HIGH POWER MICROWAVE/RADIO FREQUENCY (HPM/RF), KINETIC ENERGY WEAPON (KEW) and NEUTRAL PARTICLE BEAM (NPB).

GAMMA X-RAY LASER - See GAMMA-RAY LASER.

GAPFILLER SATELLITE (GAPSAT) - A high capacity super high frequency (SHF) wideband communications satellite to provide critical information to the US military and Allied forces. Three or more GAPSATs will form the Wideband

Gapfiller Satellite (WGS) system to be launched in the 2004 time frame. [Information from: Defence Systems Daily, 18 June 2001]

GARDIAN - An acronym for General ARea Defense Integrated ANti-missile. GARDIAN is a LASER system that utilized a high energy CHEMICAL LASER to protect military assets against low flying tactical threats such as cruise missiles and UNMANNED AERIAL VEHICLES (UAVs). GARDIAN generates a laser beam, which is focused on a moving target creating immense heat at a single spot, effectively burning a hole in the target. The laser can engage within a few seconds and locks on until the target is destroyed. See also DIRECTED ENERGY WEAPON (DEW).

GARNISHING - In surveillance, natural or artificial material applied to an object to achieve or assist CAMOUFLAGE.

GARRET SCANNER - An electronic device used to scan rooms for concealed weapons. It includes a "reduced sensitivity" mode for scanning near floors containing reinforcement bars (rebar).

GAS LASER - A LASER in which a gas is used as a light-emitting source. The electrons in the gas molecules are excited by x-rays plus electrical discharges (called *electrical/gas lasers*), or by chemical reactions (called CHEMICAL LASERS). The choice of gas determines the color of the output light. See also CRYSTAL LASER, DIODE LASER, DYE LASER.

GATE - (1) An interval of time during which some portion of a circuit or display is allowed to be operative. (2) The circuit that provides gating.

GATE DECEPTION - A SELF SCREENING ECM technique that returns a large jamming or on-frequency noise signal back to a victim automatic tracking radar. The jamming signal is much stronger than, and thus masks in the (velocity, range, or angle) gate, the true signal returned by the radar cross section of the jamming platform. The jamming signal is then gradually increased or decreased relative to the true return signal, causing the radar's gate to move away from the true signal. After a specified time or signal-magnitude, the jamming signal is turned off, causing the radar to lose its track and go into a search mode to reacquire the target. This process then repeats itself.

GATEWAY - A device that forwards information from one network to another. Also called a ROUTER or switch.

GATING - (1) The process of selecting those portions of a signal that exist during one or more selected time intervals. (2) (Radar) The application of enabling or inhibiting pulses during part of a cycle of equipment operation.

GATOR MINE - A component of the Navy's CBU-78/N and the Air Force's CBU-89/B air-launched cluster bombs. Each Navy bomb contains 15 antipersonnel and 45 antitank Gator mines; each Air Force bomb contains 22

antipersonnel and 72 anti-tank Gator mines. Gator mines can also be deployed from vehicles and helicopters using the VOLCANO multiple delivery mine system.

GENERIC THREAT SIMULATOR (GTS) - A test and evaluation tool, which employs simulation to evaluate the effectiveness of a ship's ELECTRONIC COUNTER-COUNTERMEASURES (ECCM) and anti-missile DECOYS. It tests the entire system: the ELECTRONIC SUPPORT MEASURES (ESM) system, which detects incoming missiles; the fire control system, which launches a counter-measure or decoy; the decoy itself; and the performance of the human operators aboard the ship.

GENERIC WEAPON - A weapon that is useful against any target.

GENETIC ALGORITHM (GA) - A computer algorithm based on the mechanisms of biological natural selection, using populations of objects, which can reproduce based on the biological concepts of survival of the fittest and mutation.

GENETIC ANTENNA - An antenna designed through use of GENETIC ALGORITHMS to best meet the antenna specifications. It is particularly useful in situations where existing designs are not adequate. See also FRACTAL ANTENNA.

GENETIC DATA MINING - The automatic extraction of prediction and classification rules from databases using advanced GENETIC ALGORITHMS.

GENISYS - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to produce technology enabling ultra-large all-source information repositories.

NOTE: In contrast with today's relational databases, Genisys will **(1)** require no *a priori* data modeling and use a simpler query language; **(2)** support automated restructuring and projection of data; **(3)** store data in context of time and space to help resolve uncertainty; **(4)** create privacy filters, "aliasing" methods, and automated data expunging agents to protect the privacy of U.S. citizens and others not involved with foreign terrorists; and **(5)** develop a large, distributed system architecture for managing the huge volume of raw data input, analysis results, and feedback.

GENOA - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to rapidly and systematically accumulate evidence, facilitate collaboration (while protecting critical information), and test hypotheses that support decision-making at the national level.

GENOA II - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to develop information technology needed by teams of intelligence analysts and operations and policy personnel in attempting to anticipate and pre-empt terrorist threats to U.S. interests.

GENOMICS - **(1)** The study of genes and their function. **(2)** A new technology combining biotechnology, genetic engineering, and microelectronics.

GEOGRAPHIC SYNTHETIC APERTURE RADAR (GEOSAR) - An airborne all-weather radar system used to map terrain. GEOSAR employs a dual frequency SYNTHETIC APERTURE RADAR (SAR) design to penetrate forest canopy and so map the actual Earth's surface.

GEOPOSITIONING - The placement, by radio control, of a satellite from one GEOSYNCHRONOUS position to another.

GEOSAR - See GEOGRAPHIC SYNTHETIC APERTURE RADAR.

GEOSTATIONARY SATELLITE - A satellite that has a circular orbit, lies in the plane of the earth's equator, and moves about the earth's polar axis in the same direction and with the same period as the earth's rotation. Thus, the satellite remains above a fixed point on the earth's equator. See also GEOSYNCHRONOUS SATELLITE.

GEOSYNCHRONOUS SATELLITE - A satellite that orbits the earth such that it remains stationary with respect to a given point on the earth because its orbit has the same period of revolution as the earth. That is to say that a radial line originating at the center of the earth and passing through the point of interest on the surface of the earth will also pass through the satellite. See also GEOSTATIONARY SATELLITE, MOLNIYA ORBIT.

GHILLIE SUIT - A CAMOUFLAGE jump suit with pieces of "camo mesh" having various colored tattered rags sewn onto it. Its purpose is to blend an individual, such as a sniper, into the surroundings by breaking up the distinctive human form. See also BALACLAVA, DRAG BAG, SNIPER FACE VEIL, UNIFORM CAMOUFLAGE. NOTE: The term "ghillie" likely was taken from that used to refer to Scottish game-keepers, who are called "ghillies." Other related terms are BODY BLIND, BODY VEIL, MILITARY NET.

GIANT MAGNETORESISTANCE (GMR) - An application of MAGNETOELECTRONICS. In a GMR material, consisting of a stack of alternating layers of magnetic and nonmagnetic atoms, a small magnetic field can produce a large change in electrical resistance, thus allowing great increases in hard drive densities. See also EXTRAORDINARY MAGNETORESISTANCE (EMR)

GLARE LASER - A NONLETHAL WEAPON intended to cause temporary loss of sight to the targeted individual (TI). NOTE: One of these devices under development is the so-called "laser dazzler," which emits low-power green laser flashes 20 times per second.

GLINT - The inherent random component of error in measurement of position or Doppler frequency of a complex target due to interference of the reflections from different elements of the target.

GLINT ENHANCE JAMMING - A jamming technique which features a jamming signal transmitted alternately from different antennas, switching from one antenna to the other either sequentially or randomly.

GLOBAL AREA STRIKE SYSTEM (GLASS) - A system incorporating a HIGH-ENERGY LASER (HEL) system, a KINETIC ENERGY WEAPON (KEW) system, and a transatmospheric vehicle (TAV). The HEL system consists of ground-based lasers and space-based mirrors, which direct energy to the intended target. The KEW system consists of terminally-guided projectiles, and the TAV is a flexible platform capable of supporting maintenance and replenishment of the space assets, and can be used for rapid deployment of special operations forces (SOF). [USAF 2025 Study]

GLOBAL COMBAT SUPPORT SYSTEM (GCSS) - "The GCSS concept provides the joint warfighter with a single, end-to-end capability to manage and monitor units, personnel, and equipment from mobilization through deployment, employment, sustainment, redeployment, and demobilization. As an end state, GCSS is a secure network environment allowing Department of Defense (DoD) users to access shared data, and applications, regardless of location and supported by a robust network/information-centric infrastructure." [GCSS Web Site (2002); updated (2003) to: <http://www.pmlis.lee.army.mil/GCSS-ARMYmain.htm>]

GLOBAL COMMAND AND CONTROL SYSTEM (GCCS) - "... A single joint command and control system for the Chairman, Joint Chiefs of Staff. GCCS assists Commanders-in-Chiefs (CINCs) and Joint Task Force commanders in the maintenance of dominant battlefield awareness through a fused, integrated, near real-time picture of the battlespace. GCCS provides information processing support in the areas of planning, mobility, and sustainment to combatant commanders, the Services, and Defense agencies." [DISA]

GLOBAL INFORMATION MANAGEMENT SYSTEM (GIMS) - A network of intelligent information gathering, processing, analysis, and advisory nodes. GIMS collects, stores, analyzes, fuses, and manages information from ground, air, and space sensors and all-source intelligence. Sensors used include acoustic, optical, radio frequency (RF), olfactory, etc. It employs neural processing to provide information tailored to the user's personal requirements. [USAF 2025 Study]

GLOBAL NAVIGATION SATELLITE SYSTEM (GLONASS) - A Russian small lightweight jammer designed to jam the Global Positioning System (GPS)

GLOBAL POSITIONING SYSTEM (GPS) - A constellation of 24 operating satellites and three in-orbit spares (1995). Each satellite continuously emits a pair of signals by which the system's precision and accuracy are achieved. GPS receivers employed by various users can provide positioning accuracy to within centimeters. NOTE: The determining of position of a GPS receiver requires the simultaneous measurement of the distances to four orbiting satellites. The measurement of raw range from a single satellite places the receiver on the surface of a sphere centered on the satellite with a radius equal to the measured range. A

simultaneous measurement of the range to a second satellite creates a second sphere that intersects the first and creates a sector upon which the receiver may be found. A third measurement produces the intersection of three spheres with only two points common to all three. One of these points will be in space, the other at the receiver's terrestrial position.

In theory, these three measurements should be sufficient to produce an unambiguous positional fix. In practice, however, the inaccuracy of the user's inexpensive clock must be accommodated by a range measurement to a fourth satellite. At this point there are four unknowns - the user's longitude, latitude and altitude measured from the center of the earth, as well as the bias required to bring the user's clock error into synchronicity with system time and four independent range equations. Solving the system of equations yields user position data to an accuracy of at least 15 meters and time to within 100 NANOSECONDS. There are at least two levels of precision associated with GPS - Coarse/Acquisition (C/A) code, which involves ionospheric and geoid correction algorithms, and encrypted Precision (P) code, presumably for ballistic missile and other military usage. See also GALILEO.

GLOBAL SURVEILLANCE, RECONNAISSANCE, AND TARGETING SYSTEM (GSRT) - A space-based all-sensor collection, processing, and dissemination system, which provides a real-time information database. This database is used to create a VIRTUAL REALITY (VR) image of the area of interest, thus providing all levels of command SITUATIONAL AWARENESS (SA), technical and intelligence information, and command & control (C²). [USAF 2025 Study]

GOVERNMENT OSI PROFILE (GOSIP) - A subset of OPEN SYSTEM INTERCONNECTION (OSI) standards specific to U.S. Government procurements, designed to maximize interoperability in areas where plain OSI standards are ambiguous or allow too many options.

GRACEFUL DEGRADATION - A system design feature to prevent catastrophic failure by allowing the system to operate at a predictably decreasing capability in the presence of increasing subsystem failure.

GRASER - See GAMMA-RAY LASER

GRAY - A term used to indicate countries other than the U.S. or the Soviet Union; e.g., gray forces, gray equipment. Contrast with BLUE, RED FORCES.

GRAYBODY - A temperature radiator whose spectral emissivity is less than unity and the same at all wavelengths. NOTE: Graybody radiation can emanate from an infrared-generating missile in flight: from the leading edges, exhaust smoke, and the engine enclosure.

GRAYBODY RADIATOR - A flare designed to emit over a wide spectrum.

GRAY-HAT HACKER - A HACKER whose aim is to publicly expose security flaws in software, and who generally posts the results on the Internet. Contrast with CRACKER. See also BLACK-HAT HACKER, HONEYPOT, TROPHY GRABBING.

GRID - A VACUUM TUBE element used to control the electrical current flowing through the tube by varying its voltage with respect to that of the CATHODE.

GRID AMPLIFIER - A solid state high power amplifier, destined (*ca* 2003) to replace VACUUM TUBES now used as MILLIMETER WAVE (MMW) amplifiers. The grid amplifier consists of an array of transistors fabricated on a single GALLIUM ARSENIDE or indium phosphide chip. Transistor output signals are combined to form a beam emanating from the face of the chip, providing as many as 20 watts of power at 30 GHz from a single chip.

GRIDLOCK - (1) The process of removing navigational and radar biases by calibrating to a common force reference point. This is accomplished by all units of the force simultaneously recording the position of a commonly-held target that has a specified relative position from the force center (or other reference point) at the same instant. (2) The computer process used to compare an individual ship's track data with remotely originated track data, and to determine the correction necessary to bring the tracks into alignment.

GROUND-BASED ELECTRO-OPTICAL DEEP SPACE SURVEILLANCE SYSTEM (GEODSS) - A system of three telescope sensors linked to video cameras, which feed their space pictures into a nearby computer for display on a monitor and recording on magnetic tape.

GROUND CLUTTER - CLUTTER resulting from the ground or objects on the ground. See also RADAR CLUTTER, WAVE CLUTTER.

GROUND EFFECT - A condition which occurs when a helicopter hovers near (within 1/2 rotor diameter) of the ground, and is due to the interference of the surface with the airflow pattern of the rotor system. When a helicopter is hovering In Ground Effect (IGE), blade efficiency increases, and less power is required than a hover Out of Ground Effect (OGE). NOTE: Maximum ground effect is achieved when hovering over smooth paved surfaces.

GROUND-EMPLACED MINE SCATTERING SYSTEM (GEMSS) - A mine dispenser designed to be towed by a vehicle. It flips one mine out of a tube every two seconds, and is capable of thus scattering up to eight hundred antipersonnel mines and/or antitank mines per load. The mines are similar to those used by the ADAM system.

GROUND HOMING ON PSEUDO-TARGET - An ECM technique consisting of pointing the ECM antenna in a direction other from that of the victim radar in order to create off-angle noise strobing or false targets.

GROUNDING - The BONDING of an equipment case, frame or chassis, to an object or vehicle structure to ensure a common [electrical] potential. See also EARTHING.

GROUND PENETRATING RADAR (GPR) - A radar which produces ultrawide-band impulses that penetrate ground substrata and produce signal reflections from more dense deposits contained therein. Also called GPEN RADAR.

NOTE: GPRs have been used to detect deposits of gold ore lying two-to-three feet deep within the tunnel wall of a working gold mine. This technology has also been used for detection of subterranean tunnels and fortifications as well as buried antipersonnel and anti-vehicle mines. In this latter role, however, GPR does not perform well in dry soil and produces false positives from rocks and tree roots. A hand-held GPR system that integrates the ground penetrating radar with a pulsed induction metal detector to produce a unit that can be used by a combat engineer or infantryman to reliably detect buried mines, including heavy anti-tank mines and small plastic anti-personnel mines.

GROUND TRUTH - The actual facts of a situation, without errors produced by sensors or human perception and judgment.

GROUND WAVE - A radio wave that is propagated over the earth and is ordinarily affected by presence of the ground and troposphere. Contrast with SKY WAVE.

GUARD BAND - A frequency band between two channels, which gives a margin of safety against mutual interference.

GUARD GATING - An ECCM technique wherein the velocity- and/or range-gate of a tracking radar is protected from GATE DECEPTION, CHAFF, and other forms of ECM by the use of additional gates.

GUARDRAIL/COMMON SENSOR (GR/CS) - An airborne SIGINT collection/location system that integrates the Improved GuardRail V (IGR V), the Communication High Accuracy Airborne Location System (CHAALS) and the Advanced QUICKLOOK (AQL) into the same platform aircraft. The system consists nominally of twelve aircraft which perform operational missions in flights of three.

NOTE: The GR/CS can employ five operation modes, selectable by the mission commander: **Direct Tether** - each aircraft talks to its own tracking operator via a data link; **Extended Tether** - The aircraft talks to both the ground station and to the other two aircraft in the flight of three; **Untethered** - The aircraft records data while aloft for later downloading; **Repeater Operations** - Extended data-collection capability with downlink to a ground vehicle, which in turn retransmits the data to a satellite for global redirection when a downlink is available; and **Direct Air-to-Satellite Relay** -- All three aircraft transmit directly to a satellite, which in turn relays to an Integrated Processing Facility (IPF) ground station that does not have to be in the operational area.

GUIDED MUNITION - A "one-on-one" munition: A specific munition engages a specific target, which is advantageous during close combat situations. An operator is required in the loop to select the target and often assist in the guidance. The munition may be either COMMAND-TO-LINE-OF-SIGHT (CLOS), or possess HOMING GUIDANCE. Contrast with BRILLIANT MUNITION. See also SMART MUNITION.

GUNSHOT DETECTION SYSTEM (GDS) - A wireless package comprising acoustic sensors, transmit/receive components, computer chips, an integrative motherboard and a power source. It operates as a "sleeper," activating only when it perceives the distinct signature of a gunshot, at which time it transmits to authorities precise data about the type gun used, number of shots fired, and the location from which the shots were fired. NOTE: The GDS may be deployed in trees, on power lines, or even on soldiers' helmets (the latter to provide data on sniper fire).

GULL - In electronic warfare, a floating radar reflector used to simulate a surface target at sea for deceptive purposes.

GYROCHIP - An angular rate sensor designed to be a reliable replacement for iron gyros. It is a single piece of piezoelectric quartz shaped like a double-ended tuning fork. It uses the Coriolis effect in determining angular rate. The unit operates on 600 milliwatts of DC power and has no motors or bearings and is essentially solid-state. The gyrochip is used in applications that include helicopter yaw control, infrared line of sight stabilization, missile flight control and guidance, parachute instrumentation and periscope stabilization.

GYROTRON - A high power microwave generating device suitable for use as a DIRECTED ENERGY WEAPON in the MILLIMETER WAVE band. See also BEAM-PLASMA DEVICE, FREE- ELECTRON LASER; VIRTUAL-CATHODE OSCILLATOR.

H

HACKER - A person who delights in having an intimate understanding of the internal workings of a system - computers and computer networks in particular. The term is almost universally misused in a pejorative context, where CRACKER would be the correct term. Also called WHITE HAT HACKER. See also GRAY-HAT HACKER, HONEYPOT. NOTE: Although CRACKER is the correct term for malicious actions directed against computer systems, the term HACKER is becoming (2001) synonymous through popular usage.

HAIRY BUFFALO (HB) - a modified NP-3 ("Orion") airplane incorporating a FIBER-OPTIC BACKBONE that allows for rapid systems integration in order to provide a flexible flying test bed for sensors, communications and COMMAND AND CONTROL (C²) equipment. This fiber optic backbone links with a Real Time Surveillance Data Link (RTSDL) that allows for secure Tactical Computer Protocol/Internet Protocol (TCP/IP) connection to the surface forces. Currently (*circa* 2002), HAIRY BUFFALO is investigating ways of ensuring autonomous platform targeting capabilities using onboard and offboard sensors and onboard targeting systems, while providing the ability to communicate and operate in a Joint Tactical Command System / NETWORK-CENTRIC WARFARE (TCS/NCW) Environment.

NOTE: The *Hairy Buffalo*, as the *Orion* is called, is a "Time Sensitive Strike and Network Centric Warfare Test Aircraft" equipped with air-to-ground sensors and data-links; it employs off-the-shelf components and some spin-off technologies to find, identify and attack moving targets within minutes.

HAND-EMPLACED JAMMER - A lightweight, man-portable, expendable solid-state jammer with self-disabling features, designed to be hand-emplaced to operate against threat signals. See also LEAVE-IT-BEHIND JAMMER.

HANDHELD STANDOFF MINE DETECTION SYSTEM (HSTAMIDS) - A lightweight dual-sensor (combined GROUND-PENETRATING RADAR and metal detector) landmine detector with a claimed (2002) detection rate near 100 percent. [Ft. Belvoir Army News Service, Feb. 20, 2002] NOTE: The dual-sensor makes detection of plastic-cased mines possible.

HANDOFF - The passing of tracking responsibility from one system to another, such as from a search radar to a fire-control radar.

HANDSHAKING - Part of a communications PROTOCOL that requires the interchange of predetermined signals between devices prior to making a connection.

HAPTIC DEVICE - A force feedback system that permits a user to experience a sense of touch (haptics) when interacting with a computer-driven interface. Haptics and VIRTUAL REALITY (VR) have applications in driving simulators and telemedicine and training for surgery.

HARD KILL - The physical destruction of a weapon or a platform through employment of electronic counter- measures techniques, bombs, or missiles. Contrast with SOFT KILL, FIRM KILL.

HARD-KILL ECM - HARD KILL weapons which employ electronic warfare concepts to achieve target destruction. See also DIRECTED ENERGY WEAPON, FRONT-DOOR SYSTEM PENETRATION, BACK-DOOR SYSTEM PENETRATION; LETHAL ELECTRONICS COUNTERMEASURES.

HARD TARGET SMART FUZE (HTSF) - A tail-mounted bomb fuze that incorporates accelerometers and a processor chip. The HTSF can determine if the bomb has struck earth, concrete, rock, or empty space, and can count the number of layers it has penetrated. Accordingly, it can compute distance or time to detonate the bomb for a specific target.

HAVE STARE (HS) - An X-band (8-12 GHz) 200 Kw tracking RADAR that can detect small space debris in the 1 to 10 cm range, depending on altitude.

HAYSTACK LONG RANGE IMAGING RADAR (LRIR) - Part of the Millstone Haystack complex consisting of two radars that share hardware and power, which precludes simultaneous operations. The two radars are the Haystack Long Range Imaging Radar (LRIR) and the Haystack Auxiliary Radar (HAX). These radars support missions for the U.S. Space Command, the National Science Foundation, and NASA. Their primary function is for deep space imaging of foreign and domestic satellites and orbital debris. The radars image every new foreign space launch in Near Earth (NE), and image domestic satellites in trouble. The LRIR takes two-dimensional images of earth satellites by processing highly stable, coherent signals to extract target return range and Doppler information. The radar is capable of tracking and imaging near-earth (NE) satellites, 200-4,000 km altitude, as well as deep space objects out to 40,000 km range and beyond. The maximum tracking rate of the Haystack antenna is 2 degrees/second, and this sets the limits on observation of near-earth satellites, especially those passing nearly overhead. The limitation on deep space objects is their size: a one square meter radar cross section at 40,000 km is roughly the detection threshold of the radar. The radar operates at 10-GHz center frequency and transmits over a broad range of pulse widths and pulse repetition frequencies, including a 1-GHz linear FM pulse which, when compressed, is used for radar imaging. The radars also provide detection of objects in space and gather information about their estimated size, velocity, altitude, and direction of travel.

HAZARDS OF ELECTROMAGNETIC RADIATION TO PERSONNEL, ORDNANCE, AND VOLATILE MATERIALS (HERO) - See ELECTROMAGNETIC RADIATION HAZARDS.

HEAD-UP DISPLAY (HUD) - A display of flight, navigation, attack, or other information superimposed upon the pilot's forward field of view. See also HORIZONTAL SITUATION DISPLAY, VERTICAL SITUATION DISPLAY.

HEALING AGENT - See AUTONOMIC HEALING

HEDGEHOG (HH) - An anti-submarine mortar-like projectile used by destroyers and anti-submarine ships *circa* 1942 - 1960. They were favored over depth charges because they could be fired in patterns 100-150 yards ahead of the ship while it still maintained sonar contact with the target submarine. Each hedgehog was approximately 7 inches in diameter at the warhead end and carried 30 lbs of TNT (or 34 lbs of Torpex). Twenty-four hedgehogs were mounted in open view in a cradle-like base on the bow of the ship. The cradle was mounted on a power drive, which allowed a training arc of 20 degrees on either bow (later versions allowed a full gun train). The ring-finned tail of each hedgehog was sleeved to a rod mount called a *spigot*, which held the firing pin. The spigots also had a tilt capability to compensate for the roll-and-pitch motion of the deck. Hedgehogs were fired in pairs at intervals, which deployed the 24 weapons in a 1-1.5 second interval, forming a circular pattern at water entry. [*ALL HANDS* magazine, April 1958, p45] See also MOUSETRAP.

NOTE: Hedgehogs had the additional advantage over depth charges (which detonated at preset depths) in that they did not detonate except on contact. Thus, if the submarine was not hit, sonar conditions were not deteriorated by bubbles and water disturbance generated by a detonation, as would be the case with depth charges. Click to view photos and additional information about hedgehog installations.

HELICOPTER MINE - A device which will autonomously search, detect, track, identify, engage and destroy enemy helicopters flying at speeds up to 350 kilometers per hour and at altitudes up to 250 meters. It possesses a positive hostile target signature identification processor that sorts and identifies helicopter acoustic signatures. The mines can be equipped with counter-mobility remote control system transceivers, enabling them to be de-activated for friendly force passage and mine recovery.

HERTZ - The unit of FREQUENCY, one cycle per second.

HETERODYNE LADAR - See HOMODYNE LADAR.

HIDDEN SCAN - An ECCM technique for use by semi-active missile guidance receivers. See also INVERSE GAIN ECCM.

HIGH ENERGY DENSITY MATERIAL (HEDM) - Material composed of high- energy ingredients, such as explosives, propellants, and pyrotechnics.

HIGH ENERGY LASER (HEL) - A HARD-KILL ECM device, which employs lasers used as directed energy weapons. They work by accelerating electrons to very high velocities, then causing them to radiate some of their kinetic energy at the proper wavelength and in the proper direction in resonance with light waves in the electron beam. [5:1] EXAMPLES: X-RAY, CHEMICAL, FREE-ELECTRON, and EXCIMER LASERS.

HIGH ENERGY MILLIMETER WAVE (MMW) - Directed energy in the MILLIMETER WAVE region of the ELECTROMAGNETIC SPECTRUM.

HIGH-ENERGY LASER WEAPON SYSTEM (HELWEPS) - A defensive system incorporating a HIGH ENERGY LASER (HEL) designed to protect Aegis-class cruiser and destroyers against high-speed, sea-skimming cruise missiles. The self-contained, modular (fire-control, ammunition, and pump) weapon configuration is intended to replace a ship's forward 5-inch/54 gun mount. The device is a deuterium-fluoride (DF) LASER which produces a coherent beam that can (with only about 1-second engagement duration) destroy missile target radomes at 4 kilometers, and optical systems at up to 10 kilometers. See also MIRACL.

HIGH ENERGY RADIO FREQUENCY (HERF) - A weapon that can direct high levels of RF radiation at digital devices such as computers and navigation equipment, thereby disrupting their operation. Also called EMP/T BOMB.

HIGH-FREQUENCY SURFACE WAVE ARRAY RADAR (HIFAR) - A BISTATIC RADAR operating in the HF (3-30 MHz) range, used for ocean surveillance. At these frequencies, the radar waves propagate over the ocean surface for long distances, well beyond the normal radar horizon.

HIGH OFF-BORESIGHT SYSTEM (HOBS) - A helmet-mounted sight and short-range missile system to combat Mig-29s.

HIGH PAY-OFF FOCUS AREA (HiPOFA) - An area where: (a) if activities were undertaken, could significantly enhance, or (b) if not undertaken, have a critical adverse impact on, the effectiveness of coalition operations. HiPOFA may include strategic, operational, tactical, technological, and inter- American, British, Canadian, Australian (ABCA) organisational activities. NOTE: The feature of a HiPOFA is that the output from the collaborative effort should be significantly greater than the collective investment.

HIGH POWER COMBINER - A radio frequency (RF) device which combines the outputs of multiple solid state amplifiers over a given frequency range.

HIGH-POWERED MICROWAVES (HPM) - See HIGH-POWERED RF.

HIGH POWER MICROWAVE/RADIO FREQUENCY (HPM/RF) - A DIRECTED ENERGY WEAPON (DEW) under DoD's WEAPONS SYSTEMS TECHNOLOGIES (WST). The use of high-power electromagnetic microwaves for penetrating military systems through unconventional and/or inadvertent pathways, causing permanent damage or temporary upset to mission-critical electronic equipment. [Information from website: <http://www.dtic.mil>]

See also ANTIMATTER PARTICLE BEAM (APB), CHARGED PARTICLE BEAM (CPB), GAMMA-RAY LASER (GRASER), KINETIC ENERGY WEAPON (KEW) and NEUTRAL PARTICLE BEAM (NPB).

HIGH-POWERED RF - A term replacing HIGH-POWERED MICROWAVES, high-power energy roughly above 1,000 MHz. See HIGH POWER MICROWAVE/RADIO FREQUENCY (HPM/RF).

HIGH-POWER SOURCE NOISE JAMMING - A type of BARRAGE JAMMING in which noise is added to the high-power signal of the jammer. Contrast with LOW-POWER SOURCE NOISE JAMMING.

HIGH POWERED ACOUSTIC WEAPON - A NONLETHAL WEAPON versatile high power acoustics system with a tunable, less-than-lethal incapacitating capability. See also ACOUSTIC WEAPON.

HIGH SPEED ANTI-RADIATION MISSILE (HARM) - High-speed anti-radiation missiles designed for use against early-warning radars and air defense systems. See also ANTI-RADIATION MISSILE.

HIGH-SPEED CHOP - A technique to achieve compatibility between RADAR WARNING RECEIVERS (RWRs) and ECM systems. The receiver and transmitter operate effectively simultaneously by implementing a high-speed time sharing scheme. See also LOOK AROUND, LOOK OVER, and LOOKTHROUGH.

HIGH TEMPERATURE SUPERCONDUCTIVITY (HTSC) - Superconductivity (zero electrical resistance) at temperatures above 125 degrees Kelvin (-234 degrees Fahrenheit).

NOTES: **(1)** The goal in HTSC is to be able to produce superconductors that can operate at room temperature. **(2)** Magnesium diboride shows promise (circa 2002) as a superconductor. Its superconducting properties were discovered by Japanese scientists in 2001. Magnesium diboride is inexpensive to make, simple to cool, easy to shape into powder-filled iron wires, and has a superconducting transition temperature of 39 degrees Kelvin.

HOG NOSE - See RIVET JOINT

HOG CHEEKS - See RIVET JOINT

HOLE-FINDING - An ECCM technique used against a noise jammer, which partially covers a radar frequency band. It consists of scanning the receiver bandwidth at the end of a pulse repetition period to determine the frequency having the lowest jamming level at which the radar will operate during the next pulse repetition period. Synonymous with HOLE-HUNTING and HOLE-SEEKING.

HOLE-HUNTING - See HOLE- FINDING.

HOLE-SEEKING - See HOLE- FINDING.

HOLOGRAM - An in-depth apparent three-dimensional image with great realism produced by illuminating an object field with two interrelated coherent light beams, one directly from a light source and the other slightly delayed, thus giving the three-dimensional appearance.

HOLOGRAPHIC DATA STORAGE SYSTEM (HDSS) - Optical interference images recorded in a light-sensitive, usually erasable, medium. To achieve high storage density, the images are multiplexed - that is, more than one image occupies the same volume within the crystal. To differentiate among images, subtle recording differences, such as changing the reference angle, changing the wavelength of the laser light, or other optical stratagems, are used. Later, the inverse optical conditions are used to reconstruct the hologram so that data can be optically or photographically read out.

HOLOGRAPHIC NIGHT VISION GOGGLES (HNVG) - Night goggles which give the wearer a see-through image, enlarged peripheral vision, and protection from flashes, while allowing the performance of night tasks for driving vehicles, flying low-speed aircraft, map reading, maintenance, and night patrols and surveillance. [*from Internet IOP Sensor System (Belgium) product description*]

NOTE: Because of the large exit pupil diameter no accurate positioning of the goggles on the head is needed. For close work such as map and document reading, there is a built-in auxiliary light source emitting light in the INFRARED (IR) spectrum so that it cannot be detected by the naked eye.

HOLOGRAPHIC MEMORY - A four- dimensional (the fourth dimension is wavelength) storage medium based on a method called "spectral hole burning" to retain holographic images (HOLOGRAMs), which can later be retrieved using low level laser rays.

HOMELAND SECURITY DEVICE - (1) Personal Device: A small, light-weight, device that can be worn on the person to alerts military, civilian, and private citizens by broadcasting accurate REAL TIME tailored messages during emergencies. Depending upon the individual's job function, organizational position, or clearance level, the wearer will receive the critical information needed to either respond to the emergency or to get out of the way. **(2) Vehicle Device:** An auto safety system that, when triggered, alerts law enforcement or security personnel that the vehicle is being tampered with or stolen, or that a driver or its occupants are victims of a holdup or car-jacking or undergoing a medical emergency. [*Govcon.com news item 2/24/02*]

NOTE: Examples of features of a vehicle homeland security device: automatically dialing 911 and opening a live channel with an emergency operator who can monitor what is going on inside the vehicle as well as pinpoint its location. The device can also disable the vehicle after engine cutoff and initiate calls to pre-selected telephone numbers to notify recipients that the vehicle is being tampered with or being stolen.

HOME-ON-JAM (HOJ) - A means whereby a missile guidance receiver utilizes the self-screening target jamming signal to develop angular steering information so that the missile can home on that target.

HOMING GUIDANCE - A system by which a missile steers itself towards a target by means of a self-contained mechanism which is activated by some

distinguishing characteristics of the target. See also ACTIVE HOMING GUIDANCE, PASSIVE HOMING GUIDANCE, SEMI-ACTIVE HOMING GUIDANCE.

HOMODYNE LADAR - A laser radar which includes an optical detector constantly receiving a local oscillator (LO) signal in the form of a low-power laser beam. When a reflected return from a target is received, the returned beam is combined with the LO beam on the optical detector which picks up the difference frequency between the two beams. The frequency of the beat signal indicates target relative speed and direction. Synonymous with HETERODYNE LADAR.

HONEYPOT - A computer system set up for the express purpose of attracting and studying computer HACKERS.

HOOAH - A slang term used by soldiers (*circa* 2001). primarily light infantry, airborne troops and rangers, referring to or meaning anything and everything except "no." Some documented meanings (presumably depending on context and the situation): (1) Wonderful, great; (2) Good copy, solid copy, roger, message received, understood, good; (3) Glad to meet you, welcome; (4) I don't know the answer, but I'll check on it, I haven't the vaguest idea; (5) You've got to be kidding; (6) Thank you; (7) Go to the next [briefing] slide; (8) You've taken the correct action; (9) I don't know what that means, but I'm too embarrassed to ask for clarification; (10) I am not listening; (11) That is really neat - I want one too; (13) Yes; (14) Stop sniveling; (15) That is enough of your drivel - sit down; (16) Amen.

HOP - (1) In FREQUENCY HOPPING (HF), the shifting of a transmitter from one frequency to another. (2) For network ROUTING, a segment of a path to a destination on a network (a path from the origin to a destination on a network is a series of hops through ROUTERS). See also ROUTE.

HORIZONTAL SITUATION DISPLAY - An electronically generated display on which navigation information and stored mission and procedural data can be presented. Radar information and television picture can also be displayed either as a map overlay or as a separate image. See also HEAD-UP DISPLAY, HORIZONTAL SITUATION INDICATOR, VERTICAL SITUATION DISPLAY.

HORIZONTAL SITUATION INDICATOR (HSI) - An electronically generated display that provides a basic horizontal view of the aircraft's navigation picture. NOTE: In the F-15E, for example, HSI can provide navigation data to selected ground navigation facilities such as TACAN or Instrument Landing System (ILS), or to onboard navigation systems such as the Inertial Navigation System (INS).

HORN - An antenna consisting of a waveguide section in which the cross-sectional area increases toward an open end which is the aperture.

HORN ANTENNA - A radiating element having the shape of a horn.

HOST-BASED INTRUSION DETECTION - A type of INTRUSION DETECTION that examines computer operations data to detect HACKERS. Also

called COMPUTER-BASED INTRUSION DETECTION. See also ANOMALY DETECTION, NETWORK-BASED INTRUSION DETECTION, PORT SCAN, SIGNATURE DETECTION.

HOSTILE ARTILLERY LOCATOR (HALO) - A system which will detect and locate all sources of high energy sound and provide rapid analysis and identification of artillery, guns, mortars and machine guns. It is accurate to 20 meters at range of 15 km; and can work at ranges of 30-40 km. NOTE: HALO processes signals from pre-positioned microphones to identify specific types of ordnance by the acoustic waves they make in flight. HALO can also identify and track engine sounds and even human footfalls.

HOT CHAFF - An infrared counter- measure employing small chaff elements which generate infrared radiation when exposed to air. When deployed, hot chaff generates a broad signature source which counters an infrared detector's decoy discrimination features. See also INFRARED COUNTERMEASURES.

HOVERING DECOY - See NULKA.

HUMAN FACTORS ECCM - A generic ECCM technique that covers the ability of an electronic warfare officer (EWO), a radar operator, a military vehicle operator, a commanding officer, and/or any other EW-associated personnel to recognize the various kinds of ECM, to decide what the appropriate ECCM should be, and/ or to take the necessary ECCM action within the framework of this command structure.

HUMAN FACTORS ECM - A generic ECM technique that covers the ability of an EW-related individual or supervisor to recognize the need for ECM, to decide what the appropriate ECM should be, and to take the necessary ECM action within the framework of the individual's command structure. [Patterned after the definition of HUMAN FACTORS ECCM from reference 8]

HumanID - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to develop automated BIOMETRIC identification technologies to detect, recognize and identify humans at great distances.

HUMAN INTELLIGENCE (HUMINT) - A category of intelligence derived from information collected and provided by human sources. See also HUMAN RESOURCES INTELLIGENCE.

HUMAN RESOURCES INTELLIGENCE - The intelligence information derived from the intelligence collection discipline that uses human beings as both sources and collectors, and where the human being is the primary collection instrument. Sometimes called HUMINT. See also HUMAN INTELLIGENCE.

HUMANE WEAPON - See NONLETHAL WEAPON (NLW)

HUNTER SENSOR SUITE (HSS) - A vehicular integrated, long-range target acquisition suite mounted on an extendible mast assembly platform, remotely controlled from an operator's station located inside the vehicle, e.g., HMMWV. HSS operates both on the move and stationary. The integrated sensor suite includes 2nd-generation THERMAL IMAGING, ACOUSTIC DETECTORS, day TV, Eyesafe laser Rangefinding, Aided Target Recognition (ATR), high density integrated processing, color digital maps, image compression/transmission, GLOBAL POSITIONING SYSTEM (GPS), North-Seeking Module (NSM) and secure communications.

HUNTER STANDOFF KILLER TEAM (HSKT) - A command and control (C^2) system to increase the Joint Maneuver Commander's situational awareness while decreasing decision and reaction timelines.

HYBRID CHANNELIZED/SUPERHETERODYNE RECEIVER ARCHITECTURE - A receiver system that uses multiple-channel channelizers to provide frequency video and to act as a pulse-by-pulse tuner for the associated narrowband superheterodyne receiver. A portion of each received signal is fed into the channelizer, with the remaining signal going straight into the superheterodyne after a delay of several hundred nanoseconds. Both receivers generate amplitude video, offering a higher probability of intercept with high levels of sensitivity and measurement accuracy.

HYBRID SPACE MINE - A variation of the SPACE MINE. The hybrid space mine is maintained in a "storage orbit" and is maneuvered to its target by command signals. A hybrid space mine's storage orbit may be such that it is covertly placed among drifting space debris until the time it is maneuvered to its target.

HYBRID THREAT - A threat resulting from a mix of systems having differing national origins, such as a Soviet aircraft using a French IFF system.

HYBRID ULTRA-LARGE AIRCRAFT (HULA) - A large aircraft sharing helium lift and aerodynamics (e.g., a lift comprising 70% helium lift and 30% air flow dynamics from forward motion).

NOTES: HULA features the following: (1) low RCS; (2) A benign failure mode (they deflate slowly and float to the surface); (3) Large capacity (e.g., more than 500 tons of military men & equipment); (4) Ability to operate without ground crews or airports; (4) Long rang capability (5,000 miles at 60-90 knots), cruising just over the surface and below 10,000 feet.

HYDROGEN FLUORIDE (HF) LASER - A CHEMICAL LASER which combines heated hydrogen (produced in a combustion chamber similar to the one in a rocket engine) with fluoride gas to produce excited hydrogen fluoride molecules. The light beam that results radiates on multiple lines between 2.7 mm and 2.9 mm. These wavelengths transmit poorly through the atmosphere. Even so, the BALLISTIC MISSILE DEFENSE (BMD) organization is considering (1997) HF lasers for space-based defenses needing to propagate through only the upper atmosphere. See also DEUTERIUM FLUORIDE (DF) LASER.

HYDROMAGNETICS - The science that deals with an electrically conducting fluid, as a liquid metal or an ionized gas.

Also called MAGNETOHYDRODYNAMICS. See also MEASUREMENT AND SIGNATURE INTELLIGENCE.

HYPERENCRIPTION - The hiding of a message within a very large stream of data. NOTE: In the face of hyperencryption, a code-breaker would be unable to store the message-within-data for eventual decoding because the total amount would simply be overwhelming.

HYPERLINK - (1) A pointer from a segment of text or from an image to a BOOKMARK or UNIVERSAL RESOURCE LOCATOR (URL), which may be located on the same page, another page or computer file in the web site in which the hyperlink exists, or to a file or bookmark in another web site on the World Wide Web. Hyperlinks allow the user to navigate between bookmarks on the same page (example: click here to move to the bookmark "HYDRODYNAMICS" above), to other files on the same site (as most of the hyperlinks in this lexicon) or to bookmarks or files on other web sites (as in the hyperlinks to sound files under ELECTROMAGNETIC JAMMING).

(2) A pointer within a HYPERTEXT document which points (links) to another document, which may or may not also be a hypertext document. Also called ANCHOR. See also HYPERTEXT MARKUP LANGUAGE (HTML).

HYPERSONIC FLIGHT - Flight faster than Mach 5, or five times the speed of sound (about 3,300 miles per hour). [NASA]

HYPERSPECTRAL IMAGERY - A process in which visual light is significantly enhanced by a computer processor, enabling the smallest changes in color variance of the water to be detected, thus improving the ability to detect submarines. The HYPERSPECTRAL (IMAGING) SENSOR is designed to provide a detailed analysis of the entire light spectrum from visible light up to FAR INFRARED. Current (1999) multispectral imaging sensors can break this range into a dozen or more sections for individual analysis. The hyperspectral imaging sensor can examine extremely narrow bands of this range, allowing the sensor to look for specific chemical compositions that reflect light only in those very narrow bands. This provides a capability to "look" through dense foliage and detect, for example, camouflage paint. The image presented to the sensor's user would give a visual representation of that "hidden" source in the same manner as infrared or other displays. See also AIRBORNE TARGETING AND CROSS-CUEING SYSTEM (ATACCS), LITTORAL AIRBORNE SENSOR-HYPERSPECTRAL (LASH), HYPERSPECTRAL SENSOR.

HYPERSPECTRAL SENSOR - A reconnaissance sensor system used to quickly pinpoint objects that are undetectable to traditional ELECTRO-OPTIC (EO) equipment. The system divides the incoming optical radiation into hundreds of spectral bands and analyzes that information for specific signatures unique to a

scene. The signatures are processed in a way that allows accurate detection of objects that are different from their backgrounds.

Synonymous with HYPERSPECTRAL IMAGING SENSOR.

See also PORTABLE HYPERSPECTRAL IMAGER FOR LOW LIGHT SPECTROSCOPY (PHILLS). NOTE: A HYPERSPECTRAL IMAGING SENSOR is a MULTISPECTRAL IMAGING SENSOR having more than 20 discrete spectral bands.

HYPERTEXT - A document, written in HYPERTEXT MARKUP LANGUAGE (HTML), which contains HYPERLINKS to other documents, which may or may not also be hypertext documents. Hypertext documents are usually retrieved from the INTERNET, using the WORLD WIDE WEB (WWW).

HYPERTEXT MARKUP LANGUAGE (HTML) - A programming language used to build Web sites. It contains standard codes, or tags, that determine how a Web page looks when a browser displays it. HTML tags may be used to create headings, paragraphs, and lists. HTML tags also make possible the HYPERLINKS that connect information on the World Wide Web.

See also DYNAMIC HYPERTEXT MARKUP LANGUAGE, GENERALIZED MARKUP LANGUAGE, JAVA. NOTE: In most browsers, you can see the underlying HTML code for the displayed page by selecting the Menu item "View", and then "Source".

HYPERVELOCITY INTERCEPTOR - A KINETIC KILL VEHICLE that can reach speeds of more than 8,000 feet per second within fractions of a second after launch.

I

IDENTIFICATION - The process of determining the friendly or hostile character of an unknown detected contact. See also TARGET IDENTIFICATION.

IDENTIFICATION, FRIEND OR FOE (IFF) - A system using electromagnetic transmissions to which equipment carried by friendly forces automatically responds, for example, by emitting pulses, thereby distinguishing themselves from enemy forces. See also COOPERATIVE TARGET IDENTIFICATION.

IGNITION SPIKE - The initial, intense, short-duration radiative emission occurring when a FLARE begins burning. NOTE: An ignition spike is the emission caused by the energy given off by the igniter material (e.g. a squib) rather than the energy given off by the flare which it ignites. This emission may be more intense, hence distinguishable from that of the flare, making it detectable by an ECCM system.

ILLUMINATED CHAFF (ILLCH) - A JAFF technique in which jamming energy is directed at deployed chaff so that the energy will be reflected to the victim sensor.

ILLUMINATOR - A system designed to impose electromagnetic radiation on a designated object so that the reflections can be used by another sensor, typically for purposes of homing. See also SEMI-ACTIVE HOMING GUIDANCE.

ILLUMINATOR GRENADE - A NONLETHAL WEAPON consisting of a grenade which provides illumination for dark rooms.

IMAGE DISPLAY - That aspect of IMAGERY EXPLOITATION involving pseudo-color, brightness, density slicing, registration with a reference image, addition/subtraction of two images, flicker between two registered images, stereo, overlay of graphic cues (SIGINT error ellipses, target symbols), image windows, split screen, and quad screen.

IMAGE-ENHANCED MIXING - An ECCM technique for use in monopulse tracking radars that depend on phase sensing for angle tracking. The objective is to use the repeated signal from an IMAGE JAMMER as a beacon for tracking the target.

IMAGE ENHANCEMENT - That aspect of IMAGERY EXPLOITATION involving dynamic range adjustment, edge enhancement, smoothing/ noise filtering, and warping.

IMAGE FREQUENCY - An undesired input frequency capable of producing the selected frequency by the same process. NOTE: An image frequency is a frequency, which differs from, but has a certain symmetrical relationship to, that which a superheterodyne receiver is tuned. Consequently, the image frequency can be mistakenly accepted and processed as a true frequency by the receiver.

IMAGE INTENSIFICATION - The increasing of the intensity of a radiant image through use of optoelectronic amplification.

IMAGE JAMMING - (1) A self-screening ECM technique for use against tracking radars that depend on phase sensing for angle tracking. The technique involves radiating a signal on the image frequency of the victim radar. (2) Jamming the image frequency of a monopulse radar causing the antenna to be driven away from the target. Not effective if the radar uses IMAGE REJECTION.

IMAGE MANIPULATION - That aspect of IMAGERY EXPLOITATION that involves image roam, zoom, and rotation.

IMAGE REJECTION - An ECCM technique incorporated as a feature in radar receiver design. The design attenuates image-signal frequencies so that IMAGE JAMMING methods will have little or no effect on the radar operation.

IMAGERY - Collectively, the representations of objects reproduced electronically or by optical means on film, electronic display devices, or other media.

IMAGERY EXPLOITATION - The extraction of needed intelligence from imagery data. Imagery exploitation consists of IMAGE MANIPULATION, IMAGE ENHANCEMENT, IMAGE DISPLAY and GEOPOSITIONING.

IMAGERY INTELLIGENCE (IMINT) - Intelligence information derived from the exploitation of collection by visual photography, infrared sensors, lasers, electro-optics and radar sensors such as synthetic aperture radar wherein images of objects are reproduced optically or electronically on film, electronic display devices or other media.

IMITATIVE COMMUNICATION DECEPTION - That division of DECEPTION involving the introduction of false or misleading but plausible communications into target systems that mimics or imitates the targeted communications.

IMITATIVE ELECTROMAGNETIC DECEPTION - That type of ELECTROMAGNETIC DECEPTION that involves the introduction of electromagnetic energy into enemy systems that imitates enemy emissions.

IMITATIVE ELECTRONIC DECEPTION - The introduction of electromagnetic energy into enemy systems that imitates enemy emissions.

IMPULSE NOISE - NOISE characterized by transient disturbances separated in time by quiescent intervals. Contrast with RANDOM NOISE.

IMPULSE NOISE JAMMING - Noise jamming using a very narrow pulse of high power across a wide BANDWIDTH that covers the bandwidth of the victim radar.

IMPULSE RADAR - (1) A radar characterized by an extremely short pulse (around 1 nanosecond) at an extremely high peak power (in the order of gigawatts). Impulse radars may have resolutions measured in inches. (2) A radar having a FRACTIONAL BANDWIDTH (FBW) greater than 0.25.

Also called ULTRA-WIDEBAND RADAR, PICOSECOND PULSE RADAR, NONSINUSOIDAL RADAR, MONOCYCLE RADAR, SHOCK RADAR.

NOTE: Impulse radars provide improved clutter suppression and range profiling, as well as greater penetration of foliage, earth, and water.

INBOUND RANGE GATE WALK-OFF - A fuze jamming technique used to predetonate a fuze that operates on target range.

INCENDIARY GRENADE - A grenade which contains a filler that burns for approximately 40 seconds at a temperature of 4,000 degrees (F). A portion of the filler turns into molten iron that produces intense heat, igniting or fusing whatever it touches. It is used to ignite combustible materials, destroy weapons, records, or equipment, or burn holes in metal doors. Also called THERMITE GRENADE. See also WHITE-PHOSPHOROUS GRENADE.

INCIDENT COMMAND MANAGEMENT SYSTEM (ICMS) - A subsystem of the ENHANCED CONSEQUENCE MANAGEMENT PLANNING AND SUPPORT SYSTEM (ENCOMPASS), ICMS computer software centers the collection and distribution of data among the Incident Commander at various levels, including the first responder, scene commander, operations center, and/or the state/national emergency center.

See also DARPA SYNDROMIC SURVEILLANCE SYSTEM (D-S³).

INCIDENT WAVE (Electromagnetic Wave) - A WAVE that impinges on a target.

INCOHERENT INFRARED SENSOR - An INFRARED sensor which detects incident radiation as the square of the absolute magnitude of the amplitude. Contrast with COHERENT INFRARED SENSOR.

INDICATIONS AND WARNING (I&W) - Those intelligence activities intended to detect and report time-sensitive intelligence information on foreign developments that could involve a threat to the United States or allied military, political, economic interests or to U.S. citizens abroad. It includes forewarning of enemy actions or intentions; the imminence of hostilities; insurgency; nuclear/non-nuclear attack on the United States, its overseas forces, or allied nations; hostile reactions to United States reconnaissance activities; terrorists' attacks; and other similar events.

INDIRECT (FREQUENCY) SYNTHESIS (IS) - FREQUENCY SYNTHESIS where generation of desired frequencies is achieved through interaction of two or more frequency sources. Contrast with DIRECT SYNTHESIS (DS).

INDIRECT TARGET IDENTIFICATION - Target identification obtained through means other than those associated with the target itself. Examples of such indirect sources are third parties and intelligence. See also NON-COOPERATIVE TARGET IDENTIFICATION, TARGET IDENTIFICATION.

INDUCED ELECTROMAGNETIC PULSE (IEMP) - Induced current that is set up within a circuit that is subjected to the radiated field of an ELECTROMAGNETIC PULSE (EMP). See also SYSTEM-GENERATED ELECTROMAGNETIC PULSE (SGMP), NEMP COUNTERMEASURES.

INEFFECTIVE PASSWORD - See WEAK PASSWORD.

INERTIAL TERRAIN-AIDED GUIDANCE (ITAG) - An adverse-weather, precision guidance system used to accurately guide bombs to their targets. ITAG uses updates from a radar altimeter correlated with terrain elevation maps to track its position. The global positioning system (GPS) is employed to initialize the inertial navigator prior to weapon release. NOTE: ITAG kits may be "strapped on" to conventional bombs to effectively convert them to precision-guided bombs.

INFORMATION BOMB - A controlled flood of information directly inserted into an adversary's computer systems, sensors, or satellites.

INFORMATION DISCOVERY - See DATA MINING.

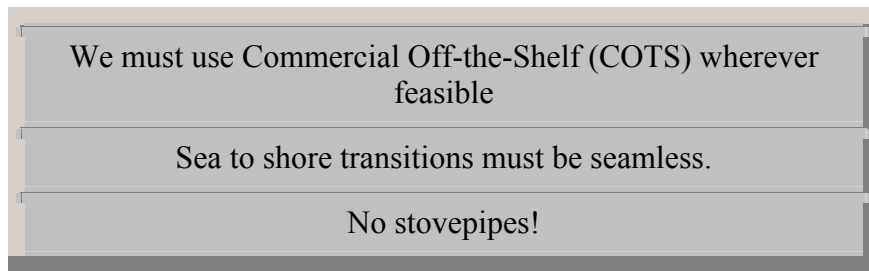
INFORMATION FUSION - Fully automated methods of merging data. Synonymous with MULTISOURCE CORRELATION or MULTISENSOR INTEGRATION.

INFORMATION HARVESTING - See DATA MINING.

INFORMATION SECURITY (INFOSEC) - A collection of disciplines related to one or more areas of information protection. See also ELECTRONIC INFORMATION SECURITY.

INFORMATION SYSTEM PRECEPTS - The seven absolute precepts to follow in building a new fleet information system are listed below.

<u>INFORMATION SYSTEM PRECEPTS</u> (From IT-21)
If the boss doesn't use it, don't buy it!
Tactical and non-tactical applications must be integrated.
We must stay common with industry.
All applications must be driven to a single PC.



NOTE: These are also referred to as "The Seven Habits of a Highly Effective Information System."

INFORMATION WARFARE (IW) - Actions taken to achieve information superiority by affecting adversary information, information-based processes, information systems, and computer-based networks while defending one's own information, information-based processes, information systems and computer-based networks. The critical aspects of IW are Information Denial, Information Distortion, and Protection. See also NETWAR, CYBERWAR.

NOTES: **(1)** Manipulative, disruptive or destructive actions taken covertly or overtly during peacetime, crisis or war against societal, political, economic, industrial or military electronic information systems. The purpose is to achieve informational advantage over an adversary and to influence behavior, deter or end conflict or, that failing, to win a war quickly and decisively, with minimal expenditure of capital, resources and personnel and with minimum casualties on either side. Information Warfare includes actions taken to preserve the integrity of one's own information systems from exploitation, corruption or destruction while at the same time exploiting, corrupting or destroying an adversary's information systems and in the process achieving an information advantage in the application of force.

(2) Information Warfare entails collecting, processing, and acting upon information faster than the adversary. Information warfare includes False Force Presentation (FFP). **(3)** The following are forms of information warfare: *Command and Control Warfare* (formerly C³CM), *Intelligence-Based Warfare* (IBW), *Electronic Warfare* (EW), *Psychological Warfare* (PSYW), *Hacker warfare*, *Economic Information Warfare* (EIW), and *Cyberwar*.

INFRARED (IR) - The region of the electromagnetic spectrum between the long wavelength extreme of the visible spectrum (about 0.7 micrometers) and the shortest microwaves (about 1 millimeter). See also ELECTRO-OPTIC, NEAR INFRARED, MID INFRARED, FAR INFRARED, EXTREME INFRARED.

NOTE: Sometimes referred to as "temperature radiation". Any physical object having a temperature above absolute zero degrees (Rankine or Kelvin) radiates infrared energy. Sources of infrared radiation from an aircraft include reflected sunlight, landing lights, oil heat exchangers, and engine exhaust.

INFRARED COUNTERMEASURES (IRCM) - Those measures employed to counter infrared sensors and weapons. They include INFRARED SIGNATURE reduction (suppression), decoy targets (such as FLARES), and guidance deception

(JAMMING). See also DIRECTIONAL INFRARED COUNTERMEASURES, HOT CHAFF.

INFRARED IMAGERY - That IMAGERY produced as a result of sensing electromagnetic radiation emitted or reflected from a given target surface in the infrared position of the ELECTROMAGNETIC SPECTRUM (approximately 0.72 to 1,000 microns).

INFRARED IMAGING - The process of sensing the natural thermal radiation emitted by a body because of its temperature. The image is formed from the temperature differences between targets and the background of the scene.

INFRARED INTELLIGENCE (IRINT) - Intelligence derived from the INFRARED portion of the ELECTROMAGNETIC SPECTRUM. NOTE: IRINT is a subcategory of ELECTRO-OPTINT.

INFRARED LINE SCANNER (IRLS) - A one-dimensional INFRARED scanner. The forward motion of the platform provides area scan. See also FORWARD LOOKING INFRARED.

NOTE: Capable of scanning a swath of from 5 to 10 miles with sufficient resolution to detect and possibly identify potential targets, the infrared line scanner generates data which may be recorded on film or transmitted to the control station via a data link.

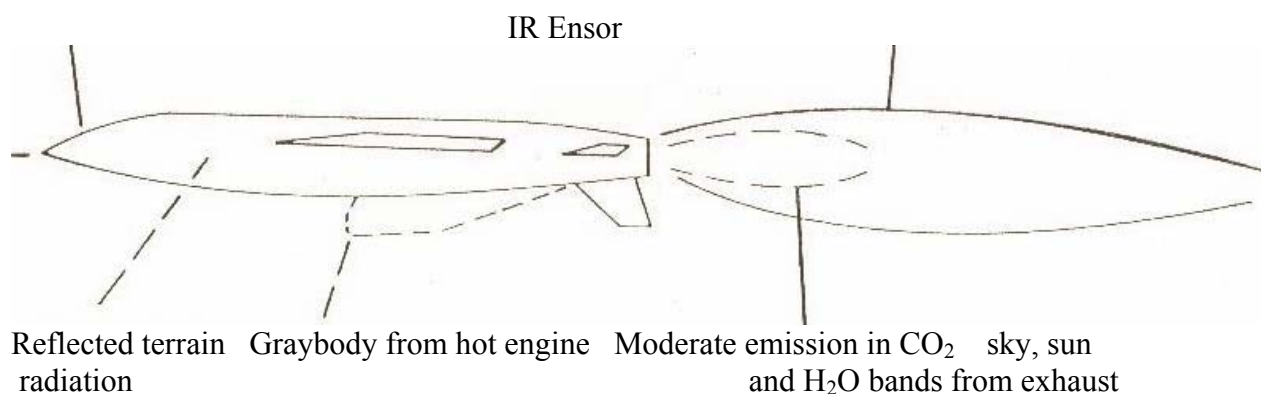
INFRARED LINESCAN SYSTEM - A passive airborne infrared recording system, which scans across the ground beneath the flight path, adding successive lines to the record as the vehicle advances along the flight path. See also LASER LINESCAN SYSTEM.

INFRARED SIGNATURE - Measurable radiation characteristics of an INFRARED source.

INFRARED SIGNATURE SOURCES

Graybody radiation from leading edges

Graybody from smoke



INFRARED SIGNATURE CONTROL - The employment of materials, electronics, and platform design features intended to reduce the susceptibility of the platform to detection, tracking, and engagement by an adversary using INFRARED (IR) sensors. This includes the use of IR paints, coatings, films, thermally or electrically activated materials, and techniques for shielding IR sensors from the platform's IR signature sources.

See also ACOUSTICS SIGNATURE CONTROL, LASER SIGNATURE CONTROL, MAGNETIC SIGNATURE CONTROL, MULTISPECTRAL SIGNATURE CONTROL, OPTICAL SIGNATURE CONTROL, RADIO FREQUENCY (RF) SIGNATURE CONTROL, and SIGNATURE CONTROL.
NOTE: Modern warships employ diesel exhaust and gas turbine exhaust suppressors to effect infrared signature control.

INFRARED WARNING SYSTEMS - A warning system, which yields automatic decisions about the state of a phenomenon based on data from observations by an INFRARED sensor and on predetermined decision algorithms.

NOTE: Infrared warning applications include: (1) detection and characterization of missile launchings, (2) detection of poisonous gases, (3) detection of nuclear detonations, (4) warning to military aircraft of ground fire, anti-aircraft missiles, or fighter pursuit, (5) terrain avoidance, (6) hazards from mines, (7) detection of hazardous levels of air pollution or of damage to the atmosphere by alien gases, (8) intrusion detection and burglar alarms, and (9) warning of a fire in a fuel tank.

INFRASOUND - NONLETHAL WARFARE measures involving very low frequency (less than 20 Hertz) sound projection to disorient, sicken or frighten people away from designated areas. Sometimes referred to as LOW FREQUENCY SOUND WEAPON.

NOTE: Infrasound frequencies are characterized by long-range propagation and can penetrate ground and structures. Its effects include mild to severe discomfort, organ functional disturbance (*e.g.*, nausea), and organ disruption (*e.g.*, bowel spasms).

INSENSITIVE HIGH EXPLOSIVES (IHE) - High explosives (HE), which requires extraordinarily high stimuli before violent reaction occurs.

NOTES: (1) Although IHE will not detonate when in a fire or hit by a fragment, bullet or high projectiles, the material may produce a severe burning reaction. (2) Compare with conventional high explosives (CHE), which are sensitive to mechanical or thermal energy.

INSERTION LOSS - A loss resulting from the insertion of a transducer in a transmission system. It is the ratio of (A) **the power** delivered to that part of the system following the transducer, before insertion of the transducer, to (B) **the power** delivered to that same part of the system after insertion of the transducer.

EXAMPLE: In the case of fiber optics, the insertion loss is the total optical power loss caused by the insertion of an optical component such as a connector or splice.

INSTANTANEOUS FIELD OF VIEW - An angular area defining limits to the volume of space within which a sensor can respond instantaneously to the presence of a target. The instantaneous FIELD OF VIEW (FOV) of an ELECTRO-OPTIC system is limited by a field stop in the focal plane (often the field stop is the physical aperture of a modulator or detector). The instantaneous field of view of an RF system is limited by the angular extent, or BEAMWIDTH, of the main beam of its antenna.

INSTANTANEOUS FREQUENCY MEASUREMENT (IFM)

RECEIVER - A SIGINT receiver which operates by splitting the incoming signal into two or more paths of differing lengths so as to generate phase differences proportional to frequency. This type receiver simultaneously covers a wide RF bandwidth with good frequency resolution and no need for spectral scanning. The IFM receiver, however, suffers from relatively poor sensitivity and an inability to sort simultaneous signals.

INSTANTANEOUS PULSE POSITION MEMORY - An ECCM technique that requires a radar pulse to be received on two successive pulse repetition periods in the same range interval before processing and display of the radar signal occurs.

INSTRUMENTED MULTISPECTRAL CUE (IMC) - An expendable replica of an actual target, such as a tank, which contains heat generators and RADAR REFLECTORS to realistically simulate both the INFRARED (IR) and radar SIGNATURES of the target.

INTEGRATED BIOMETRIC IDENTIFICATION SYSTEM (IBIS) - A handheld system, which captures and transmits forensic-quality fingerprints wirelessly for on-the-spot identification.

INTEGRATED BRIDGE SYSTEM (IBS) - An integrated collection of systems that provide ship bridge watchstanders with an enhanced degree of SITUATIONAL AWARENESS, allowing them to view in REAL TIME. The current position and movement of the ship superimposed on a high-resolution electronic chart.

NOTE: Component systems of IBS may include the VOYAGE MANAGEMENT SYSTEM (VMS), the ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM-NAVY (ECDIS-N), the AUTOMATED RADAR PLOTTING AID (ARPA), and the SHIP CONTROL SYSTEM (SCS).

INTEGRATED CIRCUIT (IC) - A combination of interconnected circuit elements inseparably associated on or within a continuous substrate.

INTEGRATED CIRCUIT CARD - See SMART CARD.

INTEGRATED COMBAT IDENTIFICATION SYSTEM (ICIDS) - A compact directional INFRARED (IR) LASER-interrogation and RF response

system consisting of two parts: one part is attached to the soldier's helmet and the other to the weapon carried by that soldier. When the soldier spots a potential target, the IR laser aiming light on the weapon is activated. If the target is friendly (and wearing an operable ICIDS) a decoder on the target's helmet decodes the laser signal and replies with the proper RF code (total elapsed time is less than one second). See also IDENTIFICATION, FRIEND OR FOE (IFF).

INTEGRATED DECKHOUSE AND APERTURES - A warship superstructure design (*e.g.*, for the DDX) featuring Electromagnetic Compatibility (EMC) with reduced SIGNATURES. Other features include nuclear overpressure resistance; effect minimization of externally and internally bursting conventional (blast, fragmentation) warheads; Electromagnetic (pulse) Protection (EMP); low RADAR CROSS SECTION (RCS) and low INFRARED (IR) signatures; all-composite superstructure; electronically steered arrays; and integrated multi-function mast. [Source: Navy's DD(X) Web site: <http://peoships.crane.navy.mil/ddx/>]

INTEGRATED "FIGHT-THROUGH" POWER SYSTEM (IFTPS) - Formerly referred to as the Integrated Power System (IPS), IFTPS is the test bed for a shipboard integrated electric drive system that could be selected as the foundation for power architecture for future ships such as the DD(X) and CG(X).

NOTE: The "Fight-Through" nickname indicates the requirement that the system be capable of "fighting through" casualties to a decentralized zonal power distribution arrangement.

INTEGRATED NAVIGATION SENSOR SYSTEM (INSS) - A compact system designed to provide very-shallow-water divers, such as SEAL teams and Explosive Ordnance Disposal (EOD) teams, with a visually enhanced sensor and precise navigation capability.

INTEGRATED PASSIVES - Passive electronic circuit elements (*e.g.*, capacitors, resistors, and inductors) integrated into a printed circuit board (becoming part of the circuit board itself), as opposed to being "surface-mounted" as discrete elements on the circuit boards.

INTEGRATED SIGHT (IS) - A weapon or tripod-mounted sight consisting of an integrated un-cooled thermal imager, eye-safe laser rangefinder, electronic compass, CCD camera and INFRARED LASER pointer. The integrated sight provides the soldier with the ability to acquire targets during daylight, darkness, adverse weather, and through battlefield OBSCURANTS to provide target position data for indirect fire.

INTELLIGENCE-BASED WARFARE (IBF) - The design and protection of systems that seek sufficient knowledge to dominate the battlespace, and the denial of such knowledge to the adversary.

INTELLIGENT MINE FIELD (IMF) - A rapid force projection initiative (RFPI) that uses both acoustic and seismic sensors to detect and track vehicles entering the minefield. The primary components of the IMF are the Wide Area

Munition (WAM) and a Gateway Controller. The WAM consists of three major subsystems: a communications module, a ground platform module and a smart submunition/warhead (sublet module). Once deployed, the WAM rights itself and autonomously searches for a target vehicle. When ready to fire, the WAM launches a sublet over the target, using a passive infrared sensor to detect it and firing an Explosively Formed Penetrator (EFP) at the vulnerable area. The Gateway Controller is a two-way communication system capable of independently commanding each WAM under its control and providing the commander with battlefield information gathered from the individual WAM sensors. This enables the instantaneous construction of a detailed "picture" of enemy forces entering the minefield. The Gateway Controller employs decision-aid logic to optimize minefield operations and is capable of safely disarming WAM units, allowing for easy battlefield cleanup.

INTERCEPTIBILITY - A measure of the ease with which an enemy can electronically intercept and identify signals and determine the location of a friendly electronic system. See also VULNERABILITY, ACCESSIBILITY, and SUSCEPTIBILITY.

INTERCEPT RECEIVER - A receiver designed to detect and provide visual and/or aural indication of electromagnetic emissions occurring within the particular portion of the ELECTROMAGNETIC SPECTRUM to which it is tuned.

INTERFACE –

- (1) As pertaining to system components: (a) A shared boundary, (b) To interact or communicate with another system component.
- (2) A boundary or point common to two or more similar or dissimilar command and control systems, sub-systems, or other entities against which or at which necessary information flow takes place.

INTERFERENCE CANCELING - A passive ECCM technique, which samples the interference or jamming signal, modifies its amplitude to be identical to that entering the receiver, and reverses its polarity. When the two signals are electrically summed, the interference is canceled.

INTERFEROMETER - As pertains to radar, a receiving system, which determines the angle of arrival of a WAVE by phase comparison of the SIGNALs received at separate antennas or separate points on the same antenna.

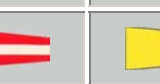
INTERFEROMETRIC TRIANGLE - In DIRECTION FINDING, the triangle formed by a segment of the wavefront of the signal of interest, the base line (the line connecting two antennas which can both receive the signal of interest), and a line from the antenna farthest from the transmitter to the wavefront as it reaches the closer antenna.

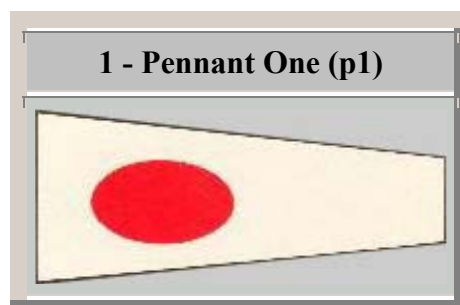
NOTE: The interferometric triangle is a right triangle with the base line as the hypotenuse.

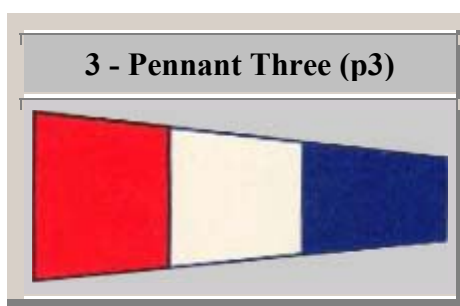
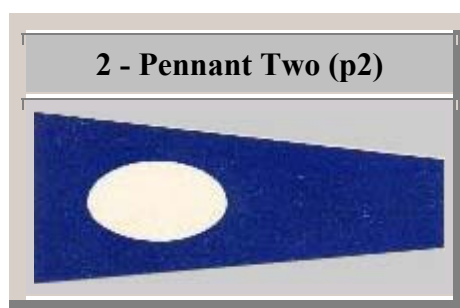
INTERNATIONAL ATOMIC TIME (TAI) - An atomic time scale maintained by the Bureau International des Poids et Mesures, near Paris, and based on data from some 230 atomic clocks located all over the world.

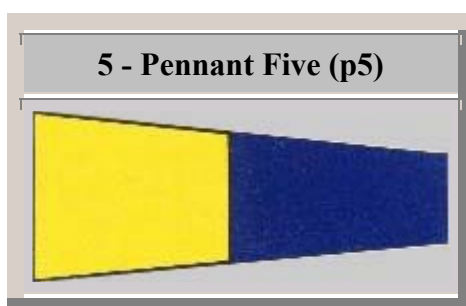
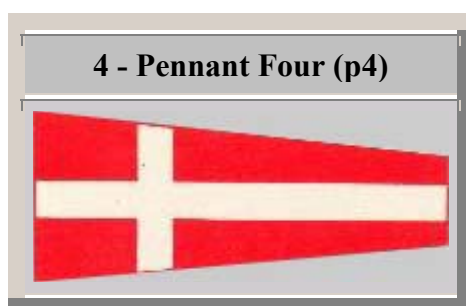
INTERNATIONAL SIGNAL FLAGS - Flags, pennants, and burgees, which denote letters, numbers, maneuvering signals, and other information.

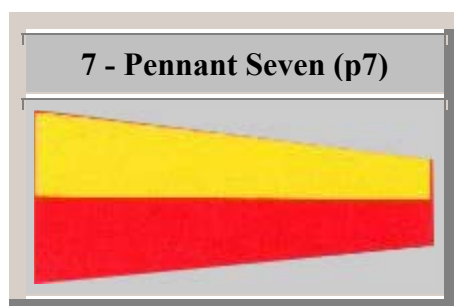
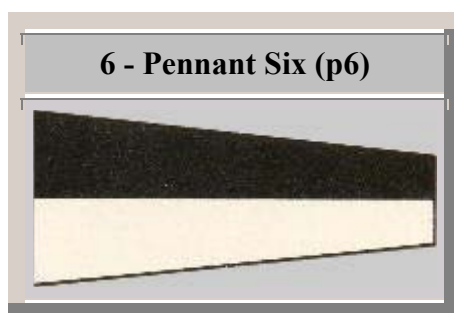
(2) Number Flags and Pennants

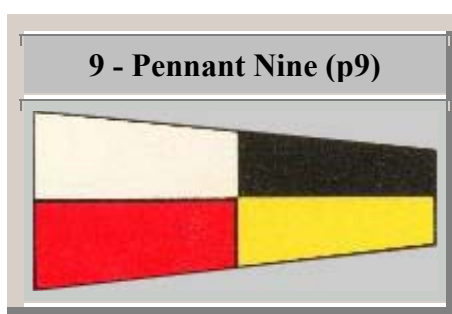
Number Flags and Pennants								
								
								
1	2	3	4	5	6	7	8	9





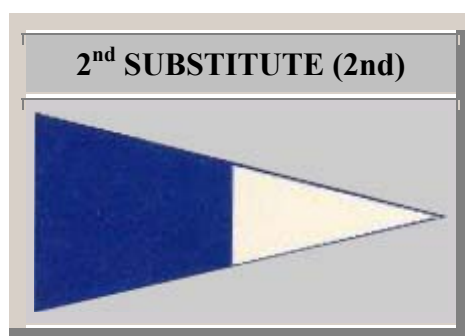
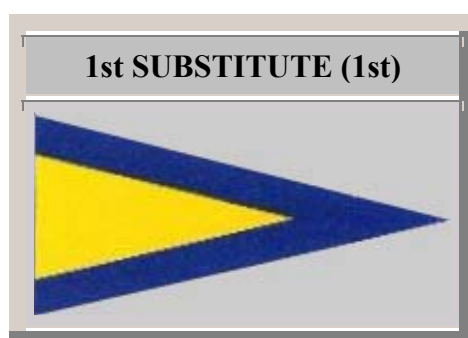


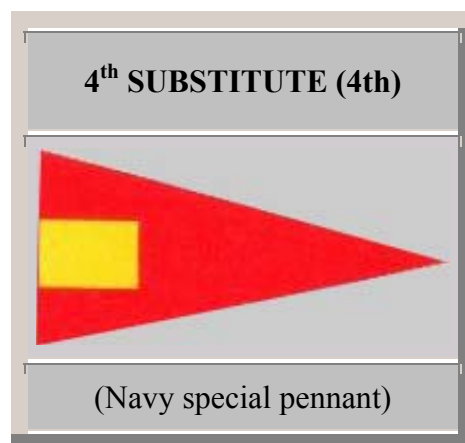
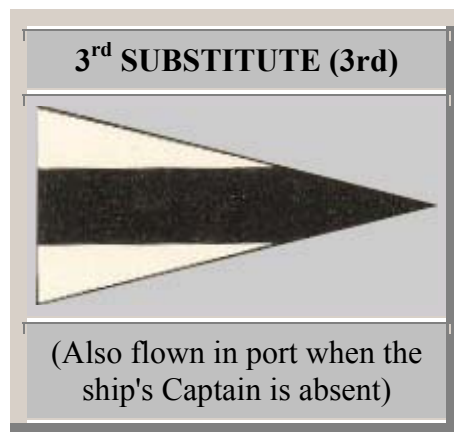






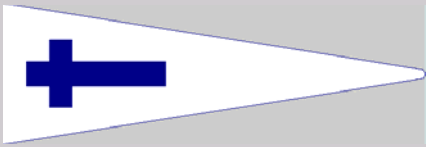
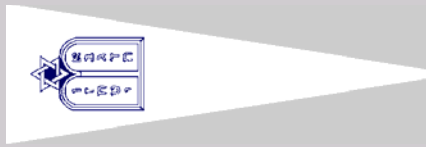
(3) Substitute Pennant





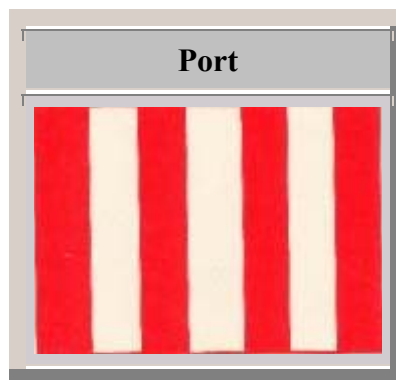
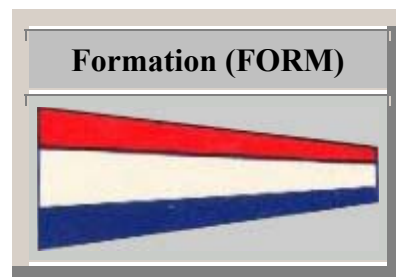
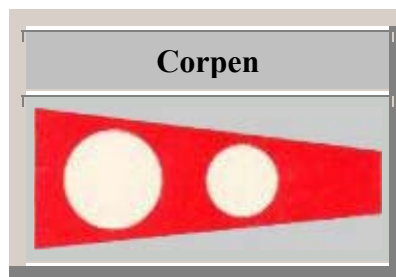
(4) Other Flags and Pennants

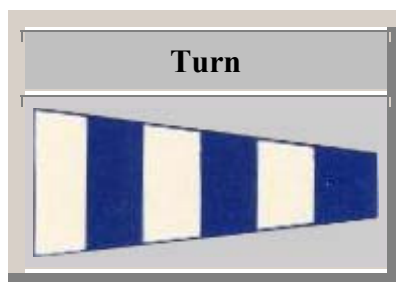
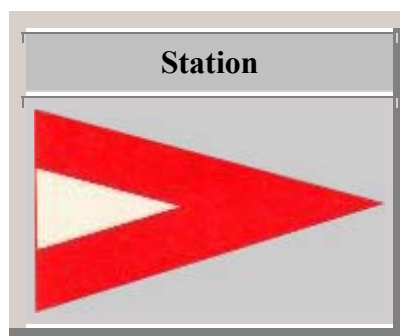
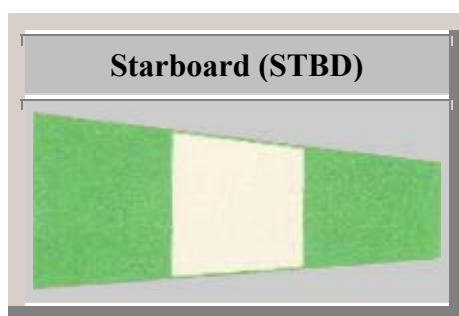
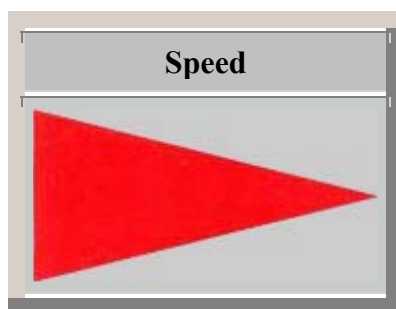
(4a) Church Pennants

Church Pennants	
The church pennant is the only flag authorized to fly above the national ensign. It is flown during church services.	
	
Christian	Jewish (authorized in 1971)

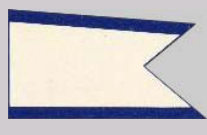
(4b) Maneuver Flags

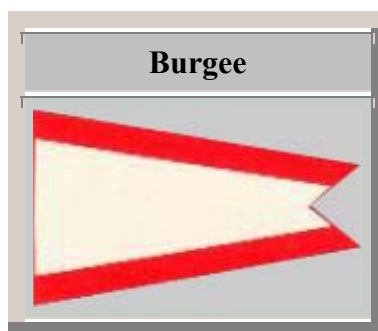
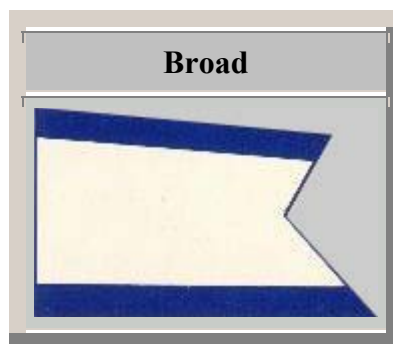
Maneuver Flags						
						
Corpen	Formation	Port	Speed	Starboard	Station	Turn

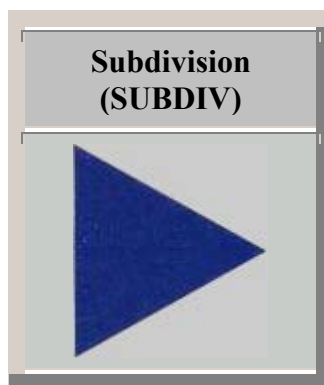
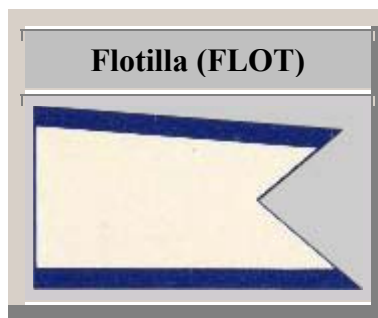




(5) Command Flags

Command Flags					
					
Broad	Burgee	Division	Flotilla	Squadron	SubDivision





(6) Miscellaneous Flags

Miscellaneous Flags						
Ans, or Code	Black	Desig	Emerg	Int	Negat	Prep

Answer (ANS) or CODE



**BLACK PENNANT
(BLACK)**

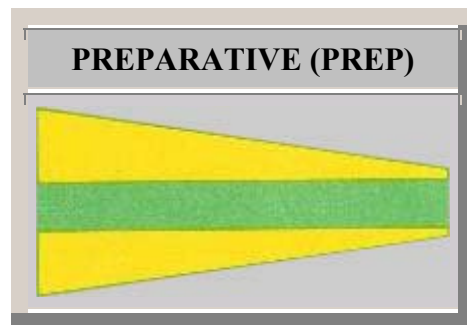


DESIG



**EMERGENCY
(EMERG)**





(7) Personal Flags

Personal Flags				
				
Commodore	Rear Admiral	Vice Admiral	Admiral	Admiral of the Fleet

Admiral of the Fleet

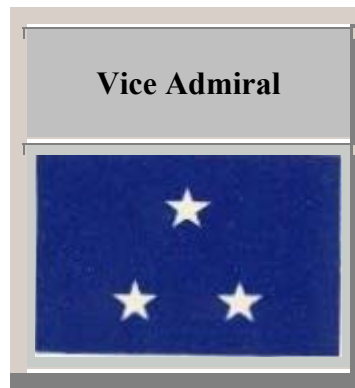


NOTE: There was only one "Admiral of the Navy" in the history of the United States. That individual, Commodore Dewey (of Spanish American War fame - "You may fire when ready, Gridley"), was granted that title by act of Congress, and was valid only for his lifetime. The rank was in recognition of his exploits in destroying the Spanish Fleet at Manila Bay in the Philippine Islands. Dewey's success allowed the U.S. to gain a foothold in the Far East, and to station peacekeeping forces close to China (essential for relief during the Boxer Rebellion, and in WWII, slowing the Japanese advance).

Source: www.history.navy.mil/faqs

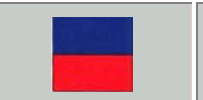
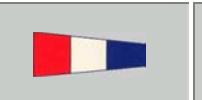
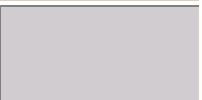
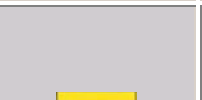
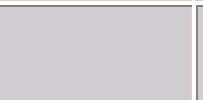
Admiral





Source: U.S. Navy training flash cards (historical appellations are from memory and various sources)

(8) Dress Ship Flag/Pennant Sequence

Dress Ship Flag/Pennant Sequence								
								
	p2	U	J	p1	K	E	p3	
								
	F	L	p4	D	M	p7	P	
								
	T	p0	C	X	p9	W	Q	

(9) INTERNATIONAL & AMERICAN MORSE CODE**INTERNATIONAL & AMERICAN MORSE CODE****LETTERS A – M****LETTERS N - Z****Letter**

International

American

Letter

International

American

A

!#

!#

N

#!

#!

B

#!!!

#!!!

O

###

! !

C

#!#!

!! !

P

!##!

!!!!

D

#!!

#!!

Q

##!#

!!#!

E

!

!

R

!#!

! !!

F

!#!

!#!

S

!!!

!!!

G

##!

##!

T

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H

!!!!

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U

!!#

!!#

I

!!

!!

V

!!!#

!!!#

J

!###

#!#!

W

!##

!##

K

#!#

#!#

X

#!#

!#!

L

!#!

—

Y

#!##

!! !!

M

##

##

Z

##!!

!!! !

NUMBERS (International Morse Code), See also - Special Characters

0 #####

1 !####

2 !!###

3 !!!##

4 !!!!#

5 !!!!!

6 #!!!!

7 ##!!!

8 ####!

9 #####!

NUMBERS (American Morse Code)

0

1 !##!

2 !!##!!

3 !!!#!

4 !!!!#

5 ###

6 !!!!!

7 ##!!

8 #!!!!

9 #!#

NOTES:

Dashes are three times the length of dots (except for the American Morse "L" and "0").
 If you wish to learn Morse Code, learn the **sounds** rather than the visual representation
 (e.g., the letter *A* should be learned as "di-dah"; *M* as "dah-dah"; *V* as "di-di-di-dah", etc.)

<u>Special Characters:</u> International (or Continental) Morse Code Special Letters and Punctuation Marks			
Letter	Code	Punctuation Mark	Code
Ä	!#!#	Full-Stop [.]	!#!##
Á	!###	Comma [,]	##!##
Å	!###	Colon [:]	###!!!
Ch	####	Question Mark [?]	!!##!!
É	!!##	Apostrophe [']	!####
Ñ	##!##	Hyphen [-]	#!!!!#
Ö	###!	Fraction Bar [/]	#!##!
Ü	!!##	Brackets [()]*	#!###!
		Quotation Mark ["]	!#!##!
*5/29/2004: Mr. Robert Moffatt, former Canadian Navy signalman comments: "With regards to brackets: Open brackets are “#!##!””, and closed brackets are #!##!#, or a combination of 'KN' for open and 'KK' for closed."			
"A mistake has been made; delete the last word"!!!!!!!			

INTERNET - (1) A collection of NETWORKS connected by ROUTERS. (2) The worldwide internet based on the TCP/IP PROTOCOL.

NOTE: The Internet is a three-level hierarchy composed of BACKBONE networks (e.g., Ultranet), mid-level networks (e.g., NEARnet), and STUB NETWORKS. The Internet is a multi-protocol internet.

INTERNET BACKGROUND NOISE - Unsolicited commercial or network control messages. NOTE: Probably so-called because they abound by the millions on the Internet.

INTERNET COOKIE - See COOKIE.

INTEROPERABILITY - (1) The ability of systems, units or forces to provide services to and accept services from other systems, units or forces and to use the services so exchanged to enable them to operate effectively together. (2) The condition achieved among communications-electronics systems or items of communications-electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users. The degree of interoperability should be defined when referring to specific cases.

INTEROPERATION - The use of interoperable systems, units, or forces.

INTERPRETABILITY - Suitability of IMAGERY for interpretation with respect to answering adequately requirements on a given target in terms of quality and scale: **a.) poor imagery** is unsuitable for interpretation to answer adequately requirements on a given type of target. **b.) fair imagery** is suitable for interpretation to answer requirements on a given type of target but with only average detail. **c.) good imagery** is suitable for interpretation to answer requirements on a given type of target in considerable detail. **d.) excellent imagery** is suitable for interpretation to answer requirements on a given type of target in complete detail.

IN-TIME INFORMATION INTEGRATION SYSTEM (I³S) - A global information net incorporating ARTIFICIAL INTELLIGENCE, NEURAL NETWORKS, and fuzzy logic to produce an advanced computer SYSTEM ARCHITECTURE for data collection, transmission, and analysis.

INTRANET - A LOCAL AREA NETWORK (LAN) employing communications PROTOCOLS and hypertext links identical to those used by the INTERNET; it is, therefore, an in-house Web site. Although intranet pages may link to the Internet, an intranet is not a site generally accessible to the public. [From the *Computer Desktop Encyclopedia*. Computer Language Company, Inc., 2003] Compare with EXTRANET.

NOTE: Because they use the same communications protocols and hypertext links as the Web, intranets provide a standard way of disseminating information internally while extending the application worldwide.

INTRUSION - A COMMUNICATIONS JAMMING technique to confuse operators and data processing equipment. It involves the transmission of false messages on victim communication channels. See also ELECTROMAGNETIC INTRUSION. NOTE: In general *intrusion* is the intentional insertion of information into transmission paths to deceive or confuse the adversary.

INTRUSION DETECTION SYSTEM (IDS) - A computer system designed to detect attacks or attack preparations by monitoring either the traffic on a computer network, an application, or operation system activities within a computer.

See also ANOMALY DETECTION, HOST-BASED INTRUSION DETECTION, NETWORK-BASED INTRUSION DETECTION, PORT SCAN, SIGNATURE DETECTION.

INVENTING - A DECEPTION technique that creates something entirely new, such as rubber tanks, false radio traffic, and false orders of battle.

INVERSE GAIN ECCM - A generic ECCM technique that degrades the effectiveness of Inverse Gain Jamming and related amplitude modulation ECM techniques. Examples are SCAN-ON-RECEIVE-ONLY (SORO) and HIDDEN SCAN.

INVERTER - In electrical engineering, a device for converting direct current into alternating current. Contrast with RECTIFIER.

INVERSE GAIN JAMMING - (1) A self-screening or support ECM technique for use against radars that depend upon the target return signal amplitude modulation recovery methods for data extraction. It consists of transmitting either an on-frequency noise signal or a repeated signal that has the inverse scan modulation characteristic of the victim radar antenna scan pattern. (2) A jamming technique wherein the jamming power is inversely proportional to the received signal power. Contrast with INVERSE GAIN ECCM.

INVISIBLE WEB - That portion of the Web that is made up of unindexable content that search engines either can't or won't index. See also SPIDER.

NOTE: The invisible web consists largely of databases, which search engines cannot access.

IONOGRAM - A display that shows the altitude of ionospherically-returned RADAR echoes as a function of frequency.

IONOSPHERE - That part of a planetary atmosphere where ions and electrons are present in quantities sufficient to affect the propagation of radio waves. NOTE: The region of the ionosphere between about 50 and 90 kilometers is called the D-layer, and is responsible for most of the daytime attenuation of LF, MF and HF radio waves. The lowest clearly-defined ionospheric layer, called the E-layer, occurs between 100 and 120 kilometers. The ionospheric region occurring between 150 and

500 kilometers is called the F-Layer, and is partitioned into the F1 and F2 layers. The F2 layer has the higher ion density and is always present. Finally, there is the sporadic E-layer that part of the E-layer that is thin, transient, and of limited extent.

IR CHAFF - See EMISSIVE CHAFF.

IRON BOX - A special computer environment designed to trap a HACKER or CRACKER logging in over a remote connection by keeping the intruder interested long enough to be traced while unobtrusively restricting movement in the system.

IRON HAND - See WILD WEASEL.

ISOLUMINESCENCE - A deception technique whereby the protected object generates - in the direction of the victim viewer - the same color and intensity of light as its background as seen by the viewer, so that it becomes indistinguishable from the background, and is thus invisible to the viewer. See also YEHUDI.

ISOTROPIC ANTENNA - A hypothetical, lossless antenna having equal radiation intensity in all directions. NOTE: The isotropic antenna provides a convenient reference for expressing the directive properties of actual antennas.

J

JACKSTRAWING - A term describing poor chaff dispersal due to tangling of stiff dipoles where no physical adhesion is involved. Contrast with BIRDNESTING.

JAFF - [Derived from "JAMming and CHaff"] An ECM tactic involving the use of jammers to illuminate chaff corridors or chaff bursts to produce false targets. Synonymous with NOISE ILLUMINATED CHAFF.

JAMMING - See ELECTRONIC JAMMING.

JAM RESISTANT - A descriptive term which indicates that a device is relatively unaffected by jamming.

JAM-TO-SIGNAL RATIO (JSR) - The ratio of jamming power to received signal power at which the target illuminated by a radar is exactly at the threshold of detection. This occurs at the BURN-THROUGH RANGE.

JAVA - A computer language, developed by Sun Microsystems Inc., for writing small programs that can be downloaded and executed. See also ACTIVEX, JAVASCRIPT.

JAVASCRIPT - A computer language, more modest than JAVA, used principally within Web pages to manipulate browser windows and the items within a browser. See also ACTIVEX, JAVA.

JET ENGINE MODULATION (JEM) - RF sidebands surrounding the SKIN PAINT. Jet engine modulation amplitude and frequency depend on engine type and jet engine speed, and may be exploited through SPECTRA RECOGNITION techniques. (NAWC, Pt. Mugu).

JITTERED PRF ECCM - An ECCM technique where the radar PULSE REPETITION FREQUENCY (PRF) is changed between two or more PRFs.

JITTERED PRF JAMMING - A jamming technique where the ECM equipment jitters the pulse frequency of the signal returned to the victim radar.

JITTERED PULSE WIDTH ECCM - An ECCM technique where the radar jitters its PULSE WIDTH.

JITTERED PULSE WIDTH JAMMING - An ECM technique that involves the reradiation of a victim radar's signal after randomly varying its PULSE WIDTH.

JOAN-ELEANOR (J/E) - A World War II directional two-way High Frequency (HF) communications device that enabled an agent on the ground to talk directly with an appropriately-equipped OSS (Office of Strategic Services) agent flying above.

NOTE: The J-E's HF band and vertical cone-shaped directivity made direction finding (DF-ing) by the enemy next to impossible.

JOGGER - A military space mission to detect missiles by employing OVER-THE-HORIZON RADAR as well as other sensor systems and classified technologies. See also FAST WALKER, SLOW WALKER.

JOINT HELMET-MOUNTED CUEING SYSTEM (JHMCS) - A CUEING (or CUING) system which projects a display onto a pilot's visor, allowing the pilot to aim the aircraft's radar, missiles, INFRARED sensors and air-to-ground weapons merely by looking at the target and pressing the applicable controls.

JOINT LAND-ATTACK CRUISE MISSILE DEFENSE

ELEVATED NETTED SENSOR (JLENS) - A Joint program designed to provide over-the-horizon, wide-area surveillance and precision tracking data to support an over-arching mission area of joint land-attack cruise missile defense and enhanced theater air defense based on the air-directed (e.g., AEROSTAT) surface-to-air missile (ADSAM) engagement concept. See also OVER-THE-HORIZON TARGETING.

JOINT MOBILE OFFSHORE BASE (JMOB) - A man-made, movable, multipurpose, sea-based logistics facility. The JMOB is ideally suited to the maintenance of continuous overseas presence; and theater access complementary to, or independent of, allied or coalition support and infrastructure. The JMOB will provide C⁴I to a Joint Task Force, house depot-maintenance and other support facilities required by tactical aviation, facilitate special operations forces (SOF) missions, and serve as a logistics base for U.S. and allied air and sea transports, (including the C-17).

JOINT READINESS AND LOGISTICS - The capability to enhance readiness and logistics for joint and combined operations. It supports the ENABLERS required to deploy and sustain the joint force across the full spectrum of operations. [NAVWAR Joint Warfighting Science and Technology Plan (*circa* 2000)]

JOINT SERVICE CHEMICAL MINIATURE AGENT DETECTOR

(JSCMAD) - A small device worn by individual personnel to warn them of a chemical agent attack. Variants include devices to quantify and warn of the presence of nerve agents and blister agents in vapor form in aircraft and shipboard compartments.

JOINT-SERVICE INTERIOR INTRUSION DETECTION

SYSTEM (J-SIIDS) - A detection device, designed for the protection of weapons storage sites, that features sensors, which can detect penetration of rooms, movement of intruders and the touching or removal of protected items.

JOINT SERVICES WORKSTATION (JSWS) - A REAL TIME multi-sensor C⁴I system.

JOINT SURVEILLANCE SYSTEM (JSS) - An overlapping system of radar units positioned across the perimeter of the continental United States. The JSS is co-owned by the U.S. Air Force (USAF) and the Federal Aviation Administration (FAA).

JOINT VIRTUAL BATTLESPACE (JVB) - A SYSTEM ARCHITECTURE designed to integrate existing military models into a robust representation of the BATTLESPACE with high fidelity digital terrain, dynamic environmental effects, and physics-based modeling. JVB allows integrated models to pass data among themselves and share a common battlespace.

NOTE: JVB is a tool for evaluating concepts, technologies and proposals, and tactics techniques and procedures (TTPs) and Concepts of Operation (CONOPS) from unit entities to Joint Task Force levels.

K

KALMAN FILTER - A device which uses sensor measurements to determine the position and velocity of a moving or stationary object. The filter can utilize angle-only measurements (e.g., from an optical sensor) or angle-plus-range measurements (e.g., from a radar). It can also simultaneously utilize measurements from more than one sensor (e.g., stereoscopic tracking). See also DEMPSTER-SHAFER REASONING.

KERR EFFECT - A change in the refractive index of a material under the influence of an electric field. See also ELECTRO-OPTICS.

KEYSTROKE MONITORING - Using a hardware or software mechanism to capture user keyboard strokes and report the stroke sequence to a HACKER.

KILL ASSESSMENT - See BATTLE DAMAGE ASSESSMENT.

KILL CHAIN - See THREAT KILL CHAIN.

KILTING - A National Security Agency (NSA) database (*i.e.*, National Technical ELINT Database) containing the characteristics and attributes of non-communications U.S. and foreign emitters. This comprehensive data source, maintained by NSA, includes the technical signal parameter detail necessary to meet the requirements of electronics intelligence (ELINT) customers.

KINEMATIC FLARE - See FLY-ALONG FLARE.

KINEMATIC SPECIAL MATERIAL DECOY (KSMD) - A rocket-propelled DECOY that dispenses special material INFRARED payloads for tactical aircraft self-protection against threats that employ motion as well as special discriminants in their SEEKERS. See also SPECIAL-MATERIAL DECOY.

KINETIC ENERGY ANTISATELLITE (KE-ASAT) - An anti-satellite missile designed to reduce orbital debris by flying close by the target satellite and swatting it with a large paddle-like extension of the weapon.

KINETIC ENERGY PENETRATOR - An armament consisting of a combustible cartridge case and a base case with a long-rod tungsten or depleted-uranium penetrator equipped with stabilizing fins and contained within a metal sabot.

NOTE: Due to its high muzzle velocity and mass, the kinetic-energy penetrator has a significant armor-penetrating ability.

KINETIC ENERGY WEAPON (KEW) - A DIRECTED ENERGY WEAPON (DEW) under DoD's WEAPONS SYSTEMS TECHNOLOGIES (WST). A term used in connection with ballistic missile defense to mean projectile-type weapons such as hypervelocity rail guns, and chemically propelled space-based interceptors.

NOTE: The Soviets have experimented with kinetic energy weapons using streams of high-speed particles of heavy metals (tungsten or molybdenum).

See also ANTIMATTER PARTICLE BEAM (APB), CHARGED PARTICLE BEAM (CPB), GAMMA-RAY LASER (GRASER), HIGH POWER MICROWAVE/RADIO FREQUENCY (HPM/RF), and NEUTRAL PARTICLE BEAM (NPB).

KINETIC KILL VEHICLE (KKV) - A Strategic Defense Initiative (SDI) kinetic energy weapon intended to be carried and launched from low Earth orbit carrier satellites against enemy intercontinental ballistic missiles (ICBMs).

NOTE: The KKV may be launched and propelled with self-contained booster rockets, or by an ELECTROMAGNETIC RAIL GUN (EMR). It carries its own communications and terminal guidance system, and will reach a terminal velocity of about 30,000 mph. The destructive force of the KKV is due to the kinetic energy of its 10-15 pound mass rather than explosives.

KLYSTRON - A velocity-modulated (vacuum) tube comprising, in principle, an input resonator, a DRIFT SPACE, and an output resonator.

KNOWLEDGE BASED SYSTEM - See EXPERT SYSTEM.

KNOWLEDGE DISCOVERY IN DATABASES - See DATA MINING.

KNOWLEDGE EXTRACTION - See DATA MINING.

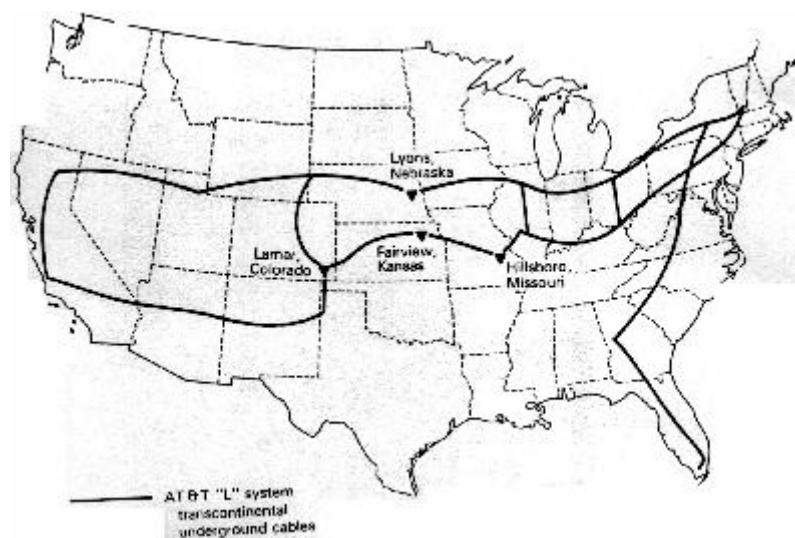
KYTOON - A combination kite and balloon.

L

"L" SYSTEM - A Department of Defense (DoD) land-line communications system provided by AT&T for use during the Cold War. The "L" system used transcontinental underground coaxial cables. The L-2 system became obsolete after WWII. The L-4 coaxial cable, installed in 1967, was a major "hardened" defense carrier, and was capable of handling more than 32,000 voice circuits (compare to fiber cables which can handle more than 300,000,000 voice circuits). Most of the L-4 sites were laid at least 40 miles from major cities. This system was called "L CXR", or the Transcontinental Cable.

<u>L-System Summary</u>					
TYPE	YEAR	BANDWIDTH	COAX TUBES	REPEATER SPACING	CAPACITY (Voice Circuits)
L-1	1941	3 MHz	4	8 miles	600
L-2	1942	840 KHz	4	16 miles	360
L-3	1953	8 MHz	8	4 miles	5,580
L-3I	1960	8 MHz	12	2 miles	9,300
L-4	1967	17 MHz	20	2 miles	32,400
L-5	1972	57 MHz	22	1 mile	108,000

The map shown below shows the layout of the transcontinental "L" system underground cables.



NOTES: (1) See Picture presented above is a map showing the AT&T underground coaxial cables in 1975, as well as the radio links in the continental United States at website: <http://www1.shore.net/~mfoster/Routes.htm>,

(2) Click the website: <http://ourworld.compuserve.com/homepages/alafrance/> to visit a site dedicated to Cold War communications, "A Secret Landscape - The Cold War Infrastructure of the Nation's Capital Region",

(3) Compared to the L-4, L-5 and L-5E (enhanced) systems, which were transistorized, the L-1 to L-3 systems were maintenance intensive,

(4) See a detailed description of the 20-tube AT&T coaxial cable at website: <http://www19.addr.com/~longline/tech-equip/coaxial/coax-desc.html>.

LADAR - Laser Radar - Developed primarily for use in missiles, LADAR is a solid state system that provides near photographic quality images of potential targets. Precise target range is determined by measuring elapsed time from a laser transmission to the reflected return of the pulse. Unlike thermal imaging, a LADAR produces high resolution three dimensional images of near photographic quality, similar to a black and white photo.

LAMBERTIAN SURFACE - A surface that reflects and emits radiation in a perfectly diffuse pattern (uniform reflection of light). NOTE: For reflections of visible light, the surface of a piece of matte paper is nearly Lambertian - the surface of a mirror is not.

LAMB SUPPRESSOR - See DICKE FIX.

LAND WARRIOR (LW) SYSTEM - A system to provide the soldier with SITUATIONAL AWARENESS (SA) through a helmet-mounted display that can show the relative locations of all squad mates and known threats. Soldiers can exchange messages and input known threats and obstacles onto digital moving maps via a small portable computer system. The object is to give the soldier a 10-minute window of warning of nearby threats. LW-equipped soldiers will also be equipped with night-vision goggles and GPS receivers, laser range finders and digital compasses that will allow them to spot and locate targets accurately enough to call for fire support.

See also COMBAT IDENTIFICATION FOR DISMOUNTED SOLDIER (CIDDS) SYSTEM.

LANTIRN - An acronym for low altitude infrared for night. The Lantirn system combines FORWARD LOOKING INFRARED (FLIR) with radar technology, and uses FEDERATED ARCHITECTURE techniques for both navigation and the target attack function.

NOTE: For navigation, a wide-field-of-view FLIR "night window" and a terrain-following radar provide redundant inputs for safe flight paths at extremely low altitudes at night. Target acquisition, weapon handoff and target designation are

accomplished using a precision-stabilized two-fields-of-view FLIR, coupled with automatic trackers and a laser designator, to provide maximum range standoff and precision weapon delivery.

LARGE-AREA SMOKE GENERATOR (LASG) - A smoke-generating system designed for mobile and stationary applications, covering both the visual and IR region, as well as degrading laser performance. The system produces up to 9,500 m³/min. of visual and thermal image obscurants for periods of up to two hours.

LASE - To illuminate an object with a LASER beam. See also LASER ILLUMINATOR.

LASER - An acronym for Light Amplification by Stimulated Emission of Radiation. The laser produces a highly monochromatic and coherent beam of radiation. A steady oscillation of nearly a single electromagnetic mode is maintained in a volume of an active material bounded by highly reflecting surfaces called a resonator. The frequency of oscillation varies according to the material used and by the methods of initially exciting or pumping the material. See also TUNABLE LASER.

LASER ABSORPTIVE VISOR - A visor containing absorbing material that will block out some LASER wavelengths while permitting clear vision.

LASER CHEMICAL DETECTOR - A frequency-agile LASER system able to operate at high repetition rates to detect chemical agents in vapors, aerosols and surface contaminants. NOTE: The sensor detects specific agents because individual chemicals tend to absorb laser energy of specific known wavelengths.

LASER COUNTERMEASURE SYSTEM (LCMS) - A man-portable, multi-role, LASER ILLUMINATOR and optical threat negation system.

LASER DESIGNATOR - device that emits a beam of LASER energy, which is used to mark a specific place or object. See also LASER ILLUMINATOR.

LASER DOPPLER VIBROMETER - A vibration sensor capable of measuring the soil velocity above and around a buried object (such as a land mine) that has been stimulated by an acoustic source (acoustic sources coupled into the earth produce scattering by buried objects). The soil vibration is measured without contact except by the LASER beam. See also LASER VIBROMETER.

LASER DYE ROD - An "Optical Flash Device" carried by a 40mm shell. On impact, the rod creates an exceptionally intense flash, which blinds surrounding electro-optical sensors and personnel.

LASER FLASHLIGHT - A LASER device designed to "spotlight" hostile individuals by placing a bright red light on them at distances up to 300 yards. The device is battery operated and can be mounted on a standard M-16 rifle/grenade

launcher. The device is harmless to the targeted individual. See also LASER DESIGNATOR.

LASER GUIDANCE UNIT - A device which incorporates a LASER SEEKER to provide guidance commands to the control system of a missile, projectile, or bomb.

LASER GUIDED WEAPON - A weapon which utilizes a seeker to detect LASER energy reflected from a laser- marked/designated target and through signal processing provides guidance commands to a control system which guides the weapon to the point from which the laser energy is being reflected.

LASER ILLUMINATOR - An ILLUMINATOR in which the electromagnetic radiation is provided by a LASER.

LASER INFRARED FLYOUT EXPERIMENT (LIFE) - (2001) A LASER-based countermeasure system intended to protect large, less maneuverable aircraft. The system is designed to defeat INFRARED guided missiles during the aircraft's takeoff and landing.

NOTE: The laser for this system is designed to confuse the missile seeker with modulation to break lock, rather than destroying its circuitry.

LASER INTELLIGENCE (LASINT) - Technical and intelligence information derived from LASER systems; a subcategory of electro-optical intelligence.

LASER LINESCAN SONAR - An underwater detection device, which employs a LASER flash to illuminate the target momentarily to create an image. The narrow beam of the laser results in useful imaging ranges several times that of other imaging systems. See also MOBILE UNDERWATER DEBRIS SURVEY SYSTEM (MUDSS).

LASER LINESCAN SYSTEM - An active airborne IMAGERY recording system, which uses a LASER as the primary source of illumination to scan the ground beneath the flight path, adding successive across-track lines to the record as the vehicle advances. See also INFRARED LINESCAN SYSTEM.

LASER ORDNANCE INITIATION SYSTEM (LOIS) - A system which uses LASER energy transmitted through fiber optic lines to initiate ordnance devices. One application is in aircraft egress systems, which use a low-power light source, such as a LIGHT-EMITTING DIODE (LED), as the laser signal source. The source is triggered from the cockpit to begin the egress process. Fiber optic lines carry the signal from the laser source to the egress system ordnance activation points which fire, ejecting the canopy and the crewmember seat or crew module.

LASER PULSE DURATION - The time during which the LASER output pulse power remains continuously above half its maximum value.

LASER RANGEFINDER - A device which uses LASER energy for determining the distance from the device to a place or object.

LASER RANGEFINDER COUNTERMEASURE (LARC) - An airborne system employing four sensors to cover the aircraft's lower hemispheres. The sensors detect incoming LASER energy and provide direction-of-arrival data. The system subsequently predicts the laser emission's time of arrival, points a beam director toward the source of emission and transmits a countermeasure optical beam toward the rangefinder, thus jamming it. See also LASER RANGEFINDER.

LASER-RETARGETING SATELLITE - A prototype twin-mirror Bifocal Relay Spacecraft designed to receive "up" beams and refocus them via a "steering" mirror and second main mirror onto targets of choice on the ground. Also called TWIN-MIRROR LASER RETARGETING SATELLITE.

NOTES: (2002) If fielded, a combination of 27 twin-mirror satellites will orbit the earth at 715 km sometime in the next decade. Potential applications include reconnaissance, space optics, space communications, remote imaging, enhancing night vision capabilities, camouflage detection and penetration, chemical warfare agent detection and identification, theater wind profiling, tunnel and underground structure detection, and cloud ceiling detection. One of the most intriguing potential uses of the space mirrors would be as giant flashlights to illuminate future battlefields.

LASER RETROFIRE - The triggering of a LASER beam in the direction of a received threat signal. See also LASER ZAPPER.

LASER SEEKER - A device based on a direction sensitive receiver, which detects the energy reflected from a laser designated target and defines the direction of the target relative to the receiver. See also LASER GUIDED WEAPON.

LASER SHIELD - A housing, screen, or other object that substantially reduces the effect of LASER energy on one side thereof, upon devices, living organisms, or circuits on the other side. [Adapted from the definition of electromagnetic shield in ref. 3]

LASER SIGNATURE CONTROL - The employment of materials, electronics, and platform design features intended to reduce the susceptibility of the platform to detection, tracking, and engagement by an adversary using LASER sensors, such as LADAR. LASER SIGNATURE CONTROL includes the use of paints, coatings and other surface treatments, and the use of special lens material.

See also ACOUSTICS SIGNATURE CONTROL, INFRARED SIGNATURE CONTROL, MAGNETIC SIGNATURE CONTROL, MULTISPECTRAL SIGNATURE CONTROL, OPTICAL SIGNATURE CONTROL, RADIO FREQUENCY (RF) SIGNATURE CONTROL, and SIGNATURE CONTROL.

LASER SPECKLE - A pattern produced by interference among various contributions of backscattered light coming to a receiver from the surface of a target illuminated by a LADAR.

NOTE: Formerly considered a nuisance because it degraded target images, speckle has potential in LADARs for high resolution in range and angle.

LASER TRACKER - A device which locks on to the reflected energy from a LASER-marked/designated target and defines the direction of the target relative to itself.

LASER TWEEZERS - A LASER device designed to trap small particles and objects in a strongly focused CONTINUOUS WAVE (CW) laser beam. Objects trapped in the focus of the laser beam experience a restoring force if they try to leave the high-intensity volume. An optical tweezer system is constructed by focusing light from a laser through a microscope with a high numerical aperture (*e.g.*, 100^x N.A. = 1.3). The tweezers can be used to move NANOMETER-size particles in order to construct a patterned array.

LASER VIBROMETER - A vibration sensor capable of measuring vibration without contact except by a LASER beam.

NOTE: The laser vibrometer detects air-transmitted vibrations from objects to be tested, such as rotating machinery and engines. Degraded components vibrate in a less organized and less energetic manner than structurally solid components.

LASER ZAPPER - A medium-powered LASER used to counter laser designators and laser pointers. It is coupled to a laser warning system, and automatically sends LASER RETROFIRE to the enemy sensor to disable it.

LATCH-UP - A condition of a Complementary Metal-Oxide Semiconductor (CMOS) integrated circuit (IC) in which parasitic bipolar transistors are switched on, drawing large currents that may destroy the device. See also BURN-OUT.

LATERAL TELLING - See CROSS TELLING.

LAUNCH-AND-LEAVE - See FIRE-AND-FORGET.

LAYER - (1) A stratum of the ionosphere, which affects radio wave propagation. (2) A stratum of water which affects sound transmission. (3) A subdivision of the OPEN SYSTEMS INTERCONNECTION (OSI) ARCHITECTURE, constituted by subsystems of the same rank. Also called LEVEL.

NOTE: Communications networks may be organized as a set of more or less independent PROTOCOLS, each in a different LAYER, or level. The lowest layer governs direct host-to-host communications between the hardware at different hosts; the highest consists of user applications. Each layer builds on the layer beneath it. For each layer, programs at different hosts use protocols appropriate to that layer to communicate with each other. TCP/IP has five layers of protocols; OSI has seven. The advantages of different layers of protocols is that the methods of passing information from one layer to another are specified clearly as part of the protocol suite, and changes within a protocol layer are prevented from affecting the other

layers. This greatly simplifies the task of designing and maintaining communication programs.

LEAVE-IT-BEHIND JAMMER - A small, expendable jammer used to attack SIDE LOBES and the main beam of the victim radar. See also HAND-EMPLACED JAMMER.

LEFT-HANDED MEDIA (LHM) - Materials that have negative refractive index. NOTE: A lense of left-handed material could potentially focus light onto a spot less than a half-wavelength across - less that the current "diffraction limit."

LEGACY - A system which is still in use, but was developed at an earlier time using the best technology then available, but whose input/output devices and user interfaces are now generally obsolete. NOTE: An example of legacy is the mainframe computer developed in the 1970s.

LEGACY MIGRATION - The process of making mainframe data available to users employing internet protocol (IP) and/or Windows-based systems.

NOTE: "Legacy" refers to technologies of the past (i.e., mainframe applications) and "migration" is the conversion to IP and Windows-based systems. LEGACY MIGRATION, then, requires knowledge of both the legacy and target systems in order to successfully migrate data to the latter applications.

LEMMINGS - A small unmanned maritime vehicle (UMV), under control of a tactical control system (TCS), designed for beach and surf reconnaissance (e.g., to crawl on beaches to search for mines and obstacles). [Information from: <http://www.ncsc.navy.mil>]

NOTE: LEMMINGS contains a video camera, a global positioning system (GPS) receiver, RF links and a PERSONALITY MODULE for integrating the device to the TCS.

LENS ANTENNA - An antenna consisting of an electromagnetic lens and a feed (antenna), which illuminates it. NOTE: An intuitive analogy is a three-dimensional structure to "focus" the electronic radiation.

LESS-THAN-LETHAL (LTL) MUNITIONS - Weapons designed to thwart adversaries while minimizing fatalities and undesired damage to property and the environment. See also NONLETHAL WEAPON.

<u>LESS-THAN-LETHAL MUNITIONS</u>	
Personnel Immobilization	
Crowd control	Examples: 40mm Sponge Grenade; foam baton; rubber balls & pellets

Standoff/barricade	
Snagging fleeing individuals	Example: Entanglement net munitions
Material immobilization	
Stopping/hindering vehicle passage with minimal endangerment to personnel inside	
Lines of Communications Interference	
Insertion of computer viruses	
Community Infrastructure Interference	
Disabling power grids	

LETHAL ELECTRONIC COUNTERMEASURES - The use of ECM-related hard-kill systems, such as anti-radiation missiles (ARMs) and directed energy weapons.

LIDAR - See LIGHT DETECTION AND RAGING.

LIFE ASSESSMENT DETECTOR SYSTEM (LADS) - A microwave Doppler movement-measuring device capable of detecting a heartbeat from a distance of approximately 100 feet.

LIGHT AMPLIFICATION - A technique whereby ambient light (such as starlight) is amplified to permit night observation.

LIGHT DETECTION AND RANGING (LIDAR) - A LASER device, which emits pulses, reflections of which are gathered by a telescope aligned with the laser. The return signal is used to determine distance and position of the reflecting material. One application is that of detecting missile plumes. The laser pulses are reflected off AEROSOLS and particles in the air caused by a missile exhaust. Other applications include employment to deter narcotics trafficking and to monitor the environment.

NOTE: LIDAR is also used to detect clear air turbulence, an invisible aircraft safety hazard.

LIGHT-EMITTING DIODE (LED) - A semiconductor device that can emit incoherent optical radiation. It is used in displays to provide a visual representation of data.

LIGHTSAT - A light, small, low-cost satellite payload for a simple application. See also FATSAT.

LIGHT SIGNATURE - The unique fiber pattern possessed by a sheet of paper, e.g., a certificate.

NOTE: A light signature is determined by passing a high-intensity light beam through a small section of the document. The light-signature device then reads the patterns created by the paper's individual fiber matrix and then digitizes and encodes the data on a magnetic stripe on the document. These data then become part of the escort memory of the document. The authenticity of the document may then be verified by passing a light beam through the scan area of the document and comparing the resultant light signature with the light-signature data residing on the magnetic stripe.

LIGHTWEIGHT MAN-PORTABLE RADIO DIRECTION-FINDING SYSTEM (LMRDFS) - A man transportable ground-based communications intercept, processing, and direction finding system.

NOTE: The system is ideal for intercept/DF operations in light, airborne, air assault and SPECIAL OPERATIONS FORCE (SOF) operations. The 60-pound system can be carried by two soldiers. The receiver/processor subsystem fits in one soldier's All-purpose Lightweight Individual Carrying Equipment (ALICE) pack and the antenna subsystem goes in another ALICE pack. A complete station can be rapidly relocated, optimizing its use in the forward areas of operations. External communications are provided by secure COMBAT NET RADIO (CNR).

LIGHTWEIGHT THERMAL WEAPON SIGHT (LTWS) - A rifle gun sight that allows the user to shoot at targets at night or in daylight, through smoke, bad weather or in total darkness. Powered by two AA batteries, the sight imager features a two-to-one electronic zoom, electronically programmable reticules, and a liquid crystal display (LCD). The LTWS employs an eyecup-activated standby mode to conserve power.

LINE CHARGE (LC) - An explosive clearing system used to clear mines in 3-10 ft water depths. See also SURF-ZONE ARRAY (SZA), BEACH-ZONE ARRAY (BZA).

LIQUID CONDUCTIVE THREAD PROJECTOR - A NONLETHAL WEAPON consisting of a hand-held device which uses pulsed electronic currents to incapacitate one or several target individuals.

LIQUID CRYSTAL DISPLAY (LCD) - A display made of material whose reflectance or transmittance changes when an electric field is applied. See also REFLECTIVE DISPLAY and TRANSFLECTIVE DISPLAY.

LITTORAL AIRBORNE SENSOR-HYPERSPECTRAL (LASH) - The LASH system - installed in P-3C Orion maritime patrol aircraft - uses HYPERSPECTRAL IMAGERY to increase the air crew's ability to detect small color variance of the water surface, thus aiding in the detection and tracking of submerged submarines.

LITTORAL REMOTE SENSING (LRS) - A system used for covert mine detection. The LRS uses surveillance satellites and other collection techniques, imagery processing and algorithms to covertly gather data on coastal and littoral defenses, environments and oceanographic phenomena such as surf conditions and weather conditions.

See also NEAR-TERM MINE RECONNAISSANCE SYSTEM (NMRS) and LONG-TERM MINE RECONNAISSANCE SYSTEM (LMRS).

NOTES: **(1)** LRS cannot locate individual mines, merely indicates areas of interest to support mine countermeasures. **(2)** LRS uses existing (*circa* 2001) US government surveillance satellites plus new collection techniques, imagery processing and algorithms to covertly gather data on coastal and littoral defenses, environments and oceanographic phenomena. The data are distributed to operational units, such as the Joint Intelligence Centers. LRS doesn't find individual mines, but indicates "areas of interest." LRS can also deliver useful data just prior to a mission, such as surf conditions and weather forecasts.

LITTORAL SEA MINE (LSM) - A multiple-influence bottom mine armed with a mobile homing warhead and a remote control (RECO) subsystem that permits the mine to be put in place, queried by fleet assets, and armed only when the situation requires.

LMU ANTENNA - A commercially-available multi-directional base station high-performance antenna in the 1,800 MHz region. The antenna unit comprises three separate antennas, each providing an angular coverage of 120 degrees. This reduces the effects of multi-path and co-channel interference and provides high accuracy, which can be exploited by position sensing technologies such as enhanced observed time difference, and ANGLE OF ARRIVAL (AOA).

NOTE: "LMU" is an acronym for "Location Monitoring Unit."

LOADSHARING - A software program used in MULTIPROCESSING. It prioritizes incoming jobs and monitors the availability, power, and existing load of the processors in the system, as well as available licenses, memory, disk space, and swap partitions, assigning tasks to the most appropriate processor in the system. See also PROCESSOR FARM.

LOBE - A portion of the directional pattern (of an antenna) bounded by one or two cones of nulls (surfaces of minimum radiation). NOTE: A LOBE that exists in the desired direction is called the MAJOR LOBE. Other lobes are called SIDE LOBES or the BACK LOBE, as appropriate.

LOBE SWITCHING - A means of direction finding in which a directive radiation pattern is periodically shifted in position so as to produce a variation of the signal at the target. The signal variation provides information on the amount and direction of displacement of the target from the pattern mean position. Also called SEQUENTIAL LOBING.

LOCAL AREA NETWORK (LAN) - A data or computer NETWORK covering a small geographical area (e.g., 1 km² or less) Contrast with WIDE AREA NETWORK (WAN).

LOCATION FINGERPRINTING - The combining of radio frequency (RF) multipath patterns with other signal characteristics to create a signature unique to a given location.

LOCK-ON METHOD OF CHAFF DEPLOYMENT - A DISTRACTION CHAFF deployment method that is based on the principle of generating a number of chaff clouds that act as false targets. These targets must be positioned relative to the protected surface unit in a pattern that will insure the missile will find a false target first, irrespective of its search method. Synonymous with DILUTION CHAFF.

LOG-PERIODIC ANTENNA (LPA) - An antenna having a structural geometry such that its impedance and radiation characteristics repeat periodically as the logarithm of frequency.

LOGIC BOMB - Computer code which is surreptitiously inserted into an application or operating system (OS) that performs some destructive or security-compromising activity whenever specified conditions are met.

LOGISTICAL FOOTPRINT - The amount of personnel, spares, resources, and capabilities physically present and occupying space at a deployed location. [*I cannot find a documented definition for this often-used term; send help to Echoplex@ieee.org*]

LOITERING AUTONOMOUS MUNITION (LAM) - A small winged munition dropped from an Unmanned Combat Air Vehicle (UCAV). (*ca* 2002) The LAM is able to hover in the air for up to 30 minutes seeking its target across an 80 square-km area. Also called the Long Loiter Cooperative Attack Munition. See also UNMANNED AERIAL VEHICLE (UAV).

LOITERING ELECTRONIC WARFARE KILLER (LEWK) - A recoverable UNMANNED AIR VEHICLE (UAV) providing ELECTRONIC WARFARE (EW) JAMMING at a low cost. It is capable of being launched from air, sea or ground platforms.

LONG RANGE ADVANCED SCOUT SURVEILLANCE SYSTEM (LRAS³) - A relatively light weight (approx. 120 lbs.) system incorporating a FORWARD LOOKING INFRARED (FLIR) sensor with long-range optics, a laser rangefinder and a television camera that provides day/night far-target recognition and location.

LONG-TERM MINE RECONNAISSANCE SYSTEM (LMRS) - An UNMANNED UNDERWATER VEHICLE (UUV) about the size of an Mk 48 torpedo. The UUV is launched from a torpedo tube, but remains tethered to the launch platform via a fiber-optic link, which can extend out to several miles. Equipped with

an onboard inertial navigation system, the UUV uses a multi-beam, forward-looking active sonar to detect moored and bottomed objects, and a side-scanning HF sonar to classify them. Data are relayed to an operator console in the launching platform.

See also NEAR-TERM MINE RECONNAISSANCE SYSTEM (NMRS) and LITTORAL REMOTE SENSING (LRS).

LONG WAVE INFRARED - See FAR INFRARED.

LOOK AROUND - An EW technique to achieve compatibility between RADAR WARNING RECEIVERS (RWRs) and ECM systems. The receiver uses frequencies other than those currently in use (i.e., jamming and harmonic frequencies) by the ECM. See also LOOK OVER, LOOKTHROUGH, and HIGH-SPEED CHOP.

LOOK OVER - An EW technique to achieve compatibility between RADAR WARNING RECEIVERS (RWRs) and ECM systems. The receiver is able to receive in the presence of jamming by analyzing the expected emitter signal level and the expected level of the jamming signal at the receive antenna ports. The receiver blanks ECM transmission according to a schedule based on preset tolerable percentages, based on the particular threat. See also LOOK AROUND, LOOKTHROUGH, and HIGH-SPEED CHOP.

LOOKTHROUGH - An EW technique to determine jammer effectiveness by measuring victim RADAR PARAMETERS. The jammer is turned off momentarily so that the receiver can detect the victim radar's signals. See also LOOK AROUND, LOOK OVER, and HIGH-SPEED CHOP.

LOW ALTITUDE/AIRSPEED UNMANNED AIRCRAFT (LAURA) - An autonomous aircraft designed to carry Electronic Warfare (EW) payloads for long-flight endurance at ship-like speeds.

NOTE: LAURA is intended to be launched out of small container and match a ship's course and speed, cruising for example for 20 hours at about 20 knots. It can carry reconnaissance, radio link, or other electronic payloads that need to be carried off-board a ship and move with the Fleet.

LOW-COST ANTI-ARMOR SUBMUNITION (LOCAAS) - An autonomous submunition that can be delivered by missiles or aircraft. The system uses a solid-state LADAR seeker for autonomous search, acquisition and tracking of potential targets. The smart, air-launched submunition that can loiter over enemy territory and autonomously search for, recognize and destroy moving SAMs and other targets. Depending on the stand-off launch range, the LOCAAS can have up to 15 minutes of search time over enemy territory. Using an INERTIAL NAVIGATION SYSTEM (INS) and GLOBAL POSITIONING SYSTEM (GPS) for navigation, along with target coordinate data from the launching aircraft, LOCAAS builds its own logical search pattern. The high-resolution sensor is equipped with automatic target recognition algorithms and a built-in target library, has the capability to distinguish between military targets and civilian vehicles, and can classify vehicles such as tanks, trucks and armored personnel carriers. Over target, the LOCAAS laser sensor

functions as a smart fuse for the submunition to fire in one two warhead modes. An explosively formed, long, rod-shaped penetrator slug is fired at the top of heavily armored targets. Multiple small slugs are fired against light armor to enhance lethality. Also called LOW-COST AUTONOMOUS ATTACK SYSTEM, LCAAS.

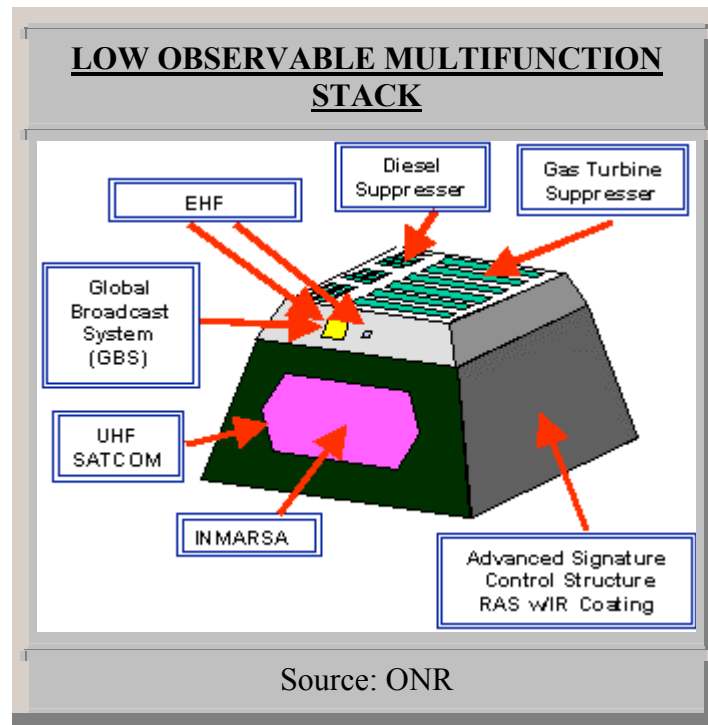
NOTES: **(1)** The LOCAAS is programmed to self-destruct if the submunitions don't find a target. **(2)** LOCAAS, along with the Small Bomb System (SBS), has been incorporated (*circa* 2000) into the MINIATURE MUNITION CAPABILITIES program

LOW ENERGY LASER WEAPON - A laser weapon having output energy of the order of milliwatts, which is still capable, however, of producing severe damage to the retina of the eye and permanent blinding, and can cause temporary malfunction of sensitive electro-optical weapon sights.

NOTE: Lasers cause damage to the target primarily by the transfer of thermal energy at a rate faster than the target can safely absorb it. Laser light is seen by the eye as if it were coming from a point source. The eye can only focus it onto a very small point on the retina. The effect is to magnify the brightness of the light by a factor of approximately 100,000.

LOW INTENSITY CONFLICT (LIC) - Political-military confrontation between contending states of groups below conventional war and above the routine, peaceful competition among states. It frequently involves protracted struggles of competing principles and ideologies. Low intensity conflict ranges from subversion to the use of armed force. It is waged by a combination of means employing political, economic, informational, and military instruments. Low intensity conflicts are often localized, generally in the Third World, but contain regional and global security implications. See also CONTINGENCY AND LIMITED OBJECTIVE WARFARE (CALOW), UNCONVENTIONAL WARFARE.

LOW OBSERVABLE MULTIFUNCTION STACK - A surface ship composite exhaust stack having embedded multi-function satellite communication array antennas and INFRARED SIGNATURE CONTROL features. Composite exhaust stacks also reduce a ship's topside signature, volume, weight, and mast antenna population.



LOW OBSERVABLES (LO) - See SIGNATURE CONTROL

LOW OBSERVABLES TECHNIQUES - See STEALTH TECHNIQUES.

LOW-POWER SOURCE NOISE JAMMING - A type of BARRAGE JAMMING in which a low-level noise source is amplified to produce the jamming signal. Contrast with HIGH-POWER SOURCE NOISE JAMMING.

LOW PROBABILITY OF IDENTIFICATION (LPID) RADAR - A LOW PROBABILITY-OF-INTERCEPT (LPI) RADAR with parameters that make it difficult for an ESM receiver to correctly identify the radar type.

LOW PROBABILITY OF INTERCEPT - That property of a radiating device which, because of its low power, high directivity, frequency variability or other design attributes, make it difficult to be detected or identified by means of passive devices.

LOW PROBABILITY OF INTERCEPT (LPI) RADAR (LPIR) - A radar that, because of its low peak power output, the way in which it is operated, and other design features, is difficult to detect by means of an ELECTRONIC SUPPORT MEASURES (ESM) or ELECTRONICS INTELLIGENCE (ELINT) receiver, and difficult to identify if detected.

See also BINARY-PHASE-CODED CONTINUOUS-WAVE RADAR, COHERENT RADAR, FREQUENCY AGILE RADAR, QUIET RADAR, SILENT RADAR, RANDOM SIGNAL RADAR.

LOW RATE INITIAL PRODUCTION (LRIP) - Optional materiel acquisition phase used when substantial doubt or risk exists about an item's producibility.

LPID RADAR - See LOW PROBABILITY OF IDENTIFICATION (LPID) RADAR.

LUMINOUS LIGHT - See PHOTOMETRIC LIGHT.

M

MACH NUMBER - The ratio of the velocity of a body to that of sound in the surrounding medium.

MACHINE CODE - Computer instructions and data definitions expressed in a form that can be recognized by the processing unit of a computer.

MACHINE LANGUAGE - A language that can be recognized by the processing unit of a computer. Such a language usually consists of patterns of 1s and 0s, with no symbolic naming of operations or addresses. See also ASSEMBLY LANGUAGE.

MAGIC COOKIE - See COOKIE.

MAGIC LANTERN - A wide area light detection and ranging (LIDAR) system used to detect moored and free-floating mines. It employs a neodymium: YTTRIUM-ALUMINUM GARNET laser as a light source. The system also directs a compact mini-torpedo, or torpedolet, called "Terminator", to destroy the mine. MAGIC LANTERN can operate at altitudes between 400 feet and 1,500 feet above sea level. There is a trade-off between improved resolution and SIGNAL-TO-NOISE RATIO at lower altitudes and expanded field of view at higher altitudes. The system's search depth is not greatly affected by the aircraft's altitude. Also called AIRBORNE LASER MINE-DETECTION SYSTEM (ALMDS).

MAGIC WARRIOR (MW) - A mobile tactical multi-sensor ground surveillance vehicle designed to provide line-of-sight surveillance and targeting. The MW sensor suite consists of a bore-sighted FLIR camera, high-resolution long-range color and black & white cameras, a radar, a Mini Eye-safe Laser Infrared Observation Set (MELIOS), a digital compass, and a GPS system. The MW is leveled using four hydraulic jacks controlled from the driver's compartment and can be deployed or stowed in less than five minutes.

MAGNESIUM DIBORIDE - See HIGH TEMPERATURE SUPERCONDUCTIVITY (HTSC).

MAGNETIC ANOMALY DETECTOR (MAD) - A system, employed by ASW patrol aircraft, helicopters, and blimps, to detect the presence of a submerged submarine's metal hull through measurement of local fluctuations in the earth's magnetic field. The MAD sensor was extended well behind the aircraft's fuselage to minimize interference from its metal structure.

NOTE: One MAD tactic used by a low-flying aircraft was to drop a bright yellow dye marker and/or a white smoke float on the water at the point of a detected a magnetic signal (at which point the MAD operator would transmit the codeword "MADMAN" to alert other ASW forces in the area). After several more passes over the marked location, if signals were still detected, the aircraft would drop a depth charge or

homing torpedo at the location. MAD-carrying aircraft include the Navy's P-3 Orion, the RAF Nimrod MR2, and the Air Force SH-2G Super Sea Sprite helicopter.

MAGNETIC COOLING - The use of magnetic fields for cooling. See also MAGNETOCALORIC EFFECT.

MAGNETIC GRADIOMETER - A magnetic sensor configured to detect the spatial variation of the magnetic field intensity from sources external to the instrument, that is, the *gradient* of the magnetic field intensity.

NOTE: Magnetic gradiometers and MAGNETOMETERS are key elements of MAGNETIC ANOMALY DETECTORS, mine fuses, intrusion and ordnance detection systems, proximity detection systems, underwater mine detection systems and active DEGAUSSING systems. Magnetic sensors in a tactical missile can be used to detect and localize a target, such as a tank, from the background magnetic field variations.

MAGNETIC MATERIALS - That category of MATERIALS TECHNOLOGY which addresses materials with military applications in magnetic shielding, SONAR (e.g., magnetostrictive alloys), and very high-speed power supplies.

MAGNETIC RANDOM ACCESS MEMORY (MRAM) - A type of RANDOM ACCESS MEMORY (RAM) that does not lose data when power is removed.

MAGNETIC SIGNATURE CONTROL - The employment of materials, electronics, and platform design features intended to reduce the susceptibility of the platform to detection, tracking, and engagement by an adversary using magnetic sensors, such as those found in mines. MAGNETIC SIGNATURE CONTROL includes the use of specially designed materials, structures, coatings, or paints to reduce magnetic signature. It also includes the use of nonferrous armors, magnetic SPOOFING devices, and DEPERMING or DEGAUSSING techniques for larger military items.

See also ACOUSTICS SIGNATURE CONTROL, INFRARED SIGNATURE CONTROL, LASER SIGNATURE CONTROL, MULTISPECTRAL SIGNATURE CONTROL, OPTICAL SIGNATURE CONTROL, RADIO FREQUENCY (RF) SIGNATURE CONTROL, and SIGNATURE CONTROL.

MAGNETOCALORIC EFFECT - The phenomenon where magnetic materials heat in a magnetic field and cool upon its removal. See also CRYOGENICS.

MAGNETOELECTRONICS - The use of electrons' spins (not just their electrical charge) in information circuits. Also called SPIN ELECTRONICS or SPINTRONICS.

NOTES: **(1)** One magnetoelectronic device is the magnetic hard drive based on the GIANT MAGNETORESISTANCE (GMR) effect. **(2)** The use of spin would make it possible to produce quantum computers that would not have to rely on binary digits, but instead could encode information in different spin states.

MAGNETOHYDRODYNAMICS - See HYDROMAGNETICS.

MAGNETO-IONIC MEDIUM - An ionized gas, which is permeated by a fixed magnetic field.

MAGNETOMETER - An instrument for measuring the intensity and/or direction of a magnetic field. See also MAGNETIC GRADIOMETER.

MAGNETO OPTICAL RECORDING (MO RECORDING) - A digital recording technique involving magnetic material on which magnetic fields are used to store the data. In MO recording, a tightly-focused laser beam supplements the magnetic field used to write to the MO disk. The laser alone is used to read the disk, employing the KERR EFFECT: when influenced by a (local) magnetic field, a reflected light beam polarization is rotated slightly.

MAGNIFIED TELEVISION SYSTEM - A system consisting of a television monitor and camera, which allows the operator to visually identify targets at long ranges. The system may also include an infrared feature to allow night operation in the mid-infrared spectrum (3-5 microns).

MAIN LOBE - See MAJOR LOBE.

MALICIOUS CACHE POISONING - The providing of false information to a DOMAIN NAME SYSTEM (DNS) by a host not authorized to provide such information. Also called DNS SPOOFING and DOMAIN NAME SYSTEM SPOOFING.

NOTE: Susceptibility to DNS spoofing is a significant security threat in that it can allow attackers to access a site's E-mail, can cause users to be redirected to the wrong web site, and can be an opening move in a denial of service attack, or E-BOMB.

MAJOR LOBE - The radiation lobe containing the direction of maximum radiation. Synonymous with MAIN LOBE. See also LOBE.

MALICIOUS SOFTWARE - Computer programs created by CRACKERS and designed to infect target computer systems. Malicious software may be grouped as follows: VIRUSES, which hide themselves and replicate in computer file systems, TROJANS (or TROJAN HORSES), which masquerade as useful or amusing software to be accepted by unsuspecting users, and WORMS, which propagate themselves across computer networks, attacking target systems without human intervention.

MANHUNTER - See FIELD EFFECT DETECTOR.

MAN-IN-THE-LOOP SYSTEM - A system which requires human decision, data input, or other action for its proper operation. Contrast with AUTONOMOUS TARGET RECOGNITION.

MANIPULATIVE COMMUNICATION DECEPTION (MCD) -

Action to eliminate revealing, or convey misleading communications.

MANIPULATIVE ELECTROMAGNETIC DECEPTION - That type of ELECTROMAGNETIC DECEPTION that involves actions to eliminate revealing, or convey misleading, electromagnetic telltale indicators that may be used by hostile forces.

MANIPULATIVE ELECTRONIC DECEPTION - Action to eliminate revealing, or convey misleading, telltale indicators that may be used by hostile forces.

MANPOWER AND PERSONNEL INTEGRATION (MANPRINT) -

An Army program which promotes the embedding of human factors at the start of the development of a weapon system.

MANTIS - See MULTI-ADAPTABLE NIGHT TACTICAL IMAGING SYSTEM

MARINE PATTERN (MARPAT[®]) - A new (*circa* 2000) technique of CAMOUFLAGE that employs five optimized colors and digital technology to produce the pattern used on combat utility uniforms.

UNIFORM CAMOUFLAGE PATTERNS

(1) Digital Camouflage

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(USMC & USN REENACTORS ASSOCIATION)



Woodland



Desert



Urban
(not officially adopted)

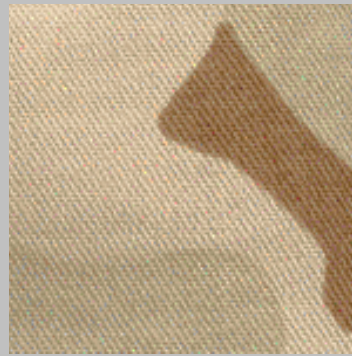
UNIFORM CAMOUFLAGE PATTERNS

(2) Desert and Urban

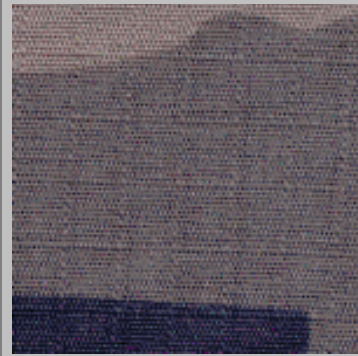
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(USMC & USN REENACTORS ASSOCIATION)



Desert
(6-color)



Desert
(3-color)



Urban "T"
(not officially adopted)

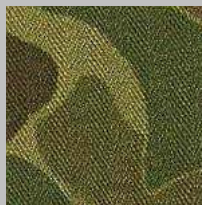
UNIFORM CAMOUFLAGE PATTERNS

(3) Jungle and Woodland

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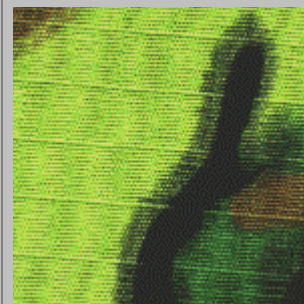
Jungle Green



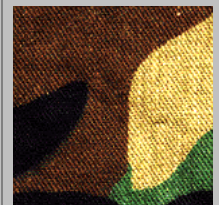
Army "Frog"
reversible side
1



USMC "Frog"
reversible side 1



"Early" ERDL



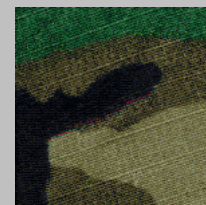
**Woodland -
twill**



Army "Frog"
reversible side
2



USMC "Frog"
reversible side 2



"Late" ERDL



**Woodland -
ripstop**

MASKING - A COVER technique that conceals characteristics, such as CAMOUFLAGE or electronic measures to make an operation invisible.

MASKIROVKA - A set of processes designed to mislead, confuse, and interfere with accurate data collection regarding all areas of plans, objectives, strengths, and weaknesses (of a force organization or nation). Also called SOVIET MASKIROVKA.

MASQUERADER - A person who obtains and uses authorized user access privileges (e.g., user names and passwords) to enter a system and then, posing as that user, attacks the system. NOTE: Masqueraders are usually persons outside the penetrated organization. See also BLACK-HAT HACKER, MISFEASOR.

MASSIVELY PARALLEL COMPUTER - A computer capable of simultaneous operations among multiple processing elements.

MAST-MOUNTED SENSOR (MMS) - An integrated, precise, multi-sensor, electro-optical sighting system. Designed for shipboard use, the MMS employs a thermal imaging sensor, a thermally stabilized laser range-finder designator, a digital scan converter that has freeze frame and electronic zoom, and a FORWARD LOOKING INFRARED SENSOR (FLIR). See also NON HULL-PENETRATING PERISCOPE (NPP).

NOTE: The MMS can be used for search and rescue, naval gunfire support, mine detection, IDENTIFICATION, FRIEND-OR-FOE (IFF), as an aircraft landing assistance device, and a navigation tool.

MATCHED FIELD PROCESSING - A technique for processing ocean acoustic data to estimate the location of sources of acoustic energy.

MATERIALS INTELLIGENCE - The collection, processing, and scientific analysis of gas, liquid, or solid samples.

NOTES: **(1)** Materials intelligence is critical for determining nuclear, chemical, and biological warfare threats. It is also important for analyzing military and civil manufacturing activities, public health concerns, and environmental problems. Samples are collected by both automatic equipment, such as air samplers, and directly by humans with access to areas of interest. Samples, once collected, may be rapidly characterized or undergo extensive forensic laboratory analysis to determine the identity and characteristics of the sources of the samples. **(2)** Materials intelligence is encompassed under MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT).

MATERIALS TECHNOLOGY - In the military context, technology relating to materials that provide specific military advantage, covering the physical properties, mechanical properties, behavior, and/or processing required to achieve that advantage. The technology includes materials engineered to defeat an enemy threat and functional materials needed to preserve the capability of high-performance hardware in daily operations. The MILITARILY CRITICAL TECHNOLOGIES

LIST (MCTL) identifies the categories of materials technology listed in the table below:

<u>CATEGORIES OF MATERIALS TECHNOLOGY</u>
Anti-Armor Materials
Armor Materials
Biomaterials
Electrical Materials
Magnetic Materials
Optical Materials
Special Function Materials
Structural Materials

MAXIMUM USABLE FREQUENCY (MUF) - The highest frequency of radio waves that can be used between two points under specified conditions for reliable transmission by reflection from the regular layers of the IONOSPHERE.

MEACONING - A system of receiving radio beacon signals and re-broadcasting them on the same frequency to confuse navigation. The meaconing stations cause inaccurate bearings to be obtained by aircraft or ground stations.

MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT)
 - Scientific and technical intelligence information obtained by quantitative and qualitative analysis of data (metric, angle, spatial, wavelength, time dependence, modulation, plasma, and HYDROMAGNETICS) derived from specific technical sensors for the purpose of identifying any distinctive features associated with the source, emitter, or sender and to facilitate subsequent identification and/or measurement of the same. See also SIGNALS INTELLIGENCE (SIGINT).

NOTE: MASINT includes the components listed in the following table:

<u>MEASUREMENT AND SIGNATURES INTELLIGENCE (MASINT)</u>	
ACOUSTIC INTELLIGENCE (ACINT or ACOUSTINT)	DIRECTED ENERGY WEAPONS INTELLIGENCE (DEWINT)
ELECTRO-OPTICAL INTELLIGENCE (ELECTRO-OPTINT) INFRARED INTELLIGENCE (IRINT)	LASER INTELLIGENCE (LASINT)
MATERIALS INTELLIGENCE CHEMICAL AND BIOLOGICAL INTELLIGENCE (CBINT) EFFLUENT/DEBRIS COLLECTION	NUCLEAR INTELLIGENCE (NUCINT)
RADAR INTELLIGENCE (RADINT)	RADIO FREQUENCY/ELECTROMAGNETIC PULSE INTELLIGENCE (RF/EMPINT)
SPECTROSCOPIC INTELLIGENCE	UNINTENTIONAL RADIATION INTELLIGENCE (RINT)

MEASUREMENTS OF POLLUTION IN THE TROPOSPHERE

(MOPITT) - A satellite system which measures carbon monoxide and methane in the troposphere using correlation spectroscopy with pressure modulated and length modulated gas cells. See also CERES and MISR.

MECHANICAL-THERMAL NOISE - In

MICROELECTROMECHANICAL SYSTEMS (MEMS), the noise component of the output signal that is primarily due to the random, temperature- dependent motion of gas molecules striking the microstructures and imparting mechanical forces that are indistinguishable from the inertial forces that the sensor is designed to measure.

MECHATRONICS - The optimal integration of mechanical, electronic and computer systems in order to create high precision products and manufacturing processes.

NOTE: A mechatronic system might combines electronic, mechanical, and computing components such as automatic cameras, miniature disk drives, CD players, camcorders, VCRs, etc. As an interdisciplinary subject it has now evolved to incorporate optical, communication, and information technologies. In particular, optical sensing and data processing technologies are being integrated, at an accelerated rate, into mechatronic systems because these optical based technologies provide components for high precision, rapid information processing, and smart functions.

MEDIUM EXTENDED AIR-DEFENSE SYSTEM (MEADS) - A system of missile launchers, ground radars, and sensors to track hostile targets. The system, intended to replace the aging HAWK and PATRIOT missile systems, contains multiple communications links and a high resistance to jamming.

NOTES: **(1)** MEADS, transportable on five-ton trucks, can be flown to the theater of operations in a variety of aircraft, including the C-130 and C-160. **(2)** MEADS is a co-developmental program involving the U.S., Germany and Italy. It is a highly mobile ground-based terminal defense system that will be able to engage theater ballistic missiles, large-caliber rockets, cruise missiles and aircraft. Current (2002) plans involve using the PAC-3 interceptor that will provide 360 degrees of protection for joint maneuver forces. [Source: MDA website: <http://www.acq.osd.mil/bmdo/bmdolink/>]

MEDUSA - A countermeasures concept that entails detection and identification of a radiating threat signal, followed by immediate deployment of an appropriate response.

MELIOS - Acronym for **Mini Eye-safe Laser Infrared Observation Set**. It is a hand-held LASER rangefinder/compass used for target location and fire direction. MELIOS can range to a distance of nearly 10 km with an accuracy of +/- 5 meters.

MEMORY CARD - A subgroup of the SMART CARD, or INTEGRATED CIRCUIT CARD group. Memory cards are further subdivided into free access and secure access categories. The former have variable storage capacities, are reusable and have service functions that involve frequently changed data. Secure access memory cards, on the other hand, include non-reusable (or paid reusable) read/write functions. See also MICROPROCESSOR CARD.

NOTE: Examples of free access cards include portable files and electronic marketing memory cards. Examples of secure access cards include pay-per-view television cards, identification cards, and subscriber cards.

MERCHANT INTELLIGENCE (MERINT) - In intelligence handling, communication instructions for reporting by merchant vessels of vital intelligence sightings.

MESH NETWORK - A high-level network used to connect widely separated wireless routers that can't "see" each other [*e.g.*, limited to line of sight (LOS)]. It essentially consists of a network of intermediate points, called AIRHEADs, which can be seen by their respective networks, called AIRHOODs.

NOTE: In an Internet mesh network, the airheads are connected to a distribution point called a "backhaul aggregation point," which in turn is connected (backhauled) to the Internet service provider.

MESICOPTER - A centimeter-size electric helicopter designed to stay airborne while carrying its own power supply.



NOTE: Successful constrained tests of a 4-rotor mesicopter demonstrated the basic feasibility of the design and manufacturing concepts.

MESOSCALE ELECTRONIC DEVICE - An electronic component or device that straddles the size range between conventional microelectronics (submicron range) and traditional surface mount components (10-mm range).

NOTE: This size range is particularly important to the military, wireless communications, and medical communities.

METAL EMBRITTLEMENT - The use of agents, which severely weaken metals by chemically changing their molecular structure. They are clear, leave imperceptible residue, can attack almost any metal, and can be applied with a felt tip pen.

METAL OXIDE VARISTOR (MOV) - A semiconducting device that conducts at high voltages. MOVs typically are used in overload protection circuits. See also NUCLEAR ELECTROMAGNETIC PULSE COUNTERMEASURES (NEMPCM).

METEOR BURST COMMUNICATIONS - A method of communications involving the reflection of bursts of high frequency (HF) or very high frequency (VHF) radio waves off the transient ionized trails of free electrons left by meteors.

NOTE: Billions of meteor trails are laid down 50 to 65 miles above the Earth's surface daily. Effective communication ranges are from 150 to 1,200 miles. Meteor burst communications have low probability of intercept and are relatively unaffected by nuclear weapon effects and solar flares.

MICRO AIR VEHICLE (MAV) - A miniature UNMANNED AIR VEHICLE (UAV) used for intelligence, surveillance and reconnaissance, and ELECTRONIC WARFARE (EW) applications. MAVs do not exceed six inches in any direction, fly up to six miles and travel at 40-50 miles per hour. Mission endurance ranges between 20 minutes to two hours. Also called MINIATURE AIR VEHICLE, MICRO UAV. See also FLY ON THE WALL, MICROMECHANICAL FLYING INSECT (MFI).

NOTE: A possible mission involves the landing of a radar-jamming payload directly on an enemy's radar. The tiny payload will take advantage of the very low power needed to jam radars at such short ranges. The concept of operation is to carry the MAV within several kilometers of the target, either by individual soldiers or a larger UAV. After launch, the MAV will fly autonomously and, due to its small size and quiet propulsion system, discreetly to its target, landing on it unnoticed. Another example of the MAV is the Army's Quick Look, which is fired from a 155mm howitzer, flying out up to 50 km to acquire and transmit targeting information such as video and GPS data back to the delivery platform via a wireless Sensor-to-Shooter link.

MICROCHAIN - A microscopic silicon chain used to rotate multiple micro drive shafts, microcamera shutters, and other devices in micro-electromechanical systems (MEMS). NOTE: A microchain is much like the leather drive belt used in 19th-century textile mills to power multiple sewing machines, quilling machines, etc.

MICROCODE - A symbolic representation of a MICROPROGRAM.

MICRODOT - A greatly-reduced photograph which can be pasted, say, over a period text character in an otherwise innocuous document. NOTE: The microdot is an early (WW II) example of STEGANOGRAPHY.

MICROELECTRICAL MECHANICAL SYSTEM (MEMS) - See MICROELECTROMECHANICAL SYSTEM.

MICROELECTROMECHANICAL SYSTEM (MEMS) - A micrometerized system that can sense the environment and then act on this sensor information using mechanical actuators. Also called MICROELECTRICAL MECHANICAL SYSTEM.

NOTE: An example of the use of MEMS (1995) is on the leading edge of aircraft wings to control boundary-layer turbulence. Vortices form around the wing as it rips a path through the atmosphere. Because boundary-layer thickness decreases as air speed increases, at high speeds, the turbulent layer over a wing may be only a few microns thick. MEMS are used to employ micron-sized flaps for controlling the formation of these vortices. Other applications include gyroscopes, compact lasers, optical sensors,

internal surgery devices, miniature computer disk drives and wrist-watches. See also ARTIFICIAL EYELID.

MICROENCAPSULATED HEALING AGENT - See AUTONOMIC HEALING

MICROGRAVITY TECHNOLOGY - Technology employing the properties of matter and laws of nature, which manifest themselves in the absence of gravity. [Adapted from an NRL description of Microgravity Research].

MICROMACHINING - Techniques used to fabricate MICROELECTROMECHANICAL SYSTEMs (MEMS) such as accelerometers and angular gyroscopes.

MICROMECHANICAL FLYING INSECT (MFI) - A paper-clip sized mechanical flying robot to be used in search and rescue (SAR) missions, mine detection, and (presumably) covert operations. See also MICRO AIR VEHICLE (MAV), FLY ON THE WALL.

MICROMETER - See MICRON.

MICROMIRROR - A MICROELECTROMECHANICAL SYSTEM (MEMS) consisting of tiny mirrors that can be moved by electrostatic forces.

NOTE: In one application, the mirrors, 100 μ m on a side, are used to steer infrared light into an infrared detector.

MICRON - The millionth part of a meter (micrometer).

MICROPHONICS - Changes in electrical characteristics of a device traceable to mechanical vibration, it causes the vibration waveform to appear in the device's output signal - hence it is a type of NOISE.

MICROPROCESSOR CARD - A subgroup of the SMART CARD group. Microprocessor cards use an operating system that provides high-level security and flexible access to advanced functions such as cryptography algorithm, memory and secret code management. See also MEMORY CARD.

MICROPROGRAM - A sequence of elementary instructions that correspond to a computer operation, is maintained in special storage, and whose execution is initiated by the introduction of a computer instruction into an instruction register of a computer. NOTE: Microprograms are often used in place of hard-wired logic.

MICRO-ROCKET - A device employed by some space MICROELECTROMECHANICAL SYSTEMs (MEMS). It consists of digital thrusters arranged in an array of chambers holding one shot of propellant each. A heater element detonates a chamber, resulting in a standard amount of thrust. Also called MICROROCKET, MICRO ROCKET.

NOTES: **(1)** The effectiveness of a rocket engine relates to the amount of thrust it generates relative to its own weight; for example the space shuttle's main engine produces a thrust-to-weight ratio of 70. Some microrockets have achieved a ratio exceeding 80. **(2)** The term "microrocket" also refers to the so-called "match-stick rocket", a home-made rocket sometimes demonstrated in science classes. The rocket is made by wrapping a piece of aluminum foil tightly around a match head; a tiny exhaust channel is then formed using a pin to create a tunnel between the foil and the match from the edge of the foil to the head. When complete, the device is placed on a suitable launcher (e.g., bent paper clip) and then heat is applied to the foil-covered head with a flame, causing the rocket to ignite. (CAUTION: THIS CAN BE A DANGEROUS OPERATION).

MICROSCAN RECEIVER - A receiver which can scan a frequency band several orders of magnitude faster than would be possible with conventional scanning super-heterodyne receivers. Synonymous with COMPRESSIVE RECEIVER and MICROSWEEP RECEIVER.

MICROSTRIP ANTENNA - A type of CONFORMAL ANTENNA, consisting of a sandwich of two parallel conducting layers separated by a single thin dielectric substrate. The lower conductor functions as a ground plane, and the upper conductor may be a dipole or a monolithically (*i.e.*, contained in the same layer) printed array of patches or dipoles and the associated feed network.

Synonymous with MICROSTRIP DEVICE. Contrast with STRIPLINE DEVICE.

See also BROADBAND MICROSTRIP ANTENNA, DOUBLY-CONFORMAL ANTENNA, CONFORMAL ANTENNA, SHARED-APERTURE ANTENNA, CONFORMAL ANTENNA ARRAY.

MICROSWEEP RECEIVER - See MICROSCAN RECEIVER.

MICROTAGGANT - Microscopic - about 44 microns in size - identification particles used to invisibly mark products such as explosive materials, toxic waste, equipment, labels, adhesives, etc. Each particle is a "sandwich" of layers forming a unique color code combination. The particles are mixed with the material to be identified.

NOTE: Microtaggants can be used to identify explosive residue after detonation has occurred.

MICRO UAV - See MICRO AIR VEHICLE.

MICROVIA - A VIA (electrical path) that is less than 0.1 mm in diameter between two layers of a circuit board structure. See also RESIN-COATED COPPER (RCC).

MICROWAVE LIGHTCRAFT - A lens-shaped launch vehicle for delivering payloads to orbit using power transmitted via microwaves, beamed from either a ground station or an orbiting solar power satellite to the lightcraft. The energy received breaks air molecules into the plasma and the magnetohydrodynamic fanjet

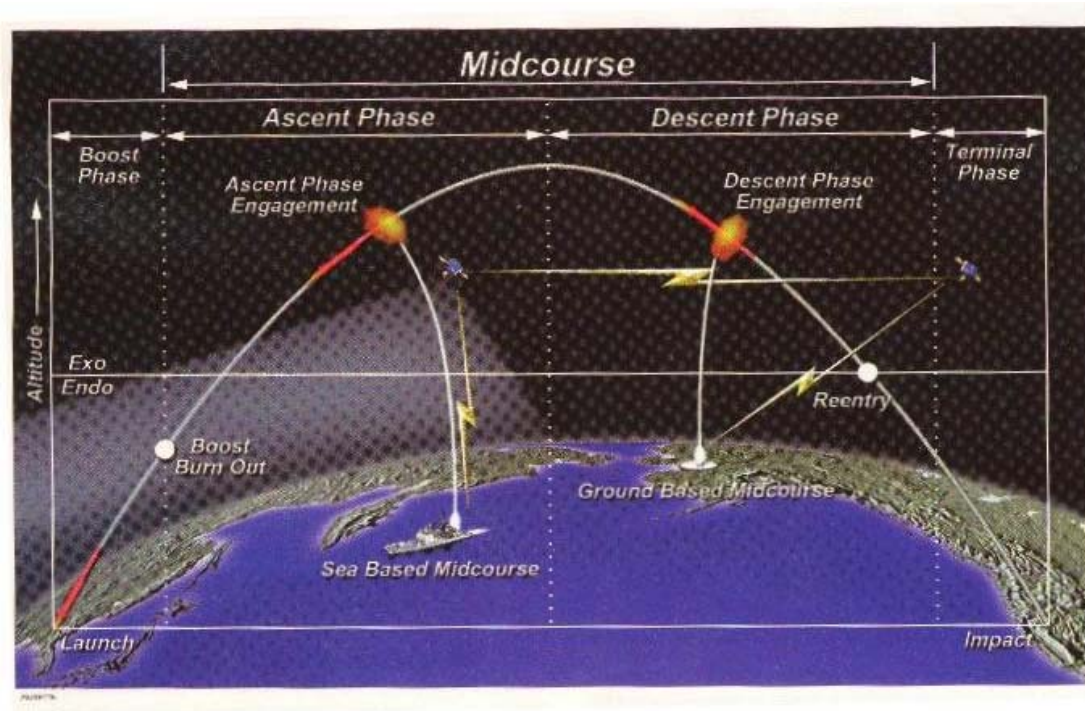
provides the lifting force. Only a small amount of propellant is required for circulation, attitude control and de-orbit. The airship part is a pressurized helium balloon-type structure made of advanced silicon carbide film (transparent to microwaves) to make the craft partly buoyant and to provide for a large parabolic reflector for the energy beamed from space. The craft would be encircled by two superconducting magnet rings and a series of ion engines, and topped with solar cells. At launch, the Lightcraft would use electricity from its solar cells (at night, the power would come from an infrared space-based laser) to ionize the air and move the craft through electrostatic discharges. The craft could move at 80 to 160 km/h (50-100 mph). This propulsion would be used to climb out to a good altitude and beyond the speed of sound where it would switch to the magnetohydrodynamic drive (MHD). Now the craft tilts from flying edgewise to flying flat into the air stream. The microwaves are reflected forward to create a superheated bubble of air above the craft, forming an air spike that acts as the nose cone as the Lightcraft accelerates to 25 times the speed of sound. This air spike provides the aerodynamics to a vehicle that does not look like it would be able fly in that attitude. When the load is properly balanced the craft sails through the air without leaving a shock wave and virtually no supersonic wake. Water is used by the craft to cool the RECTENNAs and as a propellant in the last stages of ascent. [Source: from Riding the Highways of Light website: http://science.msfc.nasa.gov/newhome/headlines/prop16apr99_1.htm]

NOTE: The hyper-energetic performance of the lightcraft will require that the crew ride in liquid-filled escape pods to protect them from g-forces greater than even fighter pilots occasionally endure. In some Air Force Space Command schemes, the crew would breath an oxygenated fluid to protect their lungs.

MIDCOURSE GUIDANCE - The guidance applied to a missile between termination of the boost phase and the start of the terminal phase of flight.

NOTE: The midcourse guidance phase is partitioned into the Ascent Phase and the Descent Phase.

MISSILE PHASES



Source: U.S. NAVAL INSTITUTE PROCEEDINGS, January 2003, page 69

MID INFRARED - The portion of the infrared spectrum band between 3.00 and 6.00 microns. Synonymous with MID WAVE INFRARED.

See also ELECTRO-OPTIC, NEAR INFRARED, FAR INFRARED, EXTREME INFRARED. NOTE: Mid infrared sensors can detect hot exhaust plumes.

MID INFRARED ADVANCED CHEMICAL LASER (MIRACL) - A DIRECTED ENERGY WEAPON (DEW) in the megawatt-class power regime at a 3.9 micron average operating wavelength intended for use against supersonic and subsonic targets, such as cruise missiles. See also HIGH-ENERGY LASER WEAPON SYSTEM (HELWEPS).

MID-LEVEL NETWORK - The second level of the INTERNET hierarchy. They are the TRANSIT NETWORKS which connect the STUB NETWORKS to the BACKBONE networks. See also NETWORK.

MID WAVE INFRARED - See MID INFRARED.

MILITARILY CRITICAL TECHNOLOGY (MCT) - A technology that DoD assesses, in support of the Joint Chiefs of Staff (JCS) objectives, as critical to the development, production and use of military capabilities of significant value to potential adversaries. The MCTL process is the systematic ongoing assessment and analyses of technologies to determine which technologies are Militarily Critical. The Militarily Critical Technologies Lists (MCTL) for four periods are shown in the table below: (the list for 2000 is identical with that for 1999 with the exception that Materials and Marine Systems have swapped positions in the list)

<u>MILITARILY CRITICAL TECHNOLOGY AREAS</u>			
1991	1993	1996	1999
ING PROPULSION	CHEMICAL AND BIOLOGICAL SYSTEMS	AERONAUTICS SYSTEMS	AERONAUTICS SYS
LOGY	COMPUTERS	ARMAMENT & ENERGETIC MATERIALS	ARMAMENT & ENER MATERIALS
MATERIALS	DIRECTED ENERGY (DE) AND KINETIC ENERGY (KE) SYSTEMS	CHEMICAL & BIOLOGICAL SYSTEMS	CHEMICAL AND BIO SYSTEMS
ONAL FLUID	ELECTRONICS	DIRECTED AND KINETIC ENERGY	DIRECTED & KINET SYSTEMS
ON	INDUSTRIAL PRODUCTION	ELECTRONICS	ELECTRONICS
MANUFACTURING	LASER, OPTICS, AND POWER SYSTEMS	GROUND SYSTEMS	GROUND SYSTEMS
GY DENSITY (HEDM)	MARINE SYSTEMS	GUIDANCE, NAVIGATION, & VEHICLE CONTROL	GUIDANCE, NAVIGA VEHICLE CONTROL
FORMANCE G	MATERIALS	INFORMATION SYSTEMS	INFORMATION SYS
OCITY PROJECTILES N	MUNITIONS DEVICES AND ENERGETIC MATERIALS	INFORMATION WARFARE	INFORMATION WAR
CE/ROBOTICS	NAVIGATION GUIDANCE AND VEHICLE CONTROL	MANUFACTURING & FABRICATION	MANUFACTURING & FABRICATION
NSORS	NUCLEAR-RELATED TECHNOLOGY	MARINE SYSTEMS	MARINE SYSTEMS
S	PROPULSION AND VEHICULAR SYSTEMS	MATERIALS	IMATERIALS
VER	SENSORS AND ELECTRONIC COMBAT	NUCLEAR SYSTEMS	NUCLEAR SYSTEMS
UCTORS/MICRO-C CIRCUITRY	SURVIVABILITY AND HARDENING	POWER SYSTEMS	POWER SYSTEMS
RADARS	TELECOMMUNICATIONS	SENSORS & LASERS	SENSORS & LASERS
IMAGE PROCESSING		SIGNATURE CONTROL	SIGNATURE CONTR
CONTROL		SPACE SYSTEMS	SPACE SYSTEMS
N & MODELING		WEAPONS EFFECTS AND COUNTERMEASURES	WEAPONS EFFECTS COUNTERMEASURE
ENGINEERING			
STEM ENT			

NOTES: **(1)** Technologies are selected for inclusion in the MCTL through deliberation and consensus of working groups of technical experts from Government, Industry and Academia. **(2)** For more recent and comprehensive information, visit the Defense Technical Information Center (DTIC) Militarily Critical Technologies List web page.

MILITARY CAPABILITY - The ability to achieve a specified wartime objective. It includes four major components: **(1)** FORCE STRUCTURE, **(2)** MODERNIZATION, **(3)** READINESS, and **(4)** SUSTAINABILITY.

MILITARY DECEPTION - Actions executed to mislead foreign decision-makers, causing them to derive and accept desired appreciations of military capabilities, intentions, operations, or other activities that evoke foreign actions that contribute to the originator's objectives.

There are three categories of military deception: **(a)** STRATEGIC MILITARY DECEPTION, **(b)** TACTICAL MILITARY DECEPTION, and **(c)** DEPARTMENT/SERVICE MILITARY DECEPTION.

NOTE: Military deception is a part of offensive information operations.

MILITARY INTEGRATED INTELLIGENCE DATA SYSTEM/ INTEGRATED DATA BASE (MIIDS/ IDB) - The Military Intelligence Integrated Data System (MIIDS) Program provides order-of-battle and installation/facility data to military intelligence users (national, theater, and tactical) through an architecture designed to better assist decision-makers in planning for and executing their missions in peace, crisis, and wartime scenarios. The cornerstone of the MIIDS Program is the Integrated Data Base, which structures this intelligence in terms of units, equipment, installations/ facilities and locations tied together with relational data sets that address attributes of these relationships.

MILITARY NET - See GHILLIE SUIT.

MILITARY OPERATIONS ON URBANIZED TERRAIN (MOUT) - Military operations in the urban battlespace. NOTE: MOUT seeks to achieve military objectives with minimum casualties and collateral damage.

MILITARY REQUIREMENT - An established need justifying the timely allocation of resources to achieve a capability to accomplish approved military objectives, missions, or tasks. See also OPERATIONAL REQUIREMENT, TOP LEVEL WARFARE REQUIREMENT.

MILLIMETER WAVE (MMW) - Radio frequencies in the range from 30 to 300 GHz.

MILLIMETER-WAVE CAMERA - A camera capable of measuring the time delay and intensity of millimeter-wave energy that radiates naturally from living beings and inanimate objects.

NOTE: Millimeter-wave cameras can be used for "remote frisking" to detect weapons or drugs carried by persons. This is because at millimeter wavelengths, people are good emitters, while metals are very poor emitters. Dielectric objects, such as plastics, ceramics and powdered drugs are somewhere in-between. Clothing and building materials such as wallboard, on the other hand, are virtually transparent.

MILLIMETER-WAVE PROJECTOR - A NONLETHAL WEAPON which consists of a microwave antenna able to transmit a narrow beam of microwaves that rapidly heats up the surface layer of the skin, prompting targets to flee.

MILLION THEORETICAL OPERATIONS PER SECOND

(MTOPS) - A measure of performance used by the U.S. government and cooperating countries in determining whether a computer can be exported abroad to certain countries that might use it for nuclear arms development.

MIME - Acronym for Multipurpose Internet Mail Extensions. MIME defines the standard ways of packaging one or more separate objects into a message so that any compliant mail system can use it. It specifies how to encode and encapsulate non-text attachments, such as voice and animation, to e-mail.

NOTE: The full definition of MIME is described in the following REQUEST FOR COMMENTS: RFC 1521 and RFC 1522. MIME is fully described at website: <http://www.cis.ohio-state.edu/cgi-bin/rfc/rfc1522.html>.

MIMICKING - A DECEPTION technique involving the use of one thing imitating another, such as a fighter mimicking a bomber to lure enemy fighters.

MINE CLEARING LINE CHARGE (MICLIC) - A rocket projected explosive line charge (350 feet long, containing 5 pounds per linear foot of C-4 explosive), which provides a close-in breaching capability for maneuver forces. When detonated, MICLIC provides a lane 8 meters wide by 100 meters long. [*U.S. Army*]

MINE COUNTERMEASURES (MCM) - Techniques and tactics for detecting, classifying, and neutralizing land mines and sea mines.

NOTE: Mine countermeasures may be partitioned into ORGANIC MCM SYSTEMS (tactical in nature) and DEDICATED MCM SYSTEMS (theater or strategic assets).

<u>MINE COUNTERMEASURES</u>			
NOTE: This is neither an official nor a comprehensive listing			
LAND MINES		SEA MINES	
<i>Detection</i>	<i>Clearing</i>	<i>Detection</i>	<i>Clearing</i>

ATAMIDS	Air-chisel mine clearing	ALMDS	ALISS
Chemical residue detector	Clausen Power Blade	Imagery techniques	AMNS
Dogs & other animals	Directed-energy devices	LRS	BZA
Electromagnetic Induction Detector	ESMB	Magnetic Gradiometer	DET
Genetically-improved bees and other insects	ESMC	LMRS	Joint Amphibious Mine Clearance system
GPR	Mine roller	MMS	Line Charge
Imagery techniques	Miniature shaped-charge arrays	MNS	Mission Package
Laser Doppler vibrometer	Pasotron	MUDSS	MNS
NQR	Water-jet mine clearing	OASIS	MNV
Nuclear residue detector	Wattenburg Plow	RMS	Pasotron
VMMD		Sea mammals	RAMICS
Water jet erosion		SQUID	SABRE
		STIL	SZA
		TVSS	VTDP compound helo
		VTDP compound helo	Water Hammer
			Water-jet mine clearing

<u>OTHER LAND-MINE DETECTION TECHNOLOGIES</u>	
TECHNOLOGY	OPERATING PRINCIPLE
Acoustic/seismic	Examines acoustic waves reflected by mines
Biological (dogs, bees, bacteria)	Living organisms react to explosives vapors
Electrochemical	Measure changes in electrical resistance
Infrared (IR)	Measures heat differences in the soil
Neutron	Induces radiation emissions from the explosive's atomic nuclei
Piezoelectric	Measures the shift in resonant frequency of various materials exposed to explosives vapors

MINEFIELD BELT - A minefield consisting of a line of mines, from 60 to 150 meters in width, used to protect a border or perimeter. It may be enclosed with concertina wire reinforced with engineer stakes. Also called OBSTACLE BELT.

MINE-NEUTRALIZATION SYSTEM (MNS) - A system consisting of shipboard consoles and a remotely-operated electro-hydraulic submersible MINE-NEUTRALIZATION VEHICLE (MNV) equipped with a low-light TV camera, high-resolution SONAR, and the ability to deliver several types of explosive charges, or MISSION PACKAGES to neutralize all types of maritime mines.

MINE-NEUTRALIZATION VEHICLE (MNV) - An underwater vehicle (UV) guided by commands from the launch ship via an umbilical cable to maneuver close to suspected mines in order to make positive identification. It may then engage an identified mine by deploying an appropriate MISSION PACKAGE.

MINE RECONNAISSANCE SYSTEM - See LONG-TERM MINE RECONNAISSANCE SYSTEM (LMRS).

MINE ROLLER - A heavy (multi-ton) device attached to the front of a tank and rolled over the ground to detonate mines before they reach the first BOGEY WHEEL. It is used to clear large sections of land.

NOTE: A World War II (and perhaps earlier) forerunner of the mine roller was a chain-flail device mounted on the front of a tank. When activated, it resembled a

street-sweeper with "bristles" of chain lengths flailing the ground in front of the vehicle to detonate land mines.

MINIATURE AIR-LAUNCHED DECOY (MALD) - An airborne decoy system designed to generate a radar return of any Air Force tactical aircraft. The MALD's electronics can present an enemy radar system with a signal return indicating the presence of an aircraft.

NOTES: MALDs are equipped with signature augmentation subsystems that can actively expand the vehicle's RADAR CROSS SECTION (RCS) to portray a tactical fighter to the enemy radar system.

MALDs may be employed as follows: **(1)** Tactical combat aircraft can launch the decoy in the heat of battle to protect themselves against enemy radar-guided missiles. **(2)** Air defense suppression aircraft could employ the decoy in a WILD WEASEL application to trick ground-based enemy systems into betraying their radar locations. **(3)** Stand-off aircraft can launch large numbers of decoys to fool an adversary into diverting scarce air defense assets against a phantom large attack force.

MINIATURE AIR VEHICLE (MAV) - See MICRO AIR VEHICLE.

MINI EYE-SAFE LASER INFRARED OBSERVATION SET (MELIOS) - See MELIOS.

MINIMIZE - A condition wherein normal message and telephone traffic is drastically reduced in order that messages connected with an actual or simulated emergency shall not be delayed. NOTE: MINIMIZE is also referred to as the "reduction and control of information transfer in an emergency."

MINIMUM ESSENTIAL INFORMATION INFRASTRUCTURE (MEII) - The minimum mixture of U.S. information systems, procedures, laws, and tax incentives necessary to ensure the nation's continued functioning, even in the face of a sophisticated strategic INFORMATION WARFARE (IW) attack.

MINOR LOBE - Any radiation lobe except a MAJOR LOBE. See also BACK LOBE, SIDE LOBE.

MIRRORED MEMORY - See REFLECTED MEMORY.

MISFEASOR - An authorized user for a system who gains additional but unauthorized access to system resources or otherwise misuses existing privileges and authority (*e.g.*, falsifying records, embezzling money) Contrast with HACKER, MASQUERADER.

MISSILE APPROACH WARNING SYSTEM (MAWS) - A system used to detect and provide warning of approaching missiles. MAWS may be partitioned into ACTIVE MAWS and PASSIVE MAWS.

MISSILE HEIGHT TARGET (MHT) - An aircraft-towed target, which simulates a sea-skimming missile for live-fire and tracking exercises.

MISSILE MAGNET - An appellation for the TOWED DECOY because the decoy lures missiles to itself.

MISSILE RELEASE LINE - The line at which an attacking aircraft could launch an air-to-surface missile against a specific target.

MISSILE WARNING DEVICE - A device that detects and warns of missile-related threat signals, such as missile guidance radar signals, CW illumination, and active missile seeker signals.

MISSION - **(1)** The task, together with the purpose, which clearly indicates the action to be taken and the reason therefore. **(2)** In common usage, especially when applied to lower military units, a duty assigned to an individual or unit; a task. **(3)** The dispatching of one or more aircraft to accomplish one particular task.

MISSION PACKAGE - In anti-mine operations, one of the following devices carried by a MINE-NEUTRALIZATION VEHICLE (MNV): **(1)** an explosive cutter to cut a moored mine's cable, allowing it to rise to the surface; **(2)** an explosive bomblet charge to neutralize a bottom mine; and **(3)** a buoyant explosive charge attached to a mine-mooring cable to render the mine inert.

MISSION-RECONFIGURABLE UNMANNED UNDERSEA VEHICLE (MRUUV) - A system (approximately 21 inches in diameter, and 2,800 lbs. weight) designed to be launched from a Virginia-class or Los Angeles-class attack submarine (SSN) for clandestine intelligence collection, surveillance, and reconnaissance (ISR), as well as mine neutralization and tactical ocean survey.

MISSION-RESPONSIVE ORDNANCE - Ordnance containing computer-controlled, microminiaturized detonators integrated into the explosive material that can control the timing, magnitude, shape, and lethal area of the ordnance, thus changing its blast and fragmentation pattern depending on the target.

MISSION SUCCESS CRITERIA (MSC) - A set of measurable quantitative thresholds relating to mission performance. Each of these thresholds must be attained or exceeded for the related mission to be considered successful.

MISSION SUPPORT - A mission area in which dedicated EW or tactical cryptologic program (TCP) platforms and systems provide counter-surveillance and threat warning, or disruption, of enemy C3 systems in support of other platforms. See also SELF-PROTECTION.

MIXED SEEKER TECHNIQUES - ECCM techniques, which employ two or more types of SEEKERS on missiles.

MOBILE COMPUTER CORE (MCC) - (2000) A battery-operated dual-speed (300 MHz and 800 MHz), roughly a 3/4 x 3 x 5" 9-ounce computer with a 10 GB hard drive, 3-D graphics chip, voice and handwriting recognition and 128 MB of RAM. It is suitable for carrying by individuals in the field.

NOTE: MCC may be employed with other devices such as GPS, helmet-mounted displays, watch displays, etc. One application is the downloading of thermal images from, say, a helicopter in order to pinpoint a target in an urban area.

MOBILE ELECTRONIC WARFARE SUPPORT SYSTEM

(MEWSS) - A system of electronic jammers and related EW systems mounted on an armored chassis, designed to support fast-moving Marine units.

MOBILE ANALYTICAL LABORATORY SYSTEM (MALS) - A mobile system designed to provide rapid on-site analysis of chemical, biological or nuclear contaminants to a controlling Weapons of Mass Destruction Civil Support Team (WMD-CST).

MOBILE TACTICAL HIGH ENERGY LASER (MTHL) - A battlefield weapon designed to destroy cruise missiles, UNMANNED AIR VEHICLES (UAVs), very-short-range ballistic missiles, mortar shells, ground- and air-launched rockets and artillery projectiles. MTHL employs a steady-state deuterium-fluoride (DF) LASER beam that suffers very little absorption in the atmosphere to destroy its targets.

NOTE: The MTHL laser optics employ very low-absorption optical coatings, eliminating the need for unwieldy active cooling systems.

MOBILE UNDERWATER DEBRIS SURVEY SYSTEM (MUDSS) -

An ELECTRO-OPTIC LASER system designed to hunt mines and other underwater debris. It produces high resolution images that allow searchers to find, identify and locate items on the ocean floor. MUDSS comprises two sensing devices: a SYNTHETIC APERTURE SONAR (SAS) and a LASER LINESCAN SONAR, which are housed in a torpedo-like underwater vehicle designed to be towed behind a ship over the search area. The submersible has wings by which its attitude and the depth of its search run are controlled. Information recorded by the sensors is transmitted to the surface where it is fed into a computer, producing near real-time detailed images.

MOBILE USER OBJECTIVE SYSTEM (MUOS) - An integrated combat connectivity communications system scheduled (2003) to enter service in 2009. It comprises a space segment, groundstations and mobile user terminals. The satellites will provide unprotected, narrowband UHF communications capable of reaching handheld devices under adverse signal and weather conditions.

NOTE: MUOS is to replace the UHF Follow-On (UFO) satellite communications system.

MOBILITY KILL Vehicle stoppage without affecting the vehicle's ability to employ its weapons.

MODERNIZATION - The component of MILITARY CAPABILITY that relates to technical sophistication of forces, units, weapon systems, and equipment.

MODULAR CROWD CONTROL MUNITION (MCCM) - A NONLETHAL WEAPON system which utilizes materials that produce a shock effect consisting of appropriate levels of light intensity, sound intensity, and percussion at a range of up to 50 meters.

NOTE: The modular crowd control munition, intended to disperse crowd, produces a flash bang and delivers about 600 rubber balls that will not penetrate the body. It resembles the lethal claymore mine used extensively in Vietnam.

MODULAR PACK MINE SYSTEM (MOPMS) - A system which forms an INTELLIGENT MINE FIELD (IMF) by deploying SMART MINES which can be controlled by means of a hand-held remote control radio unit. Theoretically, the user is able to turn off the minefield to allow friendly forces to pass through it, and then turn it on again to entrap or harass the enemy.

MODULAR ROBOT - A robot comprised of interconnecting re-configurable modules which, together, perform the overall function desired of the robot.

NOTE: Re-configurability, for example, allows certain robots to automatically change shape and mode of locomotion (*e.g.*, roll like a tank tread, climb stairs, slither like a snake, climb like a caterpillar, and walk like a spider) in order to proceed over varying terrains.

MODULAR WEAPON - A weapon which is loaded (*e.g.* on a helicopter) to meet specific weapon requirements. Contrast with ORGANIC WEAPON.

MODULATED HOT LAMP - An infrared power source which is mechanically or electronically modulated, and is used for jamming infrared missiles. Examples are alkali metal vapor lamps, silicon carbide lamps, and rubidium-filled lamps.

MODULATED MULTIPLE FREQUENCY REPEATER - A FUZE JAMMING technique that simulates the Doppler shift needed to trigger a Doppler fuze.

MODULATED RETROREFLECTOR - An optical mirror device which always reflects light back to its source (*i.e.*, RETROREFLECTION), as in a base station to an UNMANNED AERIAL VEHICLE (UAV) or satellite.

MODULATING SIGNAL - See MODULATION.

MODULATION - A variation in the AMPLITUDE, FREQUENCY, or phase of a WAVE (called a CARRIER) in accordance with some signal called a

MODULATING SIGNAL. For additional discussion, click the website:
<http://ewhdbks.mugu.navy.mil/modulate.htm>

MOLECULAR ELECTRONICS - Electronics components and circuits made from molecular-sized building blocks. These blocks are designed to self-assemble into a circuit or device much in the same way that biological molecules self-assemble into cells, tissues, and organs. One of these potential electronic building blocks is the carbon NANOTUBE, which can have diameters as small as one nanometer (10^{-6} meters). See also BUCKY TUBE, ROTAXANE.

MOLNIYA ORBIT - A highly elliptic 12-hour orbit named for the Russian communications satellites (COMSATS) which use it.

NOTE: A Molniya orbit has a constant ground track and is an alternative to GEOSYNCHRONOUS orbits (*e.g.*, for RF weapons.)

MONITORING - (1) The act of listening, carrying out SURVEILLANCE on, and/or recording the emissions of one's own or allied forces for the purposes of maintaining and improving procedural standards and security, or for reference, as applicable. (2) The act of listening, carrying out surveillance on, and/or recording of enemy emissions for intelligence purposes.

MONITOR MODE - See PROMISCUOUS MODE.

MONOCYCLE RADAR - See IMPULSE RADAR.

MONOPULSE - A radar technique in which information concerning the angular location of a source or target is obtained by comparison of signals received in two or more simultaneous antenna beams, as distinguished from techniques such as lobe switching or conical scanning in which the beams are generated sequentially. Synonymous with SIMULTANEOUS LOBING. NOTE: The simultaneity of the monopulse beams makes it possible to obtain a two-dimensional angle estimate from a single pulse (hence the name monopulse), although multiple pulses are usually employed to improve the accuracy of the estimate or to provide Doppler resolution. The monopulse principle can be used with CONTINUOUS WAVE RADAR as well as PULSED RADAR.

MONOPULSE ANGLE JAMMING INTEGRATED

COUNTERMEASURES (MAJIC) - A system intended to counter certain air-defense tracking radars, thus preventing missile launch, and MONOPULSE radar guided missiles using angle jamming techniques such as CROSS-EYE (X-EYE) and CROSS-POLARIZATION (X-POL).

MONOPULSE ESM SYSTEM - An ESM system which provides instantaneous emitter direction on a single pulse. The ANGLE OF ARRIVAL is determined by comparing amplitude, phase, or both from two or more antenna apertures.

MONOPULSE JAMMING - ECM techniques used against monopulse radars.

MONOSTATIC RADAR - A radar for which both transmitter and receiver are collocated. Contrast with BISTATIC RADAR.

MOONLIGHT MAZE - A term assigned to the investigation of cyber security threats from HACKERS [more accurately, CRACKERS] to DoD networks overseas. See also SOLAR SUNRISE.

MOORE'S LAW - With respect to memory chips, the trend (observed by Gordon Moore in 1965) that each new chip generation contains about twice as much capacity as its predecessor, and is released within 18-24 months of the previous chip. The result is that computing power rises exponentially over relatively brief periods of time.

"MORE ELECTRIC" AIRPLANE - A future airplane in which on-board hydraulics, pneumatics, and mechanical systems will be minimized. These systems will be replaced by miniaturized, high-power, solid stated switches and electric actuators.

NOTE: The following are some of the innovations anticipated for the "More Electric" airplane: Electric-driven accessories; environmental control system; solid-state power controllers; electric driven flight actuators; electric anti-icers; electric actuated brakes; fault-tolerant solid-state electrical distribution system.

MORPHING AIRCRAFT STRUCTURE (MAS) - An adaptable, time-variant air frame capable of in-flight changes in geometry to influence aerodynamic performance. Also called MORPHING AIRPLANE.

NOTES: (1) An aircraft with MAS will be capable of changing critical physical characteristics in flight, thus allowing it to achieve multiple mission profiles. (2) MAS is a result of Continuous Moldline Technology (CMT), an innovative structural concept that utilizes highly flexible materials to enable in-flight modification of airframe geometry.

MOTE - See SMART DUST.

MOUNTED COOPERATIVE TARGET IDENTIFICATION SYSTEM (MCTIS) - A lightweight system comprising a TRANSPONDER, transceiver, processor, and antennas that communicate with one another so that a weapon system with MCTIS, say a tank, locking onto a target equipped with a MCTIS transponder will receive a signal from the target identifying it as a friendly unit.

MOUSE - A small hand-held device used in place of a keyboard to enter commands into a computer.

MOUSETRAP - A World War II era stand-off anti-submarine weapons consisting of a small array of jet-assisted explosive-filled projectiles (*e.g.*, 4) to be launched simultaneously at a target submarine. These were installed on certain frigates and smaller sub-hunters. As with the HEDGEHOG (HH), mousetrap ordnance was designed to detonate only upon impact with the submarine.

MOVEMENT TRACKING SYSTEM (MTS) - A two-way digital position and communication system utilizing GPS for movement control and route planning of military vehicles and cargo.

MOVING TARGET INDICATION (MTI) - A technique that enhances the detection and display of moving radar targets by suppressing fixed targets, such as land features and chaff.

MOZILLA - An open-source web browser designed for standards compliance, performance and portability.

MRX - A low-power molecule disrupter weapon which it was claimed (1994) to be capable of destroying any specific type of molecule without affecting any other type of molecule.

NOTE: The Russians reportedly developed a similar type device called "Elipton"

MULTI-ADAPTABLE NIGHT TACTICAL IMAGING SYSTEM (MANTIS) - A hand-held pocket scope that can be used for direct observation or as a night weapon sight using its INFRARED (IR) LASER. The IR laser beam can be used to covertly mark targets for air strikes, and can be adjusted by the user from a pinpoint size to a "floodlight" thirty degrees to augment night vision operations. [Information from: a Night Vision Equipment Company product description]

MULTI-ANGLE IMAGING SPECTRORADIOMETER (MISR) - A satellite system which measures top-of-atmosphere, cloud and surface angular REFLECTANCE functions, and measures surface Bidirectional Reflectance Distribution Functions (BRDF), aerosol, and vegetation properties using four spectral bands in each of nine PUSHBROOM IMAGING cameras oriented at different angles along-track. [NASA] See also CERES and MOPITT.

MULTIBAND IMAGING RADAR - A SYNTHETIC APERTURE RADAR having the ability to detect small objects in all weather conditions. Its high-resolution capability is due to the use of motion to synthesize the aperture of a radar antenna.

MULTIBAND LASER SENSOR SYSTEM - A suite of LASER devices used to inspect and model target components. Different frequencies of electromagnetic energy vary in their ability to penetrate materials. For a particular material, radiation at one frequency may be reflected by the surface, while another will penetrate the material. By employing laser devices over a wide frequency range,

a complete internal and external inspection of a structure can be made. [USAF 2025 Study]

NOTE: This tool can be used for nondestructive inspection of components, target VULNERABILITY analysis, TARGET IDENTIFICATION, decoy rejection, and reconnaissance.

MULTI-CLOUD DECOY - A DECOY designed to protect ships from INFRARED missiles. It consists of a false target, which may be floating, some distance from the protected ship to lure incoming missiles.

MULTICOLOR SPECTRAL PROCESSING - A method of discriminating between various sources of optical or IR wavelengths, allowing a sensor to distinguish targets from background or clutter. The sensor employs two detectors with differing wavelength responses to view the same pixel in object space. By comparing relative signal magnitude in both bands simultaneously, the target can be distinguished from clutter and background signals.

MULTICONE ANTENNA - A PHASED ARRAY ANTENNA that permits the use of multiple parallel time-synchronized transmit and receive modules to continually "watch" independent conical sectors of space.

MULTIFUNCTION ELECTROMAGNETIC RADIATING

SYSTEM (MERS) - A multifunction stealthy antenna system intended (1997) to replace a multitude of shipboard antennas with a single, low-observable structure. MERS combines four functions: UHF communications, Joint Tactical Information Distribution System (JTIDS), IDENTIFICATION FRIEND-OR-FOE (IFF), and the Combat DF V/UHF receive and direction-finding system.

MULTIFUNCTION STARING SENSOR SUITE (MFS³) - A modular, reconfigurable system utilizing sensor fusion and multiple advanced sensor components including staring infrared arrays, multifunction laser, and acoustic arrays. The MFS³ provides ground vehicles, amphibious assault vehicles, and surface ships with a compact, affordable sensor suite for long range non-cooperative target identification, low signature target acquisition, mortar/sniper fire location, and air defense targeting against low signature UAVs and long range helicopters.

MULTILINK POINT-TO-POINT PROTOCOL - A network protocol for handling simultaneous communications between computers over multiple independent links, thus increasing the effective communications bandwidth, and hence speed. Also called MULTILINK PPP.

MULTIMISSION MARITIME AIRCRAFT (MMA) - A U.S. Navy maritime patrol aircraft able to perform armed intelligence, surveillance and reconnaissance, anti-submarine warfare (ASW) and anti-surface warfare (ASUW) missions. It is a planned replacement (2000) for the EP-3E and P-3C aircraft.

MULTIMISSION MOBILE PROCESSOR (M³P) - A transportable ground station designed to meet the early warning, command and control (C²) and battlefield awareness needs of future expeditionary forces by providing leaders with REAL TIME data from orbiting reconnaissance satellites.

MULTIMODE FUZING - A fuze counter-countermeasure requiring the signals from two or more modes to be consistent in order to trigger the fuze.

NOTE: Examples of multimode fuzing are Doppler fuzes operating at two frequencies, and fuzes that measure both range and range rate.

MULTIPATH - Reference to a signal reaching a point (e.g., a receiver) via two or more paths.

MULTIPATH ERROR - With respect to the Global Positioning System (GPS), the result of the contamination of GPS signals by delayed versions of these same signals. These delayed, degrading signals are received by the GPS antenna from reflective surfaces near the antenna location, and introduces NOISE into the received GPS signals.

MULTIPLE BAND JAMMING - Jamming on two or more frequency bands simultaneously.

MULTIPLE EVENT FUZE - A fuze designed to trigger multiple munitions functions, such as detonating a blast-fragmentation warhead to tear open an installation, and then igniting a FUEL AIR EXPLOSIVE (FAE) charge to incinerate its contents. See also THERMOBARIC WEAPON.

MULTIPLE FREQUENCY REPEATER (MFR) JAMMING - See FALSE DOPPLER TARGET (FDT) JAMMING.

MULTIPLE INTEGRATED LASER ENGAGEMENT SYSTEM (MILES) - A training system for providing integrated training. It allows for direct fire force-on-force (individuals and vehicles) using eye safe LASER "bullets." Each individual and vehicle in the training exercise has a detection system to sense hits and perform casualty assessment. The laser transmitters, attached to each individual and vehicle weapon system, accurately replicate actual ranges and lethality of the specific weapon systems. MILES includes an After Action Review (AAR) feature to record and assess the performance of the units and engagements.

NOTE: Upgrades to MILES use laser pulses to transmit weapon information to a target. The pulses are transmitted each time a weapon is fired; information in the pulses include the player ID and the type of weapon used. The target entity processes the information to produce a casualty assessment - for an individual soldier, the casualty assessment produces a state of *killed* or *wounded*. The casualty assessment for a mobile weapon system can produce several outcomes: *catastrophic kill*, *mobility kill*, and *communication kill*.

MULTIPROCESSING - The simultaneous execution of two or more programs or sequences of instructions by a computer NETWORK consisting of two or more processors. See also PARALLEL PROCESSING, PROCESSOR FARM.

MULTIPURPOSE INTERNET MAIL EXTENSIONS (MIME) - See MIME.

MULTIPURPOSE SECURITY & SURVEILLANCE MISSION PLATFORM (MSSMP) - A distributed network of remote sensors mounted on vertical-takeoff-and-landing (VTOL) mobility platforms and portable control stations. The system is designed to provide a rapidly deployable, extended-range surveillance capability for a wide variety of security operations and other tactical missions.

MULTISENSOR DATA FUSION - An engineering discipline used to combine data from multiple and diverse sensors and sources in order to make inferences about events, activities, and situations. Also called DISTRIBUTED SENSING.

NOTE: Data-fusion technology has been applied to military applications such as battlefield surveillance and tactical situation assessment, and in commercial applications such as robotics, manufacturing, medical diagnosis, and remote sensing. [*ibid*]

MULTISENSOR INTEGRATION - See DATA FUSION.

MULTISOURCE CORRELATION - See DATA FUSION.

MULTISPECTRAL IMAGING SENSOR - A sensor which is capable of simultaneous or serial acquisition of imaging data from two or more discrete spectral bands. See also HYPERSPECTRAL IMAGING SENSOR.

MULTISPECTRAL OBSCURATION - The use of obscurants in several spectra, such as the generation of smoke and graphite-based compositions that can screen in the visual, IR and MMW ranges.

MULTISPECTRAL SIGNATURE CONTROL - Any combination of two or more of the following SIGNATURE CONTROL techniques that can reduce the basic signatures in each category: ACOUSTICS SIGNATURE CONTROL, INFRARED SIGNATURE CONTROL, LASER SIGNATURE CONTROL, MAGNETIC SIGNATURE CONTROL, OPTICAL SIGNATURE CONTROL, and RADIO FREQUENCY (RF) SIGNATURE CONTROL.

MULTI-SPECTRAL TARGETING SYSTEM (MTS) - A system comprising ELECTRO-OPTICAL and INFRARED sensors plus a LASER DESIGNATOR that allows remote operators to search for, identify and then designate hostile targets for precision-guided weapons.

MULTITECHNOLOGY AUTOMATED READER CARD (MARC)

- A "smart card" which it intended to be carried by individual soldiers, and which will handle six different functions (1995):

1. Preparation for overseas movement and mobilization;
2. Manifesting onto aircraft;
3. Peacetime medical care;
4. Field medical care;
5. Food service; and
6. Transportation.

Functions 1, 2, and 6 are managed by an embedded chip; functions 3 and 5 by a BAR CODE, and function 5 by a magnetic stripe. Security is handled through use of a personal identification number (PIN).

MULTIWARHEAD TOMAHAWK - An advanced version of the Tomahawk Land Attack Missile (TLAM), armed with seven warheads rather than one. Under a project (*ca* 2003) titled Multiple Responsive Ordnance (MRO) the Tomahawk could be fitted with seven independent warheads, each with its own guidance system and capable of acting independently or together as a single weapon. For example, the TLAM could release some of its payload to attack targets of opportunity while enroute to a site programmed in its memory.

<u>MULTIWARHEAD TOMAHAWK FEATURES</u>			
UNITARY MODE	AREA MODE	DISTRIBUTED MODE	INTEGRAL CHARGE
Single target Proximity, impact, delay fuzes Blast & fragmentation	Single target area Controlled pattern Simultaneous kills	Small discrete targets Multiple- dispense points Multiple kills per missile	All Warheads Dispensed Warhead in missile Target penetration followed by warhead blast

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NANCY HANKS - A voice radio code word alerting the recipient(s) that signals via INFRARED light are about to be sent.

NOTE: This normally occurs for communications among ships in formation within visual distance, or among ships in a port.

NANOBOT - A molecular-size robot, such as that being developed for use in medical inoculations.

NANOELECTRONICS - Integrated circuit devices having dimensions into the submicron (less than 10K Angstrom) regions.

NANOMETER - One billionth of a meter (about one fifty-thousandth the diameter of a human hair)

NANOPHASE MATERIAL - Material used in devices with dimensionality in the order of nanometers (10^{-9} meter).

NANOSATELLITE (NANOSAT) - A small, relatively inexpensive satellite, so-called because of its ability to maintain position relative to another satellite within nanometer tolerance. In one configuration, the NANOSAT is octagonal-shaped measuring 16 inches across and 8 inches in height.

NOTE: Various agencies are funding (1999) a collaboration of universities and other agencies in the development of nanosatellite projects.

NANOSCIENCE - The study of the performance of structures, materials, and devices with ultra-small - but controllable - features in the tens of angstroms range (nanoscale structures). See also BIOMIMETICS, SMART STRUCTURES.

NOTE: Nanoscale structures can be constructed in two ways - ATOMIC-LEVEL MANUFACTURING and SELF-ASSEMBLY.

NANOSECOND - One billionth of a second.

NANOTECHNOLOGY-ENHANCED CLOTHING - Military uniform clothing embedded with both hard (exterior) and soft (interior) body armors, and containing a variety of nanomaterials that will aid threat detection and neutralization, enhance human performance, provide REAL-TIME automated medical treatment and reduce logistical footprint on the battlefield. Also called BATTLE SUIT. See also ELECTRO-OPTIC TEXTILE, OBJECTIVE FORCE WARRIOR (OFW).

NOTE: Many features are envisioned (2002) for the battle suit: Sensors placed a key areas of the battle suit could indicate soldier's status - whether they are awake, timed or injured - and monitor physiological conditions such as blood pressure, pulse and temperature. If a soldier has been injured, a system would communicate where and

how badly. Additionally, the soft suit would be designed to become rigid in the appropriate area to act as a splint for a broken bone. The battle suit would also have an exoskeleton which could make a wearer's muscles more effective, allowing longer leaps, etc.

NANOTRANSISTOR - A transistor measuring only 60 nanometers, or about 16 times thinner than a human hair. One of its key characteristics is a layer of insulation between a gate and a source and drain that measures only 1.2 nanometers thick - the equivalent of three atoms.

NANOTUBE - See BUCKY TUBE

NANOWIRE - Nanometer-scale rods made of semiconducting materials.

NOTE: One application is the room-temperature nanowire ultraviolet laser.

NAP-OF-THE-EARTH FLIGHT - See TERRAIN FLIGHT.

NARROWBAND INTERLEAVED SEARCH AND TRACK (NBILST) - An aircraft radar mode in which the radar is used only to provide precise range and velocity data to set up a missile attack.

NARROWBAND JAMMING - Jamming where the jammer's entire power output is concentrated in a very narrow bandwidth, ideally identical to that of the victim radar. Two RF carriers are transmitted with a few hertz difference. Synonymous with SPOT NOISE JAMMING.

NARROWBAND NOISE - In acoustics, the tonal sounds generally produced by machinery in well-defined and narrow frequency bands useful for both detection and identification. Contrast with BROADBAND NOISE.

NAVAL SPACE SURVEILLANCE SYSTEM (NAVSPASUR) - See SPASUR.

NAVIGATION COUNTERMEASURES (NAVCM) - The detection and evaluation of enemy electronic aids to navigation, and the use of jamming and deception to interfere with enemy use of such aids.

NAVIGATION WARFARE (NAVWAR) - A subset of ELECTRONIC WARFARE (EW), NAVWAR is an environment in which:

- friendly forces maintain their ability to use satellite navigation,
- satellite navigation is denied to hostile users, and
- there is no effect upon civilian applications.

See also GLOBAL POSITIONING SYSTEM (GPS).

NAVY FIRES NETWORK (NFN) - A Strike Warfare (STW) Command and Control (C²) architecture for the Navy to provide quick targeting and strike capability. It is related to the Army's TACTICAL EXPLOITATION SYSTEM (TES) and the Navy's Littoral Surveillance System (LSS).

NAVY-WIDE INTRANET (NWI) - A secure digital-communication network internal to the Navy. See also NETWORK-CENTRIC WARFARE (NCW)

NEAR INFRARED - The portion of the infrared spectrum band between 0.75 and 3.00 microns. See also ELECTRO-OPTIC, MID INFRARED, FAR INFRARED, EXTREME INFRARED.

NOTE: Near infrared sensors can detect hot engine parts.

NEAR REAL TIME (NRT) - Delay caused by automated processing and display between the occurrence of an event and the reception of the data at some other location. See also REAL TIME.

NEARSAT - See SPACE MINE

NEAR-TERM MINE RECONNAISSANCE SYSTEM (NMRS) - A covert mine-detection system that ranges from deep water (DW) to shallow water (SW). NMRS consists of an UNMANNED UNDERWATER VEHICLE (UUV) about the size of the Mk 48 torpedo. NRMS is launched from a 688-class submarine's torpedo tube but remain tethered to the submarine via a fiber-optic link, which can extend out several miles. Using an onboard inertial unit to navigate, the NRMS uses a multibeam, forward-looking active sonar to detect moored and bottom objects and a side-scanning HF sonar to classify them. Data are relayed to an operator console in the submarine. See also LITTORAL REMOTE SENSING (LRS). See also LONG-TERM MINE RECONNAISSANCE SYSTEM (LMRS).

NEGATIVE CONTRAST - Detection of the absence of light, such as what is observed when looking at an eclipse of the sun.

NEMESIS - See NEW MILLENNIUM ELECTRONIC SURVEILLANCE INTERFACE SUITE.

NETWORK - With respect to computers, a data communications system, which interconnects computer systems at various sites. [10:2736]

NETWORK-BASED INTRUSION DETECTION - A type of INTRUSION DETECTION that examines network data to detect HACKERS. See also ACTIVE NETWORK INTRUSION DEFENSE (ANID), ANOMALY DETECTION, HOST-BASED INTRUSION DETECTION, PORT SCAN, SIGNATURE DETECTION.

NETWORK CENTRIC OPERATIONS (NCO) - A set of assets, balanced in their design and acquisition so as to be integrated with one another, operating

together effectively as one complete system to accomplish a mission. The assets so assembled encompass naval force combat, support, and Command, Control, Communications, Computers, and Intelligence and Surveillance and Reconnaissance (C⁴ISR) elements and subsystems, integrated into an operational and combat network.

NETWORK-CENTRIC WARFARE (NCW) - The linkage of existing sensors, command-and-control (C²) systems, and weapon shooters.

NCW incorporates three interrelated information-exchange grids: **(1)** the sensor grid, **(2)** the C² grid, and **(3)** the shooter grid. All three grids rapidly and reliably exchange sensor data, command decisions, and weapon allocations. The primary goal of NCW is to optimize the exchange of information and commands among these three grids. See also NAVY-WIDE INTRANET

NETWORK EARLY WARNING SYSTEM (NEWS) - An automated method for spotting early indicators of network-based attacks, and by correlating individual network security incidents, can help analysts determine if the site is under a large-scale or coordinated attack.

NOTE: NEWS cues the analyst to early signs of attack and can detect multi-site attacks in their stages. By examining traffic data, NEWS can determine the intended targets of an attack (e.g., an attack signature containing a string such as "CMD.EXE" would indicate the the target is Microsoft Windows).

NEURAL BEAMFORMING - The achievement of direction finding by using NEURAL NETWORK techniques to have the antenna array "learn" the relationship between received antenna radiation and the location of the target emitting (or reflecting) the radiation.

NEURAL COMPUTER - A computational device designed or modified to mimic the behavior of a neuron or a collection of neurons.

NEURAL NETWORK - Computer software intended to mimic the way humans learn and process information.

NOTE: Neural networks do not use algorithms like conventional software, nor do they use sets of IF-THEN rules as do expert systems. Instead, the neural network "learns" by using inputs and the proper corresponding outputs to develop its own mechanism for transforming input data into the correct solution. Neural networks have been used as adaptive filters to reduce interference and noise in voice and digital communications circuits.

NEURO-ELECTROMAGNETIC DEVICE - A NONLETHAL WEAPON which uses radio signals specifically modulated to directly affect the brain and nervous system from a distance. See also VOICE TO SKULL (V2S) DEVICE. Compare with SILENT SOUND DEVICE.

NEUTRAL PARTICLE BEAM (NPB) - A DIRECTED ENERGY WEAPON (DEW) under DoD's WEAPONS SYSTEMS TECHNOLOGIES

(WST). The generation, propagation and control of high intensity atomic beams of hydrogen or its isotopes. [www.dtic.mil]

NOTE: NPBs can produce a range of lethality from SOFT KILL to HARD KILL. See also ANTIMATTER PARTICLE BEAM (APB), CHARGED PARTICLE BEAM (CPB), GAMMA-RAY LASER (GRASER), HIGH POWER MICROWAVE/RADIO FREQUENCY (HPM/RF), and KINETIC ENERGY WEAPON (KEW).

NEUTRALIZE - As pertains to military operations, to render ineffective or unusable. See also EFFECTIVE DAMAGE.

NEW MILLENNIUM ELECTRONIC SURVEILLANCE

INTERFACE SUITE (NEMESIS) - An Airborne Early Warning (AEW) workstation intended (1999) to implement the latest Human-Machine Interface (HMI) technology available, including advanced displays, voice control, and new track management tools that will free the Naval Flight Officer (NFO) from numerous system operations tasks, allowing that person to focus on tactical decision making.

NIGHT EFFECT - An effect mainly caused by variations in the state of polarization of reflected waves, which sometimes result in errors in direction finding bearings. The effect is most frequent at nightfall.

NIGHT TARGETING SYSTEM (NTS) - A helicopter system which provides aircrews with highly stabilized, sharp target images through the use of sophisticated sighting and tracking sensors and a second-generation FORWARD LOOKING INFRARED (FLIR) sight.

NOTE: The NTS-A (advanced NTS) is installed (2000) on Israeli A129 multi-mission helicopters.

NIGHT VISION (NV) - See LIGHT AMPLIFICATION.

NIXIE TUBE - (1) A COLD CATHODE electron tube containing a little neon gas in a glass envelope. The CATHODEs are shaped into numerals, lined up one behind the other, (there is a single anode). Voltage applied to the appropriate pins ionizes the surrounding neon, causing the associated cathode (numeral) to glow.

(2) A set of DIODEs in a glass tube containing a little neon gas. The CATHODEs are shaped into numerals, lined up one behind the other. Voltage applied to the appropriate pins ionizes the surrounding neon, and the numeral seems to glow.

NOTE: "Nixie" is a nickname term for the original appellation of the tube, *i.e.*, "NIX-1," Numeric Indicator Experimental-1.

NODDING IDIOT - A term referring to height-finding radar antennas which oscillate (or "nod") to permit the radar to gather height information.

NOTE: The height-finding function is achieved without nodding-antenna motion in some height-finding and PHASED-ARRAY ANTENNAS which employ LOBE-SWITCHING techniques.

NOISE - An undesired disturbance within the useful frequency band. Contrast with SIGNAL. See also IMPULSE NOISE, RANDOM NOISE, WHITE NOISE.

NOISE FLOOR - A continuous NOISE JAMMING signal that is simultaneously radiated with the principal ECM signal being employed, and of considerably less power.

NOISE ILLUMINATED CHAFF - See JAFF.

NOISE JAMMING - The transmission of a NOISE-like signal in the target system's radar receiver bandpass.

NOTE: At low power levels, noise jamming has the characteristics of receiver noise and can be mistaken by the radar operator as a problem with the radar. The object of noise jamming is to introduce a disturbing signal into the hostile electronic equipment so that the actual signal is obscured by the interference. The victim of this disturbance might be a radar receiver, a communications network or a data link. See also BARRAGE JAMMING, SPOT JAMMING, SPOT NOISE JAMMING.

NOISE RADAR - A RADAR that transmits a random electromagnetic signal with a very wide bandwidth (*e.g.*, several GHz). The received signal is cross-correlated with a delayed copy of the transmitted signal to yield the target information.

NOMEX[®] - A fiber created by DUPONT with an extraordinary combination of high-performance heat- and flame-resistant properties, as well as superior textile characteristics. [DUPONT] See BALACLAVA

NOMINAL FILTER - A filter capable of cutting off a nominated minimum percentage by weight of solid particles greater than a stated micron size.

NON-COHERENT COMMUNICATIONS - Non-coherent communication links employ MODULATION precise reference generation in the receiver. As such, they perform well in channels experiencing FADING, blocking, or DOPPLER EFFECT. A coherent communication link, such as FREQUENCY SHIFT KEYING (FSK), requires a transmitter with a precise carrier frequency and a receiver with circuitry able to reproduce this frequency exactly.

NON-COOPERATIVE TARGET IDENTIFICATION - Target identification that exploits an adversary's identification system. Contrast with COOPERATIVE TARGET IDENTIFICATION. See also INDIRECT TARGET IDENTIFICATION, TARGET IDENTIFICATION.

NON-DESTRUCTIVE ELECTRONIC WARFARE - Those EW actions, not including employment of WARM, that deny, disrupt, or deceive rather than damage or destroy.

NON-DEVELOPMENTAL ITEM (NDI) - A generic term describing either a commercial product or an item, which has been developed and used by another service, country, or government agency. Use of NDI reduces R&D costs and speed up the acquisition process. Synonymous with off-the-shelf item.

NON HULL-PENETRATING PERISCOPE (NPP) - A periscope in which thermal imaging data and very- high-resolution television data are carried to the interior of the submarine or other platform via optical fibers, thus eliminating the necessity for hull penetration of the periscope.

See also MAST-MOUNTED SENSOR, REMOTELY OPERATED PLATFORM - ELECTRONIC, UNDERWATER VIEWING MODULE, UNMANNED UNDERWATER VEHICLE.

NON-LETHAL WEAPON - See NONLETHAL WEAPON.

NONLETHAL WEAPON (NLW) - (1) A warfare concept that emphasizes the preservation of human life and the environment by using advanced electromagnetic, chemical and kinematics technology to destroy and disable warfare systems. The concept includes the use of precision guidance systems to deliver nonlethal weapons through remote-detonation, REMOTELY PILOTED VEHICLES (RPVs), laser guidance and SOLDIER INTEGRATED PROTECTIVE ENSEMBLE (SIPE)-assisted fire-control and target lock-on. Synonymous with HUMANE WEAPON.

(2) The Department of Defense (DoD) defines non-lethal weapons as "weapon systems that are explicitly designed and primarily employed so as to incapacitate personnel or materiel, while minimizing fatalities, permanent injury to personnel, and undesired damage to property and the environment." Also called SUB-LETHAL WEAPON, NON LETHAL WEAPON, LESS-THAN-LETHAL WEAPON.

See also LESS-THAN-LETHAL (LTL) MUNITIONS.

NOTES: Non-lethal weapons are divided into two categories, each with a number of functional areas as follows:

(I) Counter-personnel, with functional areas include (1) Crowd control, (2) Incapacitation of personnel, (3) Area denial to personnel, and (4) Clearing facilities of personnel.

(II) Counter Material, with functional areas include (1) Area denial to vehicles; and (2) Disabling vehicles.

The following table lists examples of nonlethal weapons:

<u>NONLETHAL WEAPONS</u>	
ACOUSTIC BULLETS	ACOUSTIC WEAPONS
ACTIVE DENIAL SYSTEM	AERIAL DIVERSIONARY DEVICE
AMIABILITY AGENTS	ANESTHETICS
ANTI-AIR LASERS	ANTI-MATERIEL CHEMICALS/BIOLOGICALS
ANTI-PERSONNEL ENTANGLEMENTS	ANTI-TRACTION LUBRICANTS
ANTI-PERSONNEL BEAM WEAPON (APBW)	BEAN BAG BATONS
BLINDING LASERS	BLUNT IMPACT MUNITIONS (e.g. SOFT RAG)
BOLOs	BOUNDING NON-LETHAL MUNITION (BNLM)
BURSTING OBSCURANT SMOKE GRENADES	CALMATIVE AGENTS
CARBON FILAMENT BOMB	COMBUSTION ALTERATION
COMBUSTION INTERFERENTS	CONFUSION WEAPONS
COVARC VEHICLE DEFENSE	CROWD-DISPERSAL ROUNDS
DEFERENCE TONES	DELAYED-ACTION AGENTS
DIFFERENCE ACOUSTIC WAVE GENERATION SYSTEM (DAWGS)	DIRECTED STICK RADIATOR (DSR)
DISORIENTATION DEVICES	DRY-ICE WEAPONS
ELECTRICAL STUN DEVICES	ENGINE-DISABLING DEVICES
ENTANGLEMENT MUNITIONS	FLAMELESS EXPULSION GRENADES
FRANGIBLE PROJECTILE	GLARE LASERS
HIGH POWERED ACOUSTIC WEAPONS	ILLUMINATOR GRENADES
INFRASOUND	LIQUID CONDUCTIVE THREAD PROJECTORS

METAL EMBRITTLEMENT	MILLIMETER-WAVE PROJECTOR
MODULAR CROWD CONTROL MUNITIONS (MCCM)	NEURO-ELECTROMAGNETIC DEVICE
NON-NUCLEAR ELECTROMAGNETIC PULSE (NN-EMP)	ODOR BOMB
OVERHEAD CHEMICAL AGENT DISPERSAL SYSTEM (OCADS)	PORTABLE ROADBLOCK
PORTABLE VEHICLE ARRESTING BARRIER (PVAB)	PORTABLE VEHICLE IMMOBILIZING SYSTEM (PVIS)
PULSE-WAVE ^q MYOTRON ^q	PUNCH GUN
RADIO FREQUENCY INCAPACITATING SYSTEMS	RING AIRFOIL GRENADE (RAG)
ROAD PATRIOT/SENTRY/STAR	RUBBER-BALL LAUNCHING SYSTEMS
RUNNING GEAR ENTANGLEMENT SYSTEM (RGES)	SET BEAM HIGH INTENSITY HAND-HELD SEARCHLIGHT
SILENT SOUND DEVICE	SKAT SHELL
SMOKELESS STUN GRENADE	SONIC BULLET
SPONGE GRENADE	STARFLASH STUN GRENADE
STICKY FOAM	STICKY SHOCKER ^q
STING NET	STINGBAG
STINGBALL STUN IMPACT GRENADE	STINGSHOT
STUN DISTRACTION DEVICE	SUPER CAUSTICS
TASERS	TEFLON CONFETTI
THERMAL GUNS	THUNDER ROD STUN GRENADES
THUNDERSTRIP STUN MUNITIONS	VARIABLE VELOCITY RIFLE SYSTEMS (VVRS)
VEHICLE ACTIVE DEFENSE SYSTEMS (VADS)	VEHICLE-DISABLING WEAPON (VDW)

VESSEL STOPPER SYSTEM (VSS)	VOICE SYNTHESIS DEVICES
VOICE TO SKULL (V2K) DEVICES	VORTEX WEAPONS

IMPORTANT NOTE: Despite the term "NONLETHAL WEAPON", such devices are capable of inflicting permanent injury and death, depending upon weapon settings, method of use, the circumstances, and the physical condition of the targeted individuals (TIs) at the time of use.

NON-NUCLEAR ELECTROMAGNETIC PULSE (NN-EMP) - A type of weapon used in NONLETHAL WARFARE which entails the use of explosively-driven NN-EMP generators, bombs, or satellites to destroy computer and communication systems, power systems, and semi-hardened electronic circuitry, including electronic triggers from space or air. See also ELECTROMAGNETIC PULSE.

NONSINUSOIDAL RADAR - See IMPULSE RADAR.

NONSPECIFIC JAMMING AND INTERFERENCE - [ACOUSTIC JAMMING term] The generation of high-intensity, broadband acoustic noise into the water to indiscriminately interfere with all underwater sensors within range.

NON-VOLATILE MEMORY - See NON-VOLATILE RAM.

NON-VOLATILE RAM - RANDOM ACCESS MEMORY (RAM) which can retain information in the absence of power. An example is BUBBLE MEMORY. Contrast with VOLATILE RAM.

NORTH BRIDGE - A circuit in a computer chip which connects the central processing unit (CPU) to the system memory, accelerated graphics port (AGP) and peripheral connect interface BUSSES. Also called NORTHBRIDGE CHIP. Contrast with SOUTH BRIDGE.

NORTH SEEKING MODULE (NSM) - A system component which employs the GLOBAL POSITIONING SYSTEM (GPS) and selects an astronomical body, such as the sun, moon, or a star, as an azimuth reference, and delivers true North to the system. North seeking modules are employed in artillery, target acquisition systems, directional antennas, rocket launchers, etc.

NUCLEAR ELECTROMAGNETIC PULSE (NEMP) - See ELECTROMAGNETIC PULSE (EMP).

NUCLEAR ELECTROMAGNETIC PULSE

COUNTERMEASURES (NEMPCM) - Those measures taken to reduce or eliminate the effects of ELECTROMAGNETIC PULSES (EMPs). These include

SHIELDING, METAL OXIDE VARISTOR (MOV), high-speed ZENER DIODEs, wave-guide beyond cutoff, spark-gap arrestors, filter networks, and fiber-optic circuitry. Although it provides some degree of protection from EMPs, shielding cannot be regarded as an effective countermeasure by itself, especially at high frequencies, where leakage can occur through even the smallest gaps. Drawbacks of using MOVs for EMP suppression include relatively slow response time and a tendency for performance to degrade with each overload. A typical filter network for surge protection is a configuration of capacitor-inductor-capacitor, called a "pi filter" because its schematic resembles the Greek letter: "pi." The pi filter has proven to be an effective countermeasure for threats such as ELECTROMAGNETIC INTERFERENCE (EMI) and low-level EMP. A high-speed Zener diode provides EMP suppression. Since the pi filter protects against EMI, the combination of these two countermeasures at circuit interfaces protects against both frequency and voltage related threats. Wave-guides and spark-gap arrestors represent relatively old protection technologies that generally are not suitable for suppressing NEMP in digital, semiconductor-based devices.

See also SYSTEM-GENERATED ELECTROMAGNETIC PULSE (SGEMP), INDUCED ELECTROMAGNETIC PULSE (IEMP).

NUCLEAR INTELLIGENCE (NUCINT) - Intelligence derived from the collection and analysis of radiation and other effects resulting from radioactive sources.

NOTE: Nuclear Intelligence is a component of MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT).

NUCLEAR QUADRUPOLE RESONANCE (NQR) - A device used to detect land mines and illegal drugs. It emits a radio frequency (RF) pulse, which can disturb the nuclear magnetization of nitrogen-based explosives, such as TNT. The disturbance in the nitrogen nuclei, in turn, produces a characteristic NQR signal, which can be recorded for analysis. The device reacts to the explosive and not to the metal case, shrapnel or other clutter as metal detectors used for de-mining do.

NOTE: NQR may be ineffective against RF-shielded explosives.

NULKA - A hovering DECOY to protect vessels against anti-ship missiles. A tube-launched torpedo-shaped device about seven feet in length and six inches in diameter which, when deployed, hovers like a vertical pole controlled by three jets at the bottom, with a deployed antenna at the top. The decoy is positioned a safe distance from the protected ship and can be made to move horizontally a ship-like speed. A shipboard fire control system determines the optimum position for the decoy. The NULKA contains an ELECTRONIC WARFARE package to lure attacking missiles away from the protected vessel.

NULL STEERING - To control, usually electronically, the direction at which a directional null appears in the radiation pattern of an operational antenna.

O

OBJECTIVE FORCE WARRIOR (OFW) - A program (*circa* 2002) for designing and producing the warfighter's uniform. Starting at the skin, the uniform is built outward, integrating as many functions as possible. Intended to weigh about 50 pounds, the system will include multi-purpose electronics, including goggles that will allow the soldier to see in both the INFRARED and thermal realms, as well as have a HEAD-UP DISPLAY monocle positioned about 1.5 inches from either eye that will produce a virtual 19-inch color monitor of 800 x 600 pixels. A warning system will be incorporated that will react to a trigger squeeze if the weapon is aimed at a friendly soldier. The helmet will incorporate a GLOBAL POSITIONING SYSTEM (GPS), radio, and infrared target designator and locator. The traditional microphone will be replaced by a dime-sized sensor fastened to the head to transmit cranial vibrations to the communications system. System voice control will allow the soldier to control the computer through the microphone. For survivability, the uniform will include vented body armor. Uniform-embedded body sensors will measure the diastolic and systolic blood pressure, resting heart rate, core body temperature and skin temperature – information, which will be relayed to field medics so that they can respond to a wounded soldier. Powered tourniquets will be embedded in sleeves and pant legs, and will be capable of being activated with one hand, and operate in a pulsing motions to allow limited blood flow to the limb.

See also ELECTRO-OPTIC TEXTILE, NANOTECHNOLOGY-ENHANCED CLOTHING.

OBSCURANT - A material used to limit or prevent reconnaissance, surveillance, target acquisition, and weapon guidance. Obscurants may be identified by their impact on the ELECTROMAGNETIC SPECTRUM.

Examples of Obscurants are listed in the table below:

<u>EXAMPLES OF OBSCURANTS</u>		
Conventional (visible)	New (visible/infrared)	Experimental (IR/MMW)
Fog oil	Brass flakes	Carbon fibers
		Metal coated fibers
Diesel fuel	Graphite flakes	Metal coated glass
		Metal microwires
Phosphorous	Titanium oxide	Iron
Hexachloroethane	Terephthalic acid	Polymers

Delivery systems for the above include generators, artillery, smoke pots, mortars, smoke grenades, and rockets.

NOTES: **(1)** Obscurants have the potential to negate the value of high-cost sensor and guidance systems. Examples of obscurants include those produced by large mechanized generators, and those produced by self-protection grenades, such as the BURSTING OBSCURANT SMOKE GRENADE, as well as other devices to defeat sensors through scattering or absorbing in the visual, INFRARED, and MILLIMETER WAVE regions. **(2)** Obscurants can also be used for signaling (Indian smoke signals?) deception, and other uses.

OBSERVABLES - Characteristics of an object or phenomenon by which it can be detected. See also SIGNATURE.

NOTE: Examples of observables are radiations, reflections, magnetic fields, wakes, contrails, pressure anomalies, magnetic anomalies, environmental disturbances, and seismic sources.

OBSTACLE BELT - See MINEFIELD BELT.

OCEAN MARKING - The use of FILM-FORMING POLYMERS to provide an all-weather day and night location marker on the surface of a body of water. The two film-forming compounds are contained in a packet that, when placed in the water, disperses a film that creates a surface having a slick appearance with respect to the surrounding water. The marked area also has a reduced radar BACKSCATTER compared to the surrounding water, and as a result of reduced evaporation, has a warmer surface temperature than the surrounding water. Consequently, the marked area can be detected visually, with radar, and with INFRARED (IR) sensors.

OFF-BOARD COUNTERMEASURES - Countermeasures systems carried by a platform, and deployed (or activated) when under direct attack by the threat. Contrast with ON-BOARD COUNTERMEASURES.

OFFENSIVE AIRCRAFT SURVIVABILITY EQUIPMENT (OASE)

- Equipment including RADAR WARNING RECEIVERS, jammers, laser warning receivers, acoustic detectors, and optical countermeasures used in support of aggressive action.

OFFENSIVE ECCM - ECCM techniques that induce the enemy to use ECM wave-forms or tactics that are helpful to the victim radar.

OFFENSIVE COUNTERSPACE OPERATIONS - That part of COUNTERSPACE OPERATIONS that is intended to destroy or neutralize an adversary's SPACE SYSTEMs or the information they provide, [Information from: Air Force Doctrine Document (AFDD)-1, *Air Force Basic Doctrine*, September 1997, 47]

See also DEFENSIVE COUNTERSPACE OPERATIONS.

OFFENSIVE INFORMATION OPERATIONS - The integrated use of assigned and supporting capabilities and activities, mutually supported by intelligence, to affect [*sic*] adversary decision makers to achieve or promote specific objectives. These capabilities and activities include, but are not limited to, operations security (OPSEC), military deception, psychological operations (PSYOPS), electronic warfare (EW), physical destruction and special information operations, and could include computer network attack (CNA).

ON-BOARD COUNTERMEASURES - Countermeasure systems that are either internal or pod-mounted on the platform, and used against all modes of the threat, including functions that precede direct attack. On-board countermeasures usually encompass a receiver, a processor/ techniques generator, and a transmitter, along with associated antennas.

Contrast with OFF-BOARD COUNTERMEASURES.

ONION ROUTER - A technique for communicating anonymously over the INTERNET in real time. The "onion" is a layered, encrypted set of instructions that establishes the connection between the initiator and recipient. The actual message, also encrypted, is then sent. As the message moves through the Internet, it is successively decrypted, arriving at the recipient as unencrypted text.

ON-THE-MOVE (OTM) - Part of the RADIO ACCESS POINT (RAP) system, OTM is a system of phased array antennas and high capacity trunk radios (HCTRs) installed in a Standard Integrated Command Post (SICP) shelter, which is mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV).

OPEN-LOOP SIMULATION - Simulation in which there is a one-way path from the simulator to the system being tested. Contrast with CLOSED-LOOP SIMULATION.

OPEN SOURCE INFORMATION (OSINT) - See OPEN SOURCE INTELLIGENCE.

OPEN SOURCE INTELLIGENCE (OSINT) - Publicly available information (i.e., any member of the public could lawfully obtain the information by request or observation), as well as other unclassified information that has limited public distribution or access. Also called OPEN SOURCE INFORMATION.

OPEN SYSTEMS INTERCONNECTION (OSI) - A suite of PROTOCOLS constituting the international standard computer NETWORK ARCHITECTURE. See also OSI REFERENCE MODEL.

OPERATION ORDER (OPORDER) - A directive issued by a commander to subordinate commanders for the purpose of effecting the coordinated execution of an operation. See also FRAGMENTARY ORDER (FRAGO).

OPERATIONAL CHARACTERISTICS - Those military characteristics which pertain primarily to the functions to be performed by equipment, either alone or in conjunction with other equipment; e.g., for electronic equipment, operational characteristics include such items as frequency coverage, channeling, type of modulation, and character of emission.

Contrast with TECHNICAL CHARACTERISTICS.

OPERATIONAL CONTROL - Transferable command authority, which may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in Combatant Command (command authority) and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission.

OPERATIONAL COVER - That element of Operational Deception intended to discourage interest in the units of the force and to conceal the true mission, movement, composition, disposition, and capabilities of the force. See also COVER.

OPERATIONAL DATA STORE (ODS) - A database which contains current data being accessed by transactional users. An ODS has little or no historical data and is, therefore, up to date. Compare with DATA WAREHOUSE.

OPERATIONAL DECEPTION - A SPACE AND ELECTRONIC WARFARE (SEW) warfare discipline that begins with diplomatic posturing, ends with technical reinforcement, and includes a multiplicity of actions in between (e.g., cover and security, feint, technical deception).

OPERATIONAL DECEPTION AND COVER (OPDEC) - One of the principal elements of Area Electronic Warfare. Employment of deception measures against the enemy with regard to own force systems, doctrines, tactics, techniques, personnel operations, and other activities. See also COVER AND DECEPTION.

OPERATIONAL ENVIRONMENT - A composite of the conditions, circumstances, and influences, which affect the employment of military forces and bear on the decisions of the unit commander.

OPERATIONAL PARAMETER - A property describing the performance level of a system, defined at a level above system specification, but in sufficient detail to allow a functional architecture and/or system specification to be developed.

OPERATIONAL REQUIREMENT (OR) - An acquisition document consisting of a cover sheet plus 3 pages max and no attachments. An OR is an established need justifying the timely allocation of resources to achieve a capability to accomplish approved military objectives, missions, or tasks. An OR does not contain goals, but contains the following: Program definition; Key capabilities in general terms; Thresholds of performance or readiness parameters; EMC planning and

frequency spectrum assignment; and Cost Summary. See also MILITARY REQUIREMENT.

OPERATIONAL SECURITY - A SPACE AND ELECTRONIC WARFARE (SEW) warfare support discipline that consists of measures taken to minimize hostile knowledge of ongoing and planned military operations. It includes physical security, counterespionage, and personnel security.

OPERATIONAL SETTING - The Operational Environment, level of conflict, ORDER OF BATTLE for both sides, and description of other local military forces and commercial activity.

OPERATIONS SECURITY (OPSEC) - A process of analyzing friendly actions attendant to military operations and other activities to:

- (a) Identify those actions that can be observed by adversary intelligence systems,
- (b) Determine indicators hostile intelligence systems might obtain that could be interpreted or pieced together to derive critical information in time to be useful to adversaries,
- (c) Select and execute measures that eliminate or reduce to an acceptable level the vulnerabilities of friendly actions to adversary exploitation.

See also OPERATIONS SECURITY INDICATORS, OPERATIONS SECURITY VULNERABILITY.

NOTE: Operations security is a part of offensive information operations, and includes communications security (COMSEC), emission control (EMCON), etc.

OPERATIONS SECURITY INDICATORS (OPSEC INDICATORS) - Friendly detectable actions and open-source information that can be interpreted or pieced together by an adversary to derive critical information. See also OPERATIONS SECURITY, OPERATIONS SECURITY VULNERABILITY.

OPERATIONS SECURITY MEASURES - Methods and means to gain and maintain essential secrecy about critical information. The following categories apply: (a) action control, (b) countermeasures, and (c) counter-analysis.

See also OPERATIONS SECURITY VULNERABILITY.

OPERATIONS SECURITY VULNERABILITY - A condition in which friendly actions provide OPSEC INDICATORS that may be obtained and accurately evaluated by an adversary in time to provide a basis for effective adversary decision-making. See also OPERATIONS SECURITY, OPERATIONS SECURITY MEASURES.

OPTICAL COMPUTER - A computer designed or modified to use light to represent data and whose computational logic elements are based on directly-coupled optical devices.

OPTICAL COMPUTING - The utilization of light waves to achieve the interconnects that in conventional computers would be accomplished through wires, traces on PC boards and surface metallization on ICs.

OPTICAL COUNTER-COUNTERMEASURES (OCCM) - That division of INFORMATION WARFARE (IW) involving measures taken to counter OPTICAL COUNTERMEASURES (OCM).

OPTICAL COUNTERMEASURES (OCM) - That division of INFORMATION WARFARE (IW) involving the use of LASERS, remote sensing television, INFRARED (IR) devices, ULTRAVIOLET (UV) sensors, spectrometers, RADIOMETERS, HYPERSPECTRAL devices, MULTISPECTRAL devices, and DECOYS.

OPTICAL CROSS SECTION (OCR) - The measure of radiation at the surface of the object in the ELECTRO-OPTIC (EO) band of interest (between 0.01 and 1,000 nm) emitted or reflected from the object (target) of interest.

OPTICAL MATERIALS - That category of MATERIALS TECHNOLOGY which addresses materials critical to the reliable transmission of electromagnetic radiation to surveillance sensors, weapon guidance systems, or for countermeasures purposes while protecting the associated electronic components from the environment. Optical materials include IR optical materials, IR coating materials for protection against hazardous environments, germanium optics, specialty transparent materials for coating and filters, nonlinear optical (NLO) materials for wavelength conversion, and substrates and optical thin film coatings for high energy laser optical components (e.g., mirrors, beam splitters and windows).

OPTICAL PARAMETRIC OSCILLATOR (OPO) - A crystal which increases the wavelength of an impinging LASER beam (i.e., the frequency decreases). An input laser beam of one-wavelength results in two output beams of longer wavelength. Contrast with DOUBLER and TRIPLER.

OPTICAL POWER - RADIANT POWER in the visible spectrum.

OPTICAL SIGNATURE CONTROL - The employment of materials, electronics, and platform design features intended to reduce the susceptibility of the platform to detection, tracking, and engagement by an adversary using optical sensors. OPTICAL SIGNATURE CONTROL includes the use of passive and active devices, materials, features, or techniques on a platform, such as lighting to reduce or mask contrast with the background, techniques to reduce, hide, or mask emissions that could be signature enhancements such as wake, smoke, contrails, other exhaust products, etc., and active and passive techniques to reduce optical cross section, and re-troreflection of optical and infrared systems.

See also ACOUSTICS SIGNATURE CONTROL, INFRARED SIGNATURE CONTROL, LASER SIGNATURE CONTROL, MAGNETIC SIGNATURE CONTROL, MULTISPECTRAL SIGNATURE CONTROL, RADIO FREQUENCY (RF) SIGNATURE CONTROL, and SIGNATURE CONTROL.

OPTOELECTRONICS (OE)- (1) Devices that respond to optical power, emit or modify optical radiation, or utilize optical radiation for internal operations. ELECTRO-OPTICS is often incorrectly used as a synonym. (2) The study of devices containing both electronic and optical components. Also called OPTO-ELECTRONICS.

NOTE: Example optoelectronic devices are photodiodes and light-emitting diodes (LEDs).

OPTRONIQUE SECTEUR FRONTAL (OSF) SYSTEM - A system used to provide French aircraft with a passive surveillance capability, as well as target-detection-and-identification functions. The OSF system is an optronic, visual and INFRARED (IR) search-and-track system that combines an IR sensor, a charge-coupled-device IMAGER, and an eye-safe LASER RANGEFINDER.

ORANGE FORCES - Those forces used in an enemy role during NATO exercises. See also BLUE FORCES, PURPLE FORCES, RED FORCES.

ORDER OF BATTLE (OOB or ORBAT) - The identification, strength, command structure, and disposition of the personnel, units, and equipment of any military force. See also ELECTRONIC ORDER OF BATTLE.

NOTE: Orders of battle may be specific to certain warfare areas; thus terms such as Air Defense Order of Battle (ADOB), Ground Order of Battle (GOB), and Naval Order of Battle (NOB) may be encountered.

ORGANIC - Assigned to and forming an essential part of a military organization. Organic parts of a unit are those listed in its table of organization for the Army, Air Force, and Marine Corps, and are assigned to the administrative organizations of the operating forces for the Navy.

ORGANIC AIRBORNE AND SURFACE INFLUENCE SWEEP (OASIS) - A helicopter-towed mine countermeasures system.

ORGANIC GMTI RADAR (OGR) - A UHF Ground Moving Target Indicating (GMTI) radar system employing beam processing and multiple receivers connected with fiber-optic links for the detection and tracking of moving vehicles and personnel through foliage.

ORGANIC LIGHT EMITTING DIODE (LED) - A light-emitting device consisting of two layers of organic thin films sandwiched between two conductors. When an electric current is applied, bright, visible light is emitted.

NOTE: Organic LEDs are lightweight, durable, flexible, power efficient, and hence ideal for portable applications and installation on sculptured surfaces (such as automobile dashboards). They need fewer process steps and use fewer and cheaper materials than the conventional LEDs.

ORGANIC WEAPON - A weapon that is required for each sortie. Contrast with MODULAR WEAPON.

ORTHOGONAL POLARIZATION ECCM - An OFFENSIVE ECCM technique in response to CROSS-POLARIZATION JAMMING. The victim radar continues to transmit on its current polarization and tracks on the orthogonal polarization using the jamming signal as a beacon.

ORTHOGONAL SIGNALS - A pair of SIGNALs that (at least theoretically) are considered mutually non-interfering; for example, frequency-modulated signals and amplitude-modulated signals are orthogonal to each other. Thus, orthogonality of signals is relative and not an intrinsic property of a single signal.

OSI REFERENCE MODEL - A seven-LAYER NETWORK ARCHITECTURE model of data communication PROTOCOLS developed by International Organization for Standardization (ISO) and CCITT (Comite Consultatif International de Telegraphique et Telephonique). Each layer specifies particular network functions:

Layer 7: The application layer (the highest layer of the model) defines the way applications interact with the network.

Layer 6: - The presentation layer includes protocols that are part of the operating system and defines how information is formatted for display or printing and how data are encrypted.

Layer 5: - The session layer coordinates communications between systems, maintaining sessions for as long as needed and performs security, logging, and administrative functions.

Layer 4: - The transport layer controls the movement of data between systems, defines protocols for structuring messages, and supervises the validity of transmissions by performing error checking.

Layer 3: - The network layer defines protocols for routing data by opening and maintaining a path on the network between systems to ensure that data arrive at the correct destination node.

Layer 2: - The data-link layer defines the rules for sending and receiving information from one node to another between systems.

Layer 1: - The physical layer (the lowest layer of the model) governs hardware connections and byte-stream encoding for transmission. It is the only layer that involves a physical transfer of information between network nodes.

OTTO FUEL - An odoriferous, reddish-orange oily liquid that used as a fuel for torpedoes and other weapon systems. NOTE: Otto fuel is a mixture of three synthetic substances: propylene glycol dinitrate (the major component), 2-nitrodiphenylamine, and dibutyl sebacate.

OUTBOARD - Acronym for "Organizational Unit Tactical Baseline Operational Area Radio Detection," a countermeasures exploitation system consisting of a direction finder (DF) with the capability to detect, locate, and identify hostile targets at long range. OUTBOARD data are sent directly to the ship's tactical data system. NOTE: OUTBOARD, itself has the acronym "OB."

OUTLAW HAWK - A long-range over-the-horizon (OTH) target detection system for aircraft carriers.

OUTLAW SHARK - A long-range over-the-horizon (OTH) target detection system for submarines.

OVERLAP TELLING - Transferring information to an adjacent facility concerning tracks detected in the adjacent facility's area of responsibility. See also BACK TELLING, CROSS TELLING, FORWARD TELLING, RELATERAL TELLING, TRACK TELLING.

OVERHEAD CHEMICAL AGENT DISPERSAL SYSTEM

(OCADS) - A NONLETHAL WEAPON system which provides a flash-bang effect when the chemical agents are rapidly dispersed. It can be used for crowd control or to provide a remotely generated protective barrier.

OVER-THE-HORIZON RADAR (OTH-R) - A BISTATIC RADAR which utilizes the Earth's ionospheric layer for refracting the transmitted and received radar signals, thus allowing the detection and tracking of targets over the normal RADAR HORIZON.

OVER-THE-HORIZON TARGETING (OTH-T) - Actions taken in order to target systems beyond the line of sight of sensors carried by the weapon platform.

P

P-STATIC - See PRECIPITATION STATIC.

PACK HUNTER - A munition, such as the SENSOR-FUZED WEAPON (SFW), which are comprised of submunitions - themselves containing SKEET warheads that scan the ground with an INFRARED sensors which search for targets upon which to fire a penetrating slug. The submunitions descend by parachute, then fire out the skeets, thus allowing each Sensor-Fused Weapon to cover about a 30-acre area.

PACKET - A group of bits that includes both header information (for routing) and user (payload) data.

PACKET INTERNET GROPER (PING) - A computer software program designed to test and debug NETWORKS or simply to determine if a host is on-line. It sends an echo PACKET to the specified host(s) and awaits a response, reporting success or failure and providing statistics about its operation. See also FINGER.

NOTE: For example, PING can be used to determine how long (round trip) it takes one's computer to connect to a given URL (Web site).

PACKET SNIFFER - A program that can record all network PACKETS traveling past a given network interface, on a given computer, on a network. It can be used to troubleshoot network problems as well as to extract sensitive information. See also SNIFFER.

PACKET SWITCHING - A data transmission process, utilizing addressed PACKETS, whereby a channel is occupied only for the duration of transmission of the packet.

NOTE: A packet may be a complete message, a group of messages, or a part of a message (the balance forming one or more separate packets). Individual packets are routed along the network independently along available paths, and are assembled again at the destination.

PAINT TAG IDENTIFICATION - A method for distinguishing between friendly and enemy platforms. The paint tag identification concept incorporates an undetectable microscopic transponder embedded in specialized, conductive paints. A low power signal emitted from the friendly source activates the transponder for discerning ID, or on the targeted enemy item - for destruction by a homing weapon.

PAINTABLE LIQUID CRYSTAL DISPLAYS - Liquid crystal displays (LCDs) capable of being "painted" on virtually any kind of surface, even flexible-plastic foil and clothing. See also NANOTECHNOLOGY-ENHANCED CLOTHING.

PANORAMIC ANNULAR LENS (PAL) - A sniper detection and location device consisting of a 360-degree imaging system based on a lens called panoramic annular lens.

PARACHUTE-VORTEX ENCOUNTER - A term given to denote a parachute interaction with a trailing wing-tip vortex of an aircraft.

PARALLEL PROCESSING - The simultaneous execution of two or more sequences of instructions or one sequence of instructions operating on two or more sets of data, by a computer having multiple arithmetic and/or logic units. See also MULTIPROCESSING, PROCESSOR FARM.

PARALYSIS COMBAT - Striking at the "vital point" of the enemy's information and support systems in order to paralyze the enemy and collapse his morale.

NOTE: Paralysis Combat is a concept under the PRC Revolution in Military Affairs (RMA).

PARITY - In computer codes, pertaining to a condition in which the number of items in a group is odd or even.

PARTICLE BEAM - Beams of neutral particles such as deuterium or heavy hydrogen at very high particle energies and low currents. The atoms are accelerated through electric fields as negative ions with an extra electron attached, then the electron is stripped off in passage through a gas cell, leaving a beam of neutral atoms.

NOTE: The advantage of the beams as weapons is that their target penetration is so high that it is virtually impossible to shield against them. However, the beams must have very long dwell times on a target to produce lethal depositions of energy.

PASCAL - A high level, general-purposed computer language that is often used for scientific and business programs.

PASOTRON - Plasma-assisted slow-wave oscillator, a small-sized, light weight source for high power, long pulse microwave energy. Considered (in 1992) to be a next-generation device for directed energy applications such as mine clearing, anti-missile defense, anti-aircraft defense, remote jamming, and other directed energy weapons. See also DIRECTED ENERGY DEVICE.

PASSIVE - In surveillance, an adjective applied to actions or equipment, which emit no energy capable of being detected.

PASSIVE AIR DEFENSE - All measures, other than active air defense, taken to minimize the effectiveness of hostile air action. These measures include deception, dispersion and the use of protective construction. See also AIR DEFENSE. Contrast with ACTIVE AIR DEFENSE.

PASSIVE CANCELLATION - A basic technique for reducing RADAR CROSS SECTION by designing the target surface so that the reflected radar signal from a part of the target cancels the reflected radar signal from another part of the target.

Contrast with ACTIVE CANCELLATION. See also RADAR CROSS SECTION REDUCTION; RADAR CAMOUFLAGE.

PASSIVE COHERENT LOCATION (PCL) SYSTEM - An electronic system, developed by the People's Republic of China (PRC), that tracks civilian radio- and TV-broadcast signals, detecting aircraft by analyzing the slight disturbance in the commercial wavelengths caused by their flight.

NOTE: The PCL system is probably capable of detecting stealth aircraft.

COMMENT: Isn't this the same phenomenon discovered over the English Channel that led to the initial discovery of radar by the British?

PASSIVE ECCM - ECCM techniques that neither radiate nor reflect energy.

PASSIVE ELECTRONIC COUNTERMEASURES - That portion of ECM associated with receiving or reflecting of signals. Contrast with ACTIVE ELECTRONIC COUNTERMEASURES. See also PASSIVE EXPENDABLES.

NOTE: Examples of passive ECM devices include radar warning receivers, missile warning receivers, laser detectors, pre-processing systems, and passive expendables.

PASSIVE EXPENDABLES - Air-launched expendables, which maintain aircraft-like signatures. These include SMART CHAFF and aerodynamic devices, which "fly along" with the aircraft.

PASSIVE HOMING GUIDANCE - HOMING GUIDANCE in which the missile or vehicle employs radiation from the target as the guidance signal.

Contrast with ACTIVE HOMING GUIDANCE. See also SEMI-ACTIVE HOMING GUIDANCE.

PASSIVE INFRARED (PIR) SENSOR - An INFRARED sensor which receives radiation. The sensor may be a COHERENT INFRARED SENSOR or an INCOHERENT INFRARED SENSOR. Contrast with ACTIVE INFRARED SENSOR.

NOTE: An example of a PASSIVE INFRARED (PIR) SENSOR is the portable *Hornet* sensor system (U.K., 1999). It reportedly has a range of 100 meters. Any heat source entering the detector's surveillance arc activates a microwave DOPPLER RADAR, which is part of the system. The radar, when activated, emits a 3-second burst of signals. The radar return data are then analyzed against the Hornet's built-in classification library, and the information (target type and bearing) is transmitted to a soldier equipped with a pager.

PASSIVE MILLIMETER WAVE (PMW) IMAGING SYSTEM - A passive imaging system, which can distinguish differences between objects and background temperatures.

NOTES: (1) PMMW imaging systems have the ability to produce images of objects obscured in fog, dust or smoke, which render visual and INFRARED (IR) sensors unusable. (2) PMMW is used in imaging systems designed to detect contraband and stowaways in trucks and other containers.

PASSIVE MISSILE APPROACH WARNING SYSTEM (PMAWS) - An ULTRAVIOLET (UV) -based detector system with a low FALSE ALARM rate having full 360 degree coverage and the ability to compute ANGLE OF ARRIVAL to an accuracy of one degree. Said to be effective against all IR threat missiles, it is intended to perform against all threat missiles. PMAWS has the ability to detect and distinguish threat missiles from surrounding clutter and non-lethal missiles. See also MISSILE WARNING DEVICE.

PASSIVE OPTICAL NETWORK (PON) - A tree-like network in which one fiber leaving a central office and is split to branch to individual customers.

NOTE: A PON can serve, say, 32 customers by passively splitting the light by a factor of four, and then splitting each of these lines again by a factor of eight as they branch out to the individual customers.

PASSIVE REPEATER - A device used to alter the propagation direction (and/or wave front polarization) of radio frequency (RF) signals, such as microwave transmissions. Types of passive repeaters include paired flat - or "billboard" - reflectors and back-to-back antennas. See also SPACE LATTICE PASSIVE REPEATER (SLPR).

PASSIVE SENSOR FOR AIRCRAFT DETECTION (PSAD) - A passive sensor designed to detect, identify, and determine the azimuth of aircraft from their radar emissions.

PASSIVE SURVEILLANCE - Surveillance solely by receive-only techniques, to determine location, direction, range, identification, and transmission parameters (frequency, bandwidth, signal modulation) of possible threats or targets. See also ELECTRONIC WARFARE SUPPORT MEASURES, FERRET RECEIVER.

PATTERN RECOGNITION - The identification of shapes, forms, or configurations by automatic means.

PEACE ENFORCEMENT - Military operations including the use of force to separate belligerents, at a time and with whatever means deemed appropriate by the legal authorities. [*United Nations*] Contrast with PEACEKEEPING.

PEACEFUL PENETRATION - A military strategy based on the idea that heavy artillery, tanks, machine-guns and aircraft should be used to devastate a limited

area of enemy territory. The infantry would then be brought up to occupy and secure the area. The success of peaceful penetration depended on carefully planned co-operation between the various units involved. [Information from the website: Spartacus Schoolnet (U.K.)]

NOTE: The "Peaceful Penetration" strategy was developed by John Monash and the Australian Imperial Force (AIF) on the Western Front during World War I. It was tried out in a series of successful raids across No Man's Land during the summer of 1918 and on a larger scale at the Battle of Le Hamel in July. The strategy was subsequently adopted by other Allied commanders during the autumn of 1918.

PEACEKEEPING - An operation involving military personnel but without enforcement powers, established by the United Nations to help maintain or restore peace in areas of conflict. [*United Nations*] Contrast with PEACE ENFORCEMENT.

PEAKING GENERATOR - An electrical power generator designed to run during peak energy periods when demand for electricity is high or when other power plant units are off line during outages or for repairs.

NOTE: Peak generators can be put into full operation in less than a minute, making them a valuable backup system during outages or emergency situations.

PELTIER DEVICE - a solid-state device that functions as a heat pump. A typical unit is a few millimeters thick by a few millimeters to a few centimeters square. It is a sandwich formed by an array of small Bismuth Telluride cubes ("couples") between two ceramic plates. When a DC current is applied, heat moves from one plate to the other. If the current is reversed then heat moves in the opposite direction. Also called THERMOELECTRIC (TE) MODULE. [Thanks to Steve J. Noll. For more information, visit website: <http://www.peltier-info.com>]

NOTES: **(1)** Heat generated by the device must be removed with a heat sink. **(2)** Peltier devices are best suited for small cooling applications. The "cold" side is commonly used to cool an electronic device, such as a microprocessor or a photodetector. **(3)** A disadvantage of Peltier devices is that they are not yet (2003) efficient and consume relatively large amounts of power. Advantages include: no moving parts, no gas refrigerant, no noise, no vibration, very small size, long life, and a capability for precision temperature control.

PENTIUM - A trademarked name for a P5 or "585" chip. The Pentium consists of more than 3 million transistors that, at 66 MHz, can deliver more than 100 million instructions per second. NOTE: Pentiums with speeds of more than 400 MHz were developed in the late 1990s.

PENTODE - A VACUUM TUBE characterized by five elements: cathode, three grids, and a plate (ANODE). See also DIODE, TETRODE, TRIODE.

PERFORMANCE PARAMETER - (As applied to TLWRs) A quantitative statement giving ranges of values or specified figures accompanied by confidence

intervals for a desired attribute, functional capability, or level of performance to satisfy the related TLWR.

PERIMETR - See DEAD HAND

PERIPHERAL DEVICE - Any computer equipment connected to the central process unit (CPU). NOTE: Disk drives, CRT screen and keyboard all may be built into the same box as the CPU, but technically speaking, they are peripherals.

PERIPHERAL VERTICAL LAUNCH SYSTEM (PVLS) - A Vertical Launch System (VLS) for TOMAHAWK, Sea Sparrow, point defense missiles, etc., installed in small blocks, say of four, along the side of a ship. PVLS is designed in such a way that if the ship were to be damaged by a round - even with sympathetic detonation - the blast would tend to blow out away from the hull, mitigating damage to the ship.

NOTES: **(1)** In present-day (*circa* 2000) ships, VLS magazines may contain 48 or 64 cells with the risk of losing all of the missiles (and the ship) if a single round were to detonate in its cell. **(2)** In addition to anti-air weapons such as the Evolved Sea Sparrow Missile (ESSM) and SM-2, the PVLS will house the land attack missiles necessary to reach targets beyond gun range and satisfy Operational Requirement Document (ORD) requirements for deep strike.

PERISCOPE ANTENNA - An antenna configuration in which the transmitting antenna is oriented to produce a vertical radiation pattern, and a flat or off-axis parabolic reflector, mounted above the transmitting antenna, is used to direct the beam in a horizontal path toward the receiving antenna. [Federal communications standard]

NOTES: **(1)** Periscope antennas facilitate increased terrain clearance without long transmission lines, while permitting the active equipment to be located at or near ground level for ease of maintenance. **(2)** Periscope antennas are employed in a number of military platforms.

PERMANENT ECHO - Any dense and fixed radar return caused by reflection of energy from the earth's surface. Distinguished from ground clutter by being from definable locations rather than large areas. See also CLUTTER, RADAR CLUTTER, WAVE CLUTTER, RADAR ECHO.

PERMISSIVE ACTION LINK (PAL) - A device used to prevent unauthorized use of nuclear weapons.

PERSISTENCE IN COMBAT (PIC) - A DARPA program (2002) to achieve accelerated self-healing and wound repair of acute minor to moderate tissue trauma, provision of novel fluid resuscitation compounds, and overall pain management to achieve the goal of a "self-healing" warfighter.

See also CONTINUOUS ASSISTED PERFORMANCE (CAP), ENERGY HARVESTING, WATER HARVESTING.

PERSISTENT COOKIE - a COOKIE that is configured to remain on a system for a specified time, even decades. Persistent cookies may contain information that identifies the user, such as after a user registers on a web site, lists of previous purchases used by "shopping cart" web sites to keep track of an order in progress, or simply information that speeds up the process when the generating web site is visited again. Contrast with SESSION COOKIE.

PERSONAL AREA NETWORK (PAN) - A wireless network composed of devices such as hand-held terminals, headsets and other wearable devices, and peripherals, typically within 30 feet or less. See also BLUETOOTH.

PERSONAL COMPUTER DEBRIEFING SYSTEM (PCDS) - A stand-alone, multimedia flight debriefing system for Air Combat Training System (ACTS) and Tactical Aircrew Combat Training System (TACTS) data used by active and reserve duty pilots. [Information from NAWCAD News Release's website: http://www.nawcad.navy.mil/view_release.cfm?article_id=2].

NOTE: PCDS is a time-saving system that takes mission information previously only available at an Advanced Display and Debriefing System (ADDS) facility and puts it into the hands of the combat pilot wherever the location.

PERSONALITY MODULE - A special interface circuit, usually a plug-in module, to provide connection between dissimilar systems.

NOTES: **(1)** A PERSONALITY MODULE might be used to provide interface between a software package and a non-compatible database. **(2)** The term apparently arises from the concept of changing a computers *personality* for different uses by employing different boot read-only memories (ROMs). **(3)** The above definition was gleaned out of context from many web sites which used - but did not define - the term. If anyone can provide a formal definition, please contact the writer at Echoplex@ieee.org.

PERSONNEL RECOVERY (PR) - An umbrella term for military, civil and political actions used to recover captured, missing or isolated personnel from danger. It includes such missions as theater search and rescue (SAR); combat SAR; survival, evasion, resistance and escape (SERE); and evasion and recovery (E&R).

PERSONAL RECOVERY EXTRACTION

SURVIVABILITY/SMART-SENSORS (PRESS) - REAL TIME, automated, precision evader location, tracking SITUATIONAL AWARENESS (SA), mission management, and re-supply devices and systems.

PETABYTE (PB) - 10^{15} BYTES. NOTE: A typewritten page is often described as having about 2,000 bytes of data per side. Thus a megabyte would represent 500 text pages(single side), and a petabyte 500 billion pages.

PHASE CONJUGATE MIRROR - With respect to a LASER light wave front, a phase conjugate mirror reverses the phase of any incoming distortion, automatically canceling aberrations when reflected through the same medium.

PHASED ARRAY ANTENNA - An ARRAY ANTENNA whose beam direction or radiation pattern is controlled primarily by the relative phases of the excitation currents and voltages of the radiating elements.

PHASE MODULATION (PM) - ANGLE MODULATION in which the angle of a CARRIER is caused to depart from its reference value by an amount proportional to the instantaneous value of the modulating function. See also AMPLITUDE MODULATION (AM), FREQUENCY MODULATION (FM).

PHONETIC SEARCH ENGINE (PSE) - A SEARCH ENGINE used to search recorded speech to locate specified terms. NOTE: One use of the PSE is to search recorded telephone messages for specific terms, regardless of who is speaking or how a word is spelled.

PHOTOMETRIC LIGHT - The energy to which the human eye is sensitive.

PHOTOMETRY - The measurement of quantities associated with light.

NOTE: There are two branches of photometry: **(1)** Measurement of the physical effect of light on the eye, and **(2)** Measurement of the physical effect on physical receptors.

PHOTON - A quantum of electromagnetic energy.

PHOTONIC BAND GAP (PBG) - An optical effect of nanochannel glass materials, used in compact optoelectronic devices that relates to spectral regions, which prohibit photons from traveling through structured materials.

PHOTONIC DEVICE - A device which uses photons (instead of electrons) in an otherwise electronic device.

PHOTONIC MAST - A periscope-like device used by submarines for visual search without breaking the water's surface.

PHOTONICS - The control and use of photons or light waves. See also OPTOELECTRONICS.

PHOTORESIST - A chemical used in printed circuit manufacture that, when exposed to an appropriate spectrum of light, reacts in such a way that subsequent developing or etching processes can remove only regions which have been exposed (or, in some cases, only regions which have not been exposed).

PHOTOVOLTAIC EFFECT - The conversion of sunlight directly into electrical power.

PHYSIOLOGICAL BIOMETRICS - BIOMETRICS which include face, eye (retina or iris), finger (fingertip, thumb, finger length or pattern), palm (print or topography), hand geometry, wrist vein or thermal images.

PICO - See PICOSATELLITE

PICOSATELLITE - A small satellite (about 1 kg), which can be launched directly into space, or launched from a larger satellite. Also called PICO, PICOSAT, or 1-KG-CLASS SATELLITE.

PICOSECOND - One trillionth of a second.

PICOSECOND PULSE RADAR - See IMPULSE RADAR.

PICTURE ELEMENT - See PIXEL

PIEZOELECTRIC EFFECT - (1) The physical property demonstrated by certain natural and synthetic crystals by which they are mechanically deformed under the influence of an electric field, usually increased in length in the direction of the applied field. (2) The effect of producing a voltage when the stress, either compression, expansion, or twisting (torsional) is undergoing change on certain crystals, and conversely, producing a stress in certain crystals by applying a voltage to it. The voltage is produced only while the applied stress is changing.

See also BRAGG CELL, SMART STRUCTURES.

PILAR - A portable passive acoustic sensing system, which detects, locates, classifies and reports in real time the origin of small caliber fire. The system detects both subsonic and supersonic projectiles fired from weapons of 5.56 to 20 mm (with or without silencer) and permits rapid counter-fire.

PINETREE LINE - A system of 44 radar sites used during the Cold War (1950s and 1960s) to counter the Soviet air threat against North America.

NOTE: The Pinetree Line was gradually replaced by Semi-Automatic Ground Environment (SAGE) system in the 1960s.

PING - See PACKET INTERNET GROPER.

PING SWEEPER - A computer program that randomly identifies potential targets on the INTERNET.

PIP EMMA - World War I telephone procedure term for "P.M." Used to avoid the possibility of misunderstanding. [Information from: Brewer's Dictionary of Phrase and Fable] See also ACK EMMA.

PIXEL - (1) A display element that can be used to construct an image, or picture, on the display face of a display device. For example, the single separate piece of the

mosaic that forms the screen of a CATHODE RAY TUBE (CRT) and whose output can be independently controlled by an electron beam. **(2)** One of the infrared detector elements of an infrared focal planar array (IRFPA) {There are about 10,000 of these elements in the area of a postage stamp}. It is also the corresponding projection of the element in object space. Synonymous with PICTURE ELEMENT.

PLANE WAVE - A wave whose equi-phase surfaces form a family of parallel planes. INTUITIVE ANALOGY: A plane wave is a wall of energy.

PLASMA - A macroscopically neutral assembly of charged and possibly also uncharged particles.

PLASMA DISPLAY - A gas discharge display. The name "plasma display" is derived from the physical fact that when emitting light, matter is in its fourth state, made up of free ions and electrons (a plasma).

PLASMA MIRROR - An inertia-less (electronically steerable) planar reflector created by driving a glow discharge between a CATHODE and an ANODE, all immersed in a strong electromagnetic field. Potential areas of application include ship self-defense, high-resolution RADAR IMAGERY, target identification, ELECTRONIC COUNTERMEASURES (ECM), high-data-rate communications, SPREAD SPECTRUM links and remote sensing.

PLASMA STEALTH SYSTEM - A system capable of creating the plasma field around an aircraft to absorb radar energy.

NOTE: The aircraft Radar Cross Section (RCS) would be reduced significantly, thereby making it virtually invisible to radar.

PLATFORM - A device or contrivance for supporting, carrying, or conveying persons or objects. The device may be a stationary fixture, such as a tower or pedestal, or it may be a vehicle such as a land conveyance, vessel, aircraft, or spacecraft.

PLUMBING LOSSES - The total of the following radar system losses: power transmission efficiency, wave-guide and antenna losses. Synonymous with TRANSMITTING LOSSES.

PLUME SUPPRESSION - Action taken to reduce the detectability of exhaust plumes of smoke and hot gases from rockets and jet engines.

PODDED PROPULSOR - A steerable pod housing an electric motor, which drives an external propeller. NOTE: Podded propulsors can be mounted at various points on a ship's hull to facilitate maneuvering.

POINT DEFENSE (PD) - Actions taken against missile SEEKERS in the terminal phase.

POINT DEFENSE SYSTEM (PDS) - An ANTI-AIR WARFARE (AAW) system designed to protect only the platform on which it is located.

POINT OF PRESENCE (POP) - A telephone connection (phone number) used by an Internet Service Provider (ISP) for dial-up INTERNET access. NOTE: Most ISPs employ multiple POPs to speed up customer Internet access.

POLARIZATION (POL) - For an electromagnetic wave, polarization is the direction in which the electric field vector is oriented; for an antenna, it is the direction in which the electromagnetic field that would be radiated by the antenna is oriented.

POLARIZATION CANCELING - An ECCM technique used against single-main-lobe types of jammers. It exploits the fact that polarization components of a single jamming signal can be correlated because they originate from a single source and antenna system, while polarization components from a radar return signal are generally not well correlated.

POLARIZATION MATCH - The condition that exists when a plane wave, incident upon an antenna from a given direction, has a polarization, which is the same as the receiving polarization of the antenna in that direction.

POLARIZATION SCREEN - A radar ECCM technique for use against cross-polarization jammers.

POLARIZATION SIGNATURE - The scattering properties of a target. The polarization signature of a target is proportional to the radar scattering cross section of the target as a function of the angles of polarization of the illuminating and reflected radiation.

PORT - With respect to computers and the Internet:

- (1.) (Computers) A place of access to a device or network where energy may be supplied or withdrawn or where the device or network variables may be observed or measured. NOTE: Examples of these ports are *serial port* (e.g., for computer mouse and keyboard), *parallel port* (e.g., for printers), *Universal Serial Bus (USB) port* for various computer peripheral devices).
- (2.) (Internet) A number used to identify a service (a computer program designed to respond to certain commands) on an Internet host. Also called TCP/IP (transfer control protocol/Internet protocol) ports, to distinguish them from other ports described in (1) above.

NOTES: (1) Each host computer connected to the Internet is identified by an Internet Protocol (IP) address such as "signature.money.com." A host may have many services running; each service uses a different port. (2) Port numbers are divided into three ranges: the Well Known Ports (0 through 1023), the Registered Ports (1024 through 49151), and the Dynamic and/or Private Ports (49152 through 65535). The Well Known Ports are assigned and managed by the Internet

Assigned Numbers Authority (IANA) (Dept. of Commerce) [Source for this note is the IANA].

PORT SCAN - The process of sending data PACKETS to potential target computers to determine what network services each one offers. See also ANOMALY DETECTION, HOST-BASED INTRUSION DETECTION, NETWORK-BASED INTRUSION DETECTION, INTRUSION DETECTION SYSTEMS, SIGNATURE DETECTION.

PORTABLE HYPERSPECTRAL IMAGER FOR LOW LIGHT SPECTROSCOPY (PHILLS) - A multisensor system designed for ultra broadband high-resolution spectroscopy. See also HYPERSPECTRAL SENSOR.

PORTABLE ROADBLOCK - A NONLETHAL WEAPON consisting of a carrying case housing a quickly-deployable (by one person) roadblock extending to more than 20 feet; it is equipped with spikes which deflate tires.

PORTABLE VEHICLE ARRESTING BARRIER (PVAB) - See PORTABLE VEHICLE IMMOBILIZATION SYSTEM (PVIS).

PORTABLE VEHICLE IMMOBILIZATION SYSTEM (PVIS) - A NONLETHAL WEAPON consisting of A pre-emplaced capture system designed to stop a 7,500 pound vehicle traveling at speeds up to 45 miles per hour without causing permanent injury to the occupants. Also called PORTABLE VEHICLE ARRESTING BARRIER (PVAB).

POSTDETECTION RECEIVER - A receiver in which the RF signal is processed by RF analog circuits, converted into a video signal by a crystal video detector, then digitized for digital processing. Contrast with PREDETECTION RECEIVER.

POST OFFICE PROTOCOL (POP) - A PROTOCOL designed to allow single user hosts to read ELECTRONIC MAIL (E-mail) from a server.

POWER-BY-WIRE (PBW) - Aviation technology involving the elimination of hydraulics, variable engine bleed air, and the constant speed drive for power generation. Advantages of PBW include reduced aircraft weight, and improved thrust specific fuel consumption obtained by eliminating engine bleed air. See also FLY-BY-LIGHT (FBL).

NOTE: The use of FBL/PBW technologies is expected to **(a)** result in lightweight, highly reliable, highly electromagnetically immune FIBER-OPTIC control systems and all-electric secondary power systems for subsonic aircraft; and **(b)** lower initial acquisition and direct operating costs, reduce weight, and increase aircraft performance and reliability.

POWER CENTROID - [ANTI-RADIATION MISSILE term] The radiation power source as perceived by the missile's homing system. See also CENTROID HOMING.

NOTE: The object of counter-ARM tactics is to produce a power centroid located, say, between two radiating platforms. The desired result is failure of the missile to hit either platform.

POWER ELECTRONIC BUILDING BLOCK (PEBB) - A converter (ac/ac, ac/dc, and dc/dc) that performs multiple power system functions such as power flow control, voltage transformation and network protection, as well as serving as interface and controller between distribution zones, to energy storage system and to pulse loads, *e.g.*, ELECTROMAGNETIC LAUNCHING SYSTEMS (EMALS) and DIRECTED ENERGY WEAPONS (DEW), for the ALL ELECTRIC SHIP (AES) [Baldwin, Thomas, Dr., Center for Advanced Power Systems, FSU presentation ca 2002]

POWER MANAGEMENT - A low-probability-of-intercept technique that uses only so much transmitted power as needed to achieve the radar or communication objectives.

POWER SHARING - The condition whereby the power amplifier of a JAMMER is called upon to amplify two or more input signals simultaneously.

PRECIPITATION STATIC (P-STATIC) - Interference that is experienced in a receiver during the times the precipitation, such as dust, rain, snow, hail, sleet, or fog, occurs between the receiver and a transmitter antenna.

NOTE: P-static is most often caused by charged particles in the precipitation impacting against the receiver antenna.

PRECISE FREQUENCY - A frequency requirement accurate to within one part in 10 EXP 9 (one part in a billion).

PRECISION ENGAGEMENT - A system of systems that enables our forces to locate the objective or target, provide responsive command and control, generate the desired effect, assess our level of success, and retain the flexibility to reengage with precision when required.

PRECISION FIRE - The neutralizing of selected targets efficiently and effectively in order to achieve the desired effects that it contributes to, and can be linked directly to, the commander's operational intent and schemes of maneuver, while limiting collateral damage.

PRECISION LOCATION AND IDENTIFICATION (PLAID)

SYSTEM - A system based on the Advanced Digital Receiver (ADR) and Doppler techniques, which allows a tactical platform to accurately sort out signals, identify friendly units and targets and provide real-time SITUATIONAL AWARENESS.

NOTE: PLAID can be integrated with any type of radar warning receiver.

PREDETECTION RECEIVER - A receiver in which the input signal is down-converted into an IF (intermediate frequency) and digitized directly using an analog-to-digital converter. Contrast with POSTDETECTION RECEIVER.

PRE-EMPTIVE INFRARED COUNTERMEASURES - An aircraft INFRARED COUNTERMEASURES (IRCM) technique whereby INFRARED (IR) jammers are turned and/or DECOY FLARES are ejected whenever there is a possibility of encountering an IR missile. Also called PRE-EMPTIVE IRCM. Contrast with REACTIVE INFRARED COUNTERMEASURES.

NOTE: Pre-Emptive IR Countermeasures are generally employed when the aircraft is not equipped with a MISSILE WARNING DEVICE.

PRE-PLANNED PRODUCT IMPROVEMENT (P3I) - Planned future evolutionary improvement of developmental systems for which design considerations are effected during development to enhance future application of projected technology. Includes improvements planned for ongoing systems that go beyond the current performance envelope to achieve a needed operational capability.

PRF - See PULSE REPETITION FREQUENCY.

PRF DIVERSITY - The use of more than one pulse repetition frequency simultaneously.

PRF SHIFTING - A change in the time interval between pulses.

PRF SLIDING - A continuous change in the interval between radar pulses.

PRF STAGGERING - The switching of the pulse repetition frequency to differing values on a pulse-to-pulse basis so that the intervals follow a regular pattern.

NOTE: PRF STAGGERING is used in pulse Doppler radars to reduce range ambiguities.

PRIMARY RADAR - A radar in which the return signals are the echoes obtained by reflection from the target. Contrast with SECONDARY RADAR.

PROCESSOR FARM - A parallel processor consisting of multiple processors - where tasks are distributed (or "farmed out") by one *farmer* to several *worker* processors, which send results back to the farmer. See also LOADSHARING, MULTIPROCESSING.

NOTE: Processor farms are suited for applications that can be partitioned into several independent tasks.

PRODUCT DATA MANAGEMENT (PDM) - The management of all the data that affects a product from its inception, through design, manufacturing, and customer sales, and eventually to its retirement.

NOTE: PDM requires networks and databases - usually Enterprise Resource Planning (ERP) - to function, and it provides developers and management unprecedented power for product management through integration.

PROFILER - An airborne downward-looking ground-penetrating RADAR capable of ground penetration from 1 to 10 meters. It can be used to detect underground pipes and military targets such as underground cables, unexploded ordnance, and mines.

PROGRAM ARCHITECTURE - See SOFTWARE ARCHITECTURE.

PROJECTED THREAT - A best estimate based on historical trends data, evidence of continuing research & development (R&D), postulated military requirements, technological capabilities, and the best intelligence available. This THREAT consists of the weapon systems and characteristics that an adversary can be expected to develop and deploy during the specified period. See also TECHNOLOGICALLY FEASIBLE THREAT.

PROMISCUOUS MODE - A computer operating in a mode which receives all PACKETS, thereby allowing outsiders to eavesdrop on account names, passwords, e-mail, etc. Synonymous with MONITOR MODE and EAVESDROPPING.

NOTE: The computer may be put into promiscuous mode by a HACKER employing a PACKET SNIFFER tool.

PROPHET - A set of three Army programs (2001) aimed at providing ground troops with networked signals-intelligence (SIGINT) and ELECTRONIC WARFARE (EW) capabilities, including intelligence gathering, precision targeting and coordinated jamming. It includes a ground-based command center (Prophet Control), a High Mobility Multipurpose Wheeled Vehicle (HMMWV)-based COMMUNICATIONS INTELLIGENCE (COMINT)/jamming system (Prophet Ground) and Prophet Air, including four helicopters and two Shadow-200 UNMANNED AERIAL VEHICLES (UAVs) serving as extensions of the helicopters.

PROPULSIVE SMALL EXPENDABLE DEPLOYER SYSTEM (ProSEDS) - An ELECTRODYNAMIC TETHER system having the mission to clean up orbital debris by exerting a drag on the tethered system (*e.g.*, an orbiting rocket booster), causing it to de-orbit and burn up in the atmosphere.

PROTOCOL - (1) A formal set of conventions governing the format and relative timing of message exchange between two communications terminals. (2) A formal set of conventions that set the relative timing and the exact sequence of bits, characters and control codes used in the transfer of data between microcomputers and peripherals.

See also HANDSHAKING, ASYNCHRONOUS COMMUNICATIONS, SYNCHRONOUS COMMUNICATIONS. NOTE: A protocol is simply a formal agreement about how computers should communicate.

PSEUDONYMOUS REMAILER - An INTERNET computer service that launders the true identity of an e-mail sender by replacing the sender's e-mail address with a false one (*i.e.*, pseudonymous address) and forwarding the message to the intended recipient. A recipient's reply is sent to the sender's pseudonymous address, which, in turn, forwards the response to the sender's true address. Compare with ANONYMOUS REMAILER.

PSEUDORANDOM NUMBER SEQUENCE - A sequence of numbers, determined by some defined arithmetic process, that is satisfactorily random for a given purpose, such as by satisfying one or more of the standard statistical tests for randomness.

NOTE: A pseudorandom number generator usually is based on a known "seed" number from which the random sequence is based. This provides the feature of re-
 pliability. That is, all random number sequences generated from a given seed will be identical, even though statistical tests for "randomness" may be satisfied. A truly random number generator (*i.e.*, one for which any given sequence cannot be replicated) might be based on (random) noise.

PSEUDORANDOM NOISE JAMMING - A controlled, noise-like, pulse pattern repeated in synchronism with the victim radar pulse repetition frequency. Synonymous with QUASI-NOISE JAMMING.

PSYCHOLOGICAL OPERATIONS (PSYOP) - Planned operations to convey selected information and indicators to foreign audiences to influence their emotions, motives, objective reasoning, and ultimately the behavior of foreign governments, organizations, groups, and individuals. The purpose of PSYOP is to induce or reinforce foreign attitudes and behavior favorable to the originator's objectives.

NOTE: PSYOP is a part of offensive information operations.

PULSE - A WAVE which departs from a first nominal state, attains a second nominal state, and ultimately returns to the first nominal state.

PULSE BANDWIDTH - The smallest continuous frequency interval outside of which the amplitude (of the spectrum) does not exceed a prescribed fraction of the amplitude at a specified frequency.

NOTES: (1) The specified frequency is generally that at which the pulse has its maximum amplitude. (2) The term should really be "pulse spectrum bandwidth" because it is the spectrum and not the pulse itself that has the bandwidth. However, usage has caused the term "pulse bandwidth" to be accepted.

PULSE CONTROL - ECCM techniques, which modify the transmitted pulse characteristics to make it difficult for an ECM operator to receive, determine the lethality of, and/or effectively jam the radar.

PULSE DETONATION ENGINE (PDE) - A type of engine that uses periodic detonation waves to generate thrust more efficiently than normal combustion engines, such as a gas turbine.

PULSE DURATION (PD) - (1) In radar, measurement of pulse transmission time in microseconds, that is, the time the radar's transmitter is energized during each cycle. (2) The time interval between the first and last instants at which the instantaneous amplitude reaches a stated fraction of the peak pulse amplitude.

Synonymous with PULSE LENGTH, PULSE WIDTH.

PULSE JAMMING - Jamming techniques that use pulsed waveforms.

PULSE LENGTH - See PULSE DURATION.

PULSE NOISE JAMMING - An ECM jamming technique that uses pulses of NOISE.

PULSE REPETITION FREQUENCY (PRF) - (1) In radar, the number of pulses that occur each second. Not to be confused with transmission frequency which is determined by the rate at which cycles are repeated within the transmitted pulse. (2) The number of pulses per unit of time - usually seconds.

Synonymous with PULSE REPETITION RATE (PRR).

PULSE REPETITION RATE - See PULSE REPETITION FREQUENCY.

PULSE-WAVE^a MYOTRON^a - A NONLETHAL WEAPON consisting of a small box about the size of a pack of cigarettes. Contact with this device by the target individual (TI) will scramble that person's signals from the part of the brain that controls voluntary activity. The result is that the person falls to the ground in intense pain, unable to move, while vital functions such as heartbeat and breathing remain unaffected. Recovery takes several minutes.

NOTE: E-mail communications from Mr. Wes Thomas point out that tests of the pulse wave myotron do not support the manufacturer's claims. For example, it was claimed that the device can deliver up to 10,000 test bursts, but testing indicates that 4,000 bursts are more likely. Also, Sandia National Laboratories tests (1998) indicate that there is no evidence to support the claim that the device "intercepts and neutralizes brain waves from the motor cortex (voluntary muscle control) and hypothalamic (aggression) regions of the brain."

PULSE WIDTH - See PULSE DURATION.

PULSE WIDTH JITTERING - The changing of the width of a radar pulse in a random or periodic manner.

PULSED CHEMICAL LASER - A laser that projects a hot, high pressure plasma in the air in front of a target surface, creating a blast wave that will result in variable, but controlled, effects on material and personnel.

PULSED DOPPLER RADAR - A DOPPLER RADAR that uses pulsed transmission.

PULSED LASER - A LASER that delivers its energy in the form of a single pulse or a train of pulses. The duration of a pulse is less than or equal to 0.25 seconds.

PULSED RADAR - A radar which transmits pulses of energy. During the period between pulses, a receiver detects reflections of the pulsed energy (echoes) from the target.

PULSE-UP-ON-NOISE - A jamming technique that uses a NOISE FLOOR to conceal target SKIN PAINT. This technique usually accompanies the RANGE GATE STEALING (RGS) jamming technique.

PUNCH GUN - A NONLETHAL WEAPON which fires a spherical 322-grain rubber ball at about 110 meters per second.

PURPLE FORCES - The forces used to oppose both BLUE and ORANGE forces in NATO exercises. This is most usually applicable to submarines and aircraft. See also BLUE FORCES, ORANGE FORCES, RED FORCES.

PUSH-AHEAD COUNTERMEASURES - See FORWARD-BIAS COUNTERMEASURES.

PUSH-TO-TALK - A service that allows users, say cell phone subscribers or warriors on a tactical network, to just push a button and be connected immediately with another subscriber in a predefined group.

NOTE: In effect, PUSH-TO-TALK allows the cell phone to be used like a "walkie-talkie" or an intercom system between individuals in the field and headquarters.

PUSHBROOM IMAGING - Imaging using a pushbroom spectrometer, which includes a rectangular photodetector array with pixels arranged in rows (parallel to a spatial axis defined by a straight slit) and columns (parallel to the spectral axis). Light enters the spectrometer through the slit. Each point or pixel along the slit corresponds to a point or pixel along one spatial axis in the scene under observation. Thus, each column of pixels gives the readout of the spectrum for one point, or pixel, on a line that crosses the scene. The term "pushbroom" arises because in an action reminiscent of a pushbroom sweeping a floor, the field of view is swept through the scene, along a line perpendicular to the slit, to acquire spectral readouts from all pixels in the scene. [NASA Tech Briefs March 1999]

PYROPHORIC FLARE - A PYROTECHNIC which reacts spontaneously with oxygen, and can produce a controlled two-band INFRARED (IR) aircraft-sized SIGNATURE.

PYROPHORIC MATERIAL - Any material that ignites spontaneously in air below about 45 degree C. Also called SPECIAL MATERIAL.

NOTE: Pyrophoric materials may be gas, liquid, or metal, such as phosphorus, zirconium, and depleted uranium (DU)

PYROTECHNIC - A mixture of chemicals which when ignited is capable of reacting exothermically to produce light, heat, smoke, sound or gas, and may also be used to introduce a delay into an explosive train because of its known burning time. The term excludes propellants and explosives. See also FLARE, IGNITION SPIKE.

PYROTECHNIC FLARE - See PYROTECHNIC.

Q

Q - A performance measure for tuned circuits and antennas.

Q-ROUTE - A system of preplanned shipping lanes in mined or potentially mined waters used to minimize the area the mine countermeasures commander has to keep clear of mines to provide safe passage for friendly shipping. [DoD]

Q-SHIP - See DECOY SHIP

QUANTUM BIT (QUBIT) - The fundamental unit of quantum information. Qubits are remarkable in that they can be in two states simultaneously (*i.e.*, be in a zero and one state at the same time). Consequently, qubits have the potential to greatly increase the speed of computing.

QUANTUM COMPUTER - A computer that controls the actions among QUANTUM BITS (QUBITS) to perform certain types of calculations.

QUANTUM CRYPTOGRAPHY - A technique for encoding and sending data along unsecured public fiber optic lines that exploits the fact that small particles of matter (*e.g.*, photons) are both intertwined and yet completely isolated. Any attempt by an outside party to analyze the (intercepted) coded material changes the atoms' characteristics, rendering the transmission useless.

QUANTUM DOT - A NANOMETER-scale device in which each dot stores a single electron.

NOTE: A quantum-dot array could require only a few thousand atoms to store one bit, whereas now (*circa* 2000), the densest dynamic random access memory (DRAM) requires tens of millions of atoms to record a single bit of data.

QUANTUM IMAGING - IMAGING that employs "entanglement," a key principle of quantum physics. In the entangled state, two particles exhibit identical properties (*e.g.*, charge and frequency) even though they are located in separate points in space. Quantum imaging begins with a source device that generates two laser beams. Each beam consists of a stream of single photons, and the twin photons in the second beam are identical in frequency, direction and polarization. Thus, if one beam illuminates an object, the other beam can generate its image.

QUANTUM POLARIZATION SHIFT COMMUNICATIONS - A concept which has potential for faster-than-light communications at any distance, and is jam proof. It is based on the fact that when two photons are emitted by a particular light source and given a unique and identical polarization, they always share the same orientation. If the polarity of one photon is changed, the other's polarity is changed instantaneously.

QUANTUM-WELL INFRARED PHOTODETECTOR (QWIP) - A sensor which can be arrayed and tailored to absorb radiation in the long-wavelength infrared (IR) region from 3 to 20 micrometers.

NOTE: QWIP technology is based on phototransitions between electron energy states in so-called *quantum wells*, the energy level between an electron's valance and conduction band. By using different thickness and compositions of quantum-well materials, wavelength response can be customized and accurately specified. The quantum-well materials can be stacked to increase IR absorption or to yield a sensor with several specific absorption bands.

QUANTUM WIRE - See BUCKY TUBE.

QUASI-NOISE JAMMING -See PSEUDORANDOM NOISE JAMMING.

QUASI-VERTICAL INCIDENCE SOUNDER (QVIS) - A RADAR that measures the characteristics of the IONOSPHERE between the Transmit and Receive sites of the RELOCATABLE OVER-THE-HORIZON RADAR. The QVIS transmits upward at frequencies that vary over its 2-20 MHz frequency band to measure the ionospheric characteristics between the Transmit and Receive sites (hence the term "quasi vertical"). This information is used to generate a QVI IONOGRAM.

QUICK REACTION CAPABILITY (QRC) - The ability to rapidly design, prototype, test, and manufacture an EW system in response to an unanticipated threat.

QUICKSTRIKE - A family of shallow-water mines, laid by aircraft, and used primarily against surface craft. [Navy CHINFO press release] See also CAPTOR and SUBMARINE LAUNCHED MOBILE MINE (SLMM).

QUIET RADAR - A LOW PROBABILITY-OF-INTERCEPT (LPI) RADAR that detects a TARGET at the same range that the target can detect the radar's SIGNAL.

QUIET TUNING - A circuit arrangement for silencing the output of a radio receiver except when the receiver is accurately tuned to an incoming carrier wave [signal].

R

RADAR - (1) A radio detection device, which provides information on range, azimuth and/or elevation of objects. (2) A device for transmitting electromagnetic signals and receiving echoes from objects of interest (targets) within its volume of coverage. Presence of a target is revealed by its ECHO or its TRANSPONDER reply. Additional information about a target provided by a radar includes one or more of the following: distance (range), by the elapsed time between transmissions of the signal and reception of the return signal; direction, by use of directive antenna patterns; rate of change of range, by measurement of Doppler shift; description or classification of target, by analysis of echoes and their variation with time. The name radar was originally an acronym for Radio Detection and Ranging.

RADAR ABSORBING MATERIAL (RAM) - Materials applied to an object to reduce its RADAR CROSS SECTION by reducing the energy reflected back to a radar. See also RADAR CROSS SECTION REDUCTION; RADAR CAMOUFLAGE; ABSORPTION.

NOTE: The absorption of radar energy is done by converting radar energy to heat. See, for example, ABSORPTIVE CHAFF.

RADAR AUTOMATIC ESM - Computer-driven radar intercept - in effect, automatic tactical ELINT - which performs a parametric analysis only of selected mission-specific signals for tactical exploitation; it is a special case of RADAR ESM.

RADAR BACKSCATTERING - See RADAR SCATTERING.

RADAR CAMOUFLAGE - (1) The use of radar absorbent or reflecting materials to change the radar echoing properties of a surface of an object. (2) The art, means, or result of concealing the presence of the nature of an object from radar detection by the use of coverings or surfaces that considerably reduce the radio energy reflected toward a radar. See also ABSORPTION; RADAR ABSORBING MATERIAL; ELECTRO-OPTIC PAINTING.

RADAR CLUTTER - Unwanted signals, echoes, or images on the face of the display tube, which interfere with observation of desired signals. See also CLUTTER, GROUND CLUTTER, WAVE CLUTTER.

RADAR CROSS SECTION (RCS) - (1) A measure of the reflective strength of a radar target; usually measured in square meters, and defined as 4π times the ratio of the power per unit solid angle scattered in a specified direction to the power per unit area in a plane wave incident on the scatterer from a specified direction. (2) The area of a fictitious perfect reflector of electromagnetic waves that would reflect the same amount of energy back to the radar as the actual target. The same object usually has a different radar cross section at various angles and radar frequencies.

NOTE: Some typical radar cross sections in square meters at microwave frequencies, assuming head-on target aspect, are shown in the table below:

Typical Radar Cross Sections (m ²)	
Pickup truck	200
Jumbo jet liner	100
Large bomber	40
Large fighter aircraft	6
Adult male	1
Conventional winged missile	0.5
Bird	0.01
Insect	0.00001
Source: Skolnick, <i>Introduction to Radar Systems</i>	

RADAR CROSS SECTION REDUCTION - Techniques to reduce the radar cross section of an object. The four basic techniques for reducing radar cross section are: SHAPING, RADAR ABSORBING MATERIAL, PASSIVE CANCELLATION, and ACTIVE CANCELLATION.

RADAR DECEPTION - See ELECTRONIC DECEPTION.

RADAR ECHO - (1) The electromagnetic energy received after reflection from an object. (2) The deflection or change of intensity on a cathode ray tube display produced by a radar echo. Synonymous with RADAR RETURN.

RADAR EQUATION - A mathematical expression for primary radar which, in its basic form, related radar parameters such as transmitter power, antenna gain, wavelength, effective echo area of the target, distance to the target, and receiver input power. The basic equation may be modified to take into account other factors, such as attenuation caused by a radome, attenuation due to atmospheric losses or precipitation, and various other losses and propagation effects. Synonymous with RADAR RANGE EQUATION, RANGE EQUATION.

RADAR ESM - (1) ELECTRONIC SUPPORT MEASURES (ESM) employing high sensitivity equipment which provides detailed analysis of all measurable parameters. (2) ELECTRONICS INTELLIGENCE (ELINT) systems which directly support the tactical commander.

RADAR FLASHLIGHT - A small (about the size of a long flashlight) hand-held Doppler radar capable of detecting the motion of humans at a distance, even

behind walls, doors, or other concealment, such as in foliage. The prototype (1998) has a range of 3 meters, and can detect body movement, including those of the chest cavity associated with breathing and heart-beating.

RADAR-FREQUENCY INTERFEROMETER (RFI) - An airborne system used to detect electronic signals emitted from air-defense vehicles.

RADAR HOMING AND WARNING (RHAW) - See RADAR WARNING RECEIVER.

RADAR HORIZON - The locus of points at which the rays from a radar antenna become tangential to the earth's surface. On the open sea this locus is horizontal but on land it varies according to the topographical features of the terrain.

RADAR IMAGERY - Imagery produced by recording radar waves reflected from a given target surface.

RADAR INTELLIGENCE (RADINT) - Intelligence information derived from data collected by radar. NOTE: RADINT is a component of MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT).

RADAR ORDER OF BATTLE - See ELECTRONIC ORDER OF BATTLE.

RADAR PARAMETERS - (Conventional radars) Measurable characteristics of radar emissions, such as ANGLE OF ARRIVAL (AOA), FREQUENCY, time of arrival (TOA), pulse amplitude (PA), PULSE WIDTH (PW), PULSE REPETITION RATE (PRR), and POLARIZATION (POL). See also RADAR EQUATION.

RADAR POLARIMETRY - A technique to compare the angular dependencies of the measured and theoretically-derived polarization signatures of the target.

RADAR RANGE EQUATION - See RADAR EQUATION.

RADAR REFLECTOR - A passive device, such as a CORNER REFLECTOR, which is used to enhance reflected radar signals. Note, in contrast with STEALTH TECHNIQUES, the use of radar reflectors is intended to provide a strong radar reflection - for example, on a small craft to lessen chances of collision.

RADAR RESOLUTION CELL (RRC) - A volume bounded by the antenna beamwidth, the width of the radar pulse and the bandwidth of the receiving filter in the radar. It defines the volume of airspace being tracked by a radar.

RADAR RETURN - See RADAR ECHO.

RADAR SCATTERING - The SCATTERING of radar waves.

NOTE: Radar scatterers are classified into three simple types: **(1)** slightly rough surfaces; **(2)** dihedral corner reflectors; and **(3)** areas (e.g., a forest) that exhibit a large amount of diffuse scattering.

RADAR SENSOR FOR MAINTAINING THE DISTANCE (RSMD)

- A MILLIMETER WAVE (MMW) device designed for maintaining the distance between the ground vehicles when the column moves in severe environmental conditions such as rain, fog, snow or dust, in order to allow increased speeds of the column up to 40-50 Km/hr. RSMD measures the range to the vehicle moving in front and equipped with the RSMD and to the vehicle moving behind and not equipped with the RSMD and transmits commands from the vehicle moving in front to the vehicle moving behind under reduced optical visibility conditions and any time during 24 hours. RSMD provides transmission from the vehicle moving in front and reception by the vehicle moving behind of up to 5 commands via a TRANSPONDER radio channel.

RADAR SHADOW - Absence of radar illumination because of an intervening reflecting or absorbing object; the shadow is manifested on the display by the absence of blips from targets in the shadow area.

RADAR SILENCE - An imposed discipline prohibiting the transmission by radar of electromagnetic signals on some or all frequencies. See also EMISSION CONTROL, RADIO SILENCE.

RADAR SPOKING - Periodic flashes of the rotating time base [sweep] on a radial display. Sometimes caused by mutual interference [or jamming].

RADAR WARNING RECEIVER (RWR) - A wideband receiver that provides information, such as radar type, identification, and direction, relating to detected radar signals.

RADIANT MERCURY IMAGERY GUARD - A system to automate the downgrading of imagery rapidly between classification levels using national imagery transmission format header information.

RADIANT POWER - The time rate of flow of radiant energy (i.e., energy transmitted via electromagnetic waves), expressed in watts. See also OPTICAL POWER.

RADIATED ELECTRONIC COUNTERMEASURES - ELECTRONIC WARFARE (EW) actions involving radiating or re-radiating electromagnetic energy in the RF spectrum taken to prevent or reduce an enemy's effective use of the ELECTROMAGNETIC SPECTRUM or to produce EFFECTIVE DAMAGE to an enemy's PLATFORM, or weapon system.

RADIATION EFFECTS ON SEMICONDUCTOR DEVICES - Degradation or damage of semiconductor devices due to radiation. For example:

- Total Ionizing Dose - Degradation and/or failure as a function of ionizing radiation accumulation (e.g., months, years);
- Single Event Effects (SEE) - Relatively instantaneous device upset or destruction (e.g., latch-up, burnout, or gate rupture);
- Displacement Damage - Degradation of solar cells, charge-coupled-sensors, fiber optics, etc., over a period of time due to lattice effect.

See also RADIATION TOLERANCE.

RADIATION HARDENING - Measures taken to improve the ability of a device to survive the effects of nuclear and space radiation to a specified level. Contrast with RADIATION TOLERANCE.

See also RADIATION EFFECTS ON SEMICONDUCTOR DEVICES. NOTE: Certain types of radiation damage in semiconductor devices can be healed rapidly and automatically through use of attached palladium catalysts.

RADIATION HAZARD (RADHAZ) - See ELECTROMAGNETIC RADIATION HAZARDS.

RADIATION INTERCEPT VULNERABILITY - The degree to which a radiating source is susceptible to detection.

RADIATION LOBE - See LOBE.

RADIATION TOLERANCE - The inherent ability of a device to survive the effects of nuclear and space radiation. Contrast with RADIATION HARDENING. See also RADIATION EFFECTS ON SEMICONDUCTOR DEVICES.

RADIATION WARNING - A visual, aural, or tactile stimulus, which alerts personnel in a vehicle to the presence of impinging radiation on that vehicle.

RADIO ACCESS POINT (RAP) - A vehicle-mounted self-contained communications center that contains an Asynchronous Transfer Mode (ATM) switch, a High-Capacity Trunk Radio (HCTR), an ON-THE-MOVE (OTM) antenna, a controlling workstation, and interfacing equipment for narrowband tactical systems such as SINCGARS and the Mobile Subscriber Radio Terminal (MSRT). RAP allows mobile narrowband tactical users to access wide bandwidth networks for voice, data, and video communication.

RADIO-ACOUSTIC SOUNDING (RAS) - The radar detection of atmospheric density variations caused by tonal sounds, such as those generated by aircraft turbines.

RADIO DECEPTION - The employment of radio to deceive the enemy. Radio deception includes sending false dispatches, using deceptive headings, employing enemy call signs, etc. See also ELECTRONIC DECEPTION.

RADIO DETECTION - The detection of the presence of an object by radio-location without precise determination of its position. See also RADAR.

RADIO DETECTION AND RANGING (RADAR) - See RADAR.

RADIODETERMINATION - The determination of the position, velocity and/or other characteristics of an object by means of the propagation properties of radio waves.

RADIO DIRECTION FINDING - Radio location in which only the direction of a station is determined by means of its emissions.

RADIO-ELECTRONIC BATTLE MANAGEMENT (REBM) - The combined functions of intelligence, surveillance, and reconnaissance; command, control, and communications; all technical operations on information; and electronic and electro-optic warfare coupled with signature management and targeting. See also SPACE AND ELECTRONIC COMBAT. ["Navy 21" Study]

RADIOELECTRONIC COMBAT (REC) - The Soviet doctrine for integrated efforts centered around reconnaissance, electronic countermeasures (jamming), physical attack (destruction), and deception operations. Each element contributes to the disruption of effective command and control at a critical decision point in battle. Synonymous with RADIO-ELECTRONIC STRUGGLE.

RADIOELECTRONIC STRUGGLE - See RADIOELECTRONIC COMBAT.

RADIO FREQUENCY/ELECTROMAGNETIC PULSE

INTELLIGENCE (RF/EMPINT) - The collection, processing, and exploitation of radio frequency/electromagnetic pulse emissions associated with nuclear testing, or other high energy events for the purpose of determining power levels, operating characteristics, and signatures of advanced technology weapons power, and propulsion systems.

NOTES: (1) Radio Frequency/Electromagnetic Pulse Intelligence (RF/EMPINT) is a component of MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT); (2) MASINT applications specifically exclude the collection of communications [COMMUNICATIONS INTELLIGENCE (COMINT)] and foreign non-communications transmissions [ELECTRONICS INTELLIGENCE (ELINT)] - functions encompassed under SIGNALS INTELLIGENCE (SIGINT).

RADIO FREQUENCY INCAPACITATING SYSTEMS -

NONLETHAL WEAPONS, which employ radio frequency radiation. NOTE: An example is the directional microwave transmitter, which heats skin to an unbearable degree as people approach the device.

RADIO FREQUENCY INTERFERENCE (RFI) - Degradation of the reception of a wanted signal caused by RF disturbance. Synonymous with RADIO INTERFERENCE.

RADIO FREQUENCY SIGNATURE CONTROL - The employment of materials, electronics, and platform design features intended to reduce the susceptibility of the platform to detection, tracking, and engagement by an adversary using RF sensors, such as radar. RF SIGNATURE CONTROL includes the use of RADAR ABSORBING MATERIALS (RAM), RADAR CAMOUFLAGE, RADAR CROSS SECTION (RCS) REDUCTION, radar absorbing structures (RAS), resistive and magnetic materials that support signature control, aperture design, FREQUENCY SELECTIVE SURFACES (FSS), paints, dopants, absorbents, impedance matching material, active electronic emissions, and propulsion system low observables design, including system signature spoiling and hot-section and engine signature control.

See also ACOUSTICS SIGNATURE CONTROL, INFRARED SIGNATURE CONTROL, LASER SIGNATURE CONTROL, MAGNETIC SIGNATURE CONTROL, MULTISPECTRAL SIGNATURE CONTROL, OPTICAL SIGNATURE CONTROL, and SIGNATURE CONTROL.

RADIO FREQUENCY SYNTHESIZER - See FREQUENCY SYNTHESIZER.

RADIO FREQUENCY TAGGING DEVICE - A device carried by a ground vehicle that identifies it as a friendly unit to aircraft equipped with devices designed to detect its presence. See also IDENTIFICATION FRIEND OR FOE (IFF).

RADIO-LOCATION - Position determination by means of radio aids for purposes other than those of navigation. See also RADAR.

RADIOMETER - A device used to measure quantities associated with radiant energy and power.

RADIOMETRY - The science of radiation measurement. See also PHOTOMETRY.

RADIOLUMINESCENT LIGHT (RL) - A glowing piece of plastic or aerogel that requires no electrical power supply and can be made in various sizes and shapes and produce almost any desired color. One type of RL is a glass tube coated on the inside with an inorganic phosphor, filled with radioactive tritium gas and sealed.

NOTE: RLs are sometimes referred to as "light sticks" or "light cubes". The ingredients that create the light are intimately bound - dissolved or suspended on a molecular scale and within atomic distances of each other. In a typical light a phosphor such as zinc sulfide is dispersed in an aerogel, a highly porous silica matrix that is in effect a low-density, glass sponge. The radioactive source, tritium gas, is incorporated into the aerogel, where it becomes chemically bonded. Beta particles given off by the tritium as it decays permeate through the open spaces of the aerogel and strike the phosphor particles, exciting them and causing them to emit light.

RADIO RECOGNITION - The determination by radio means of the friendly or enemy character, or the individuality, of another. See also IDENTIFICATION, FRIEND OR FOE.

RADIO SILENCE - A condition in which all or certain radio equipment capable of radiation is kept inoperative. See also EMISSION CONTROL, RADAR SILENCE.

RADOME - A cover designed to protect an antenna from the effects of its physical environment without degrading its electrical performance.

RADOME BLOWOFF - Structural damage to a radome caused by a DIRECTED ENERGY WEAPON.

RAIN-BLOWING PLENUM - See DOUBLE-DIAPHRAGM RADOME.

RAINBOW THREAT - Threats that span technologies and platforms from many different countries and design philosophies.

RAMP RULE - See RULES OF ENGAGEMENT.

RANDOM ACCESS MEMORY (RAM) - Computer memory in which the access time is effectively independent of the location of the data. Contrast with READ-ONLY MEMORY.

RANDOM NOISE - NOISE that comprises transient disturbances occurring at random. Contrast with IMPULSE NOISE.

RANDOM SIGNAL RADAR - A LOW PROBABILITY-OF-INTERCEPT (LPI) RADAR which uses a WAVEFORM that is truly random (*e.g.*, NOISE).

RANGE-DOPPLER IMAGING - The formation of fine resolution microwave or laser images of objects, which are rotating relative to the radar system. Doppler-frequency spectral analysis of the radar signals helps achieve the desired images. See also SYNTHETIC APERTURE RADAR.

RANGE EQUATION - See RADAR EQUATION.

RANGE GATE PULL OFF (RGPO) - A SELF-SCREENING ECM technique for use against automatic tracking radars. It captures the victim radar range gate, walks it off in range, and then turns OFF, leaving the range gate with no signal. The process is repetitive. Synonymous with RANGE GATE WALK OFF.

RANGE GATE STEALING (RGS) - A jamming technique that transmits a false target return with a time delay that slowly varies (increases or decreases) from the radar pulse time of arrival to simulate a varying (increasing or decreasing) target range in the victim radar. See also RANGE HOOK.

RANGE GATE WALK OFF - See RANGE GATE PULL OFF.

RANGE HOOK - A jamming feature used in RANGE GATE STEALING that presents a FALSE ECHO RETURN at the maximum value of the range gate stealer's delay.

RANGE RESOLUTION - (1) The ability of the radar equipment to separate two reflecting objects on a similar bearing, but at different ranges from the antenna. The ability is determined primarily by the pulse length in use. (2) The ability to distinguish between two targets solely by the measurement of their ranges (distances from the radar); usually expressed in terms of the minimum distance by which two targets of equal strength at the same azimuth and elevation angles must be spaced to be separately distinguishable. See also BEARING RESOLUTION, RESOLUTION, TARGET DISCRIMINATION.

RANGING - The process of establishing target distance. Types of ranging include echo, intermittent, manual, navigational, explosive echo, optical, radar, etc.

RAPID AIRBORNE MINE-CLEARANCE SYSTEM (RAMICS) - An airborne weapons system that integrates a LIGHT DETECTION-AND-RANGING (LIDAR) sensor and a helicopter-mounted 20mm cannon that fires bursts of 25 supercavitating projectiles designed to rapidly destroy near-surface moored mines.

See also AIRBORNE MINE-NEUTRALIZATION SYSTEM (AMNS), DISTRIBUTIVE EXPLOSIVE TECHNOLOGY (DET), SHALLOW-WATER ASSAULT BREACHING (SABRE) SYSTEM, and SHALLOW WATER INFLUENCE MINE SWEEP (SWIMS) SYSTEM.

NOTE: The RAMICS basic weapon is a door-mounted, LASER-aimed 20mm or 30mm rapid-fire cannon. The RAMICS bullet is a "supercavitating" bullet that creates a surrounding air bubble as it goes through the water, thus avoiding the deflection caused when a normal bullet enters the water. The bullet is designed to hit a mine at high speed and break up, releasing a chemical that ignites from the heat of impact and sets off the mine's explosives. Even if the impact-ignition process fails for some reason, the bullet hits with such force that it shatters the mine. RAMICS bullets are expected to be effective against mines at depths from 25 to 40 feet.

RAPID ANTISHIP CRUISE MISSILE IDENTIFICATION

SYSTEM (RAIDS) - A passive system that coordinates threat information from the ship's combat direction systems and displays it for the commanding officer or tactical action officer on large color displays. Designed to prioritize multiple threats on multiple bearings with a variety of HARD KILL and SOFT-KILL options, RAIDS order the top six threats and gives a priority order of maneuvering and countermeasures deployment. See also HARD-KILL ECM.

RAPID DECISIVE OPERATION (RDO) - An operation in which a joint force deploys quickly to any location in the world and by use of new approaches and innovative concepts, achieves victory by destroying the enemy's ability to fight. See also FORCIBLE ENTRY OPERATIONS (FEO).

REACH-BACK SYSTEM - A communications system that provides a field commander, say, additional intelligence or information resources "back" at headquarters or at other agencies to augment information obtained in the field. Also called COMMUNICATIONS REACH-BACK SYSTEM.

REACTIVE ARMOR (RA) - A form of ACTIVE ARMOR which depends upon "energetic" elements that rapidly release energy to react against the impact of a shaped charge (SC). An explosion is created in a direction opposite to that of the incoming metallic plasma (jet). An exchange of momentum occurs between the materials of the explosion and the SC jet, deflecting and partially dispersing the jet. This effect can be achieved by sandwiching a layer of high explosives between two metal plates. On a tank equipped with reactive armor, for example, the impact of antitank munitions causes the outer plate to be blown off, decreasing the penetration of the target by the jet. Such a design is about 20 times more effective than armor steel. Synonymous with ENERGETIC ARMOR. See also ELECTROMAGNETIC ARMOR, SMART ARMOR.

REACTIVE INFRARED COUNTERMEASURES - An aircraft INFRARED COUNTERMEASURES (IRCM) technique whereby INFRARED (IR) jammers are turned and/or DECOY FLARES are ejected only if a positive indication of an IR missile is indicated, such as from a MISSILE WARNING DEVICE. Also called REACTIVE IRCM. Contrast with PRE-EMPTIVE INFRARED COUNTERMEASURES.

READINESS - The component of MILITARY CAPABILITY that relates to the ability of forces, units, weapon systems, or equipment to deliver the outputs for which they were designed (including the ability to deploy, and employ without unacceptable delays).

READ-ONLY MEMORY (ROM) - Computer memory that stores data not alterable by computer instructions. Contrast with RANDOM ACCESS MEMORY.

REAL TIME - (1) The absence of delay, except for the time required for the transmission by electromagnetic energy, between the occurrence of an event or the transmission of data, and the knowledge of the event, or reception of the data at some other location. (2) Pertaining to the actual time during which a physical process transpires, for example, the performance of a computation during the time that the actual physical process transpires, in order that the results of the computation can be used in guiding the physical process.

Contrast with DEFERRED TIME. See also NEAR REAL TIME.

NOTE: This term is also used to describe processes operating interactively with humans (e.g., "man in the loop") such that they can be influenced by human intervention while they are in progress.

REARWARD JAMMING - Transmission of jamming signals in a direction away from the victim sensor so that the energy can be reflected toward the victim.

RECEIVER SENSITIVITY - The minimum input signal required to produce a specified output signal having a specified SIGNAL-TO-NOISE RATIO.

RECONNAISSANCE - A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or potential enemy; or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area.

RECTENNA - See RECTIFYING ANTENNA.

RECTIFIER - A device for converting alternating current into direct current. Contrast with INVERTER

RECTIFYING ANTENNA (RECTENNA) - A microwave antenna, which operates in a receiving mode for reception of microwave power and subsequent conversion to direct current (DC) by a diode RECTIFIER.

RED FORCES - Reference to Communist or Soviet forces. See also BLUE FORCES, ORANGE FORCES, PURPLE FORCES.

RED VIRTUAL NETWORK - A NETWORK of hosts which communicate over an unsecured PACKET-SWITCHED network using data paths secured by the encryption services of BLACKER FRONT ENDS (BFEs). [Nortel Networks Technical Documentation Web Site: <http://support.baynetworks.com/library/tpubs/docsrt.htm> 11/2000]

See also BLACK NETWORK.

REDUNDANT ARRAYS OF INEXPENSIVE DISKS (RAID) - In computer systems, multiple disks to spread and share data among drives, thus reducing costs and enhancing data integrity. NOTE: The basic technique of RAIDs is an "N + 1" scheme, in which "mirroring" is a widely used implementation. In an array of N+1 disks, non-redundant data are spread across N drives arrayed along with another drive containing the parity value. If one of the drives fails, the data on that drive can be reconstructed from the data on all the other drives.

REDUNDANT ARRAYS OF INEXPENSIVE SYSTEMS (RAIS) - See REDUNDANT ARRAYS OF INEXPENSIVE DISKS (RAID).

REED - Acronym for Radar/ECM/ECCM Data Base. REED is a classified, on-line tutorial of radars, ECM techniques, ECCM techniques, and their interactions. It includes information from textbooks, technical reports, and system specifications. REED deals primarily with airborne radar technology.

REFLECTANCE - The ratio of reflected power to incident power.

REFLECTED MEMORY - Simultaneous sharing of data at two separate nodes of a network.

REFLECTION - Energy diverted back from the interface of two media. The reflection may be specular (*i.e.*, direct) or diffuse according to the nature of the contact surfaces.

REFLECTIVE DISPLAY - A LIQUID CRYSTAL DISPLAY which produces no back-lighting, hence must be used in adequate ambient light conditions. Contrast with TRANSFLECTIVE DISPLAY.

REFLECTOMETRY - With respect to testing wires and cables, the sending of a signal (*e.g.*, pulse, sine wave) along a wire and sensing the returned reflection from the end of the wire.

See Also SMART WIRE. NOTE: Three types of reflectometry are Time Domain Reflectometry (TDR), Standing-Wave Reflectometry (SWR), and Frequency Domain Reflectometry (FDR).

REFRACTION JAMMING - An ECM technique that modifies the characteristics of the medium enclosing the protected platform so that radar energy will be refracted away from the platform, effectively reducing the platform's RADAR CROSS SECTION.

REFRACTIVE INDEX - Of a wave transmission medium, the ratio of the phase velocity in a vacuum to that in the medium.

REFRACTIVE LIQUID - Liquid crystals that display interference patterns in polarized light. They are used in ACTIVE MATRIX LIQUID CRYSTAL DISPLAYs (AMLCDs).

REGIONAL - See MID-LEVEL NETWORK.

RELATERAL TELLING - The relaying of information between facilities through the use of a third facility. This type of telling is appropriate between automated facilities in a degraded communications environment. See also BACK TELLING, CROSS TELLING, FORWARD TELLING, OVERLAP TELLING, TRACK TELLING.

RELOCATABLE OPTICAL SYSTEM (ROS) - See TRANSPORTABLE OPTICAL SYSTEM/RELOCATABLE OPTICAL SYSTEM.

RELOCATABLE OVER-THE-HORIZON RADAR (ROTHR) - A land-based BISTATIC ionospheric backscatter radar system that can detect, track, and estimate the composition of ships and aircraft at any altitude in a fixed annular sector of more than 60 degrees at ranges from 500 to 1,500 nautical miles. The transmitter radiates energy in the HF band (3-30 MHz). The IONOSPHERE refracts this energy, returning it to earth and illuminating the area under surveillance. The ROTHR consists of three radars having sufficient separation between transmitters and receivers to provide continuous bistatic operation. One radar- the BACKSCATTER RADAR (BSR) serves to detect targets, while the other two radars - the QUASI-

VERTICAL INCIDENCE SOUNDER (QVIS) and the BACKSCATTER SOUNDER (BSS) - measure the characteristics of the ionosphere. See also SPACE TO AIR BISTATIC RADAR.

REMOTELY MONITORED BATTLEFIELD SENSOR SYSTEM

(REMBASS) - A system of passive sensors, which can remain unattended for up to 30 days after emplacement. To conserve power, the sensors remain in an idle mode, monitoring the ambient energy level (seismic/acoustic, thermal, and/or magnetic), until a target comes into the detection range. The sensors then become active, classifying the target (*i.e.*, person, tracked vehicle, wheeled vehicle) and transmitting the appropriate data to a monitoring device for further determination of target location, composition, speed, and direction of travel. [From the FAS Military Analysis Network]

REMOTELY OPERATED PLATFORM - ELECTRONIC (ROPE) -

A towed buoy that operates on the surface and relays visual images to the submerged towing submarine at cruise depth via a real-time fiber-optic data link. In effect, this is a television camera acting like a periscope. See also NON HULL-PENETRATING PERISCOPE (NPP), UNDERWATER VIEWING MODULE, UNMANNED UNDERWATER VEHICLE.

REMOTELY OPERATED VEHICLE (ROV) - A subgroup of UNMANNED UNDERWATER VEHICLES (UUVs) controlled by a cable or fiber-optic tether from a surface ship. Contrast with AUTONOMOUS UNDERWATER VEHICLE (AUV).

REMOTELY PILOTED VEHICLE (RPV) - An unmanned vehicle capable of being controlled from a distant location through a communication link. It is normally designed to be recoverable. See also DRONE, UNMANNED AIR VEHICLE.

REMOTE ENVIRONMENTAL MONITORING UNITS (REMUS) -

A low cost AUTONOMOUS UNDERWATER VEHICLE (AUV) developed by the Oceanographic Systems Laboratory for coastal monitoring and multiple vehicle survey operations. The torpedo-shaped REMUS is 53 inches long with a body diameter of 7.5 inches. Easily transportable, REMUS weighs 68 pounds and is neutrally buoyant in water. It is powered by sealed lead acid batteries and can operate in fresh or salt water.

The vehicle is configured with a Conductivity/Temperature/Depth (CTD) sensor and an optical backscatter sensor on board. Telemetry data provides time of day, depth, heading, and a geographic fix for the data. [Woods Hole Oceanographic Institute www.whoi.edu/home/marine/remus_main.html]

See also AUTONOMOUS BENTHIC EXPLORER (ABE).

REMOTE MINEHUNTING SYSTEM - See REMOTE MINEHUNTING VEHICLE.

REMOTE MINEHUNTING VEHICLE (RMV) - A high-endurance, remotely controlled, low-observable, semi-submersible, mine-reconnaissance vehicle organic to a battle group. The RMV is planned to be launched, operated, and recovered from a host ship. Also called REMOTE MINE-HUNTING SYSTEM, REMOTE MINEHUNTING SYSTEM.

NOTE: The diesel-powered RMV is equipped with a snorkel mast, which also holds antennas for radio and video links. The vehicle can proceed along a programmed track, using the GLOBAL POSITIONING SYSTEM (GPS) or manually controlled by a shipboard operator. The RMV is equipped with a forward-looking SONAR and deploys a towed variable-depth sensor used to detect, localize, classify, and identify moored and bottom mines. Among the key components of the RMV (*circa* 2003) are a diesel-powered semi-submersible remote mine hunting vehicle which deploys a variable-depth sonar (VDS), line-of-sight and over-the-horizon (OTH) real-time data links, and a shipboard launch-and recovery system.

REMOTE MINIATURE WEATHER STATION (RMWS) - A MEASUREMENT AND SIGNALS INTELLIGENCE (MASINT) system for measuring and reporting local weather conditions in denied areas. The sensors report information using satellite communications. [NAVWAR Joint Warfighting Science and Technology Plan (*circa* 2000)]

NOTE: The RMWS is a backpack-portable or air-droppable weather data collection and reporting station. The RMWS collects and automatically reports desired weather measurements (the program may be changed via two-way satellite communications) via satellite to users at multiple locations. The battery power for the low-powered RMWS is augmented with solar panels.

REMOTE SOURCE LIGHTING SYSTEM - A lighting system, which uniformly transmits and distributes light through hollow tubes made of lightweight film. The light is also able to turn corners with or without the use of mirrors. The system is useful in volatile environments where maintenance can be performed at a safe, easily accessible location. This lighting system also requires fewer light sources, saving energy and the expense of multiple fixtures.

REMOTE TRACK LAUNCH ON SEARCH (RTLOS) - The engagement of a target by one unit employing radar track information sent over an existing data link.

REPACKAGING - A COVER technique that disguises an operation as something else by adding or subtracting features. NOTE: Disguising a tank as a truck is an example of REPACKAGING.

REPEAT BACK JAMMING - (1) The interception and RERADIATION of a modified signal to present erroneous data on azimuth, range, number of targets, etc. (2) The amplification, multiplication, and retransmission of received signals for the purposes of DECEPTION or JAMMING.

Synonymous with REPEATER JAMMING.

REPEATER JAMMING - See REPEAT BACK JAMMING.

REPETITIVE WAVEFORM JAMMING - A generic ECM technique which uses jamming transmissions that consist of the same waveform.

REQUEST FOR COMMENT (RFC) - A document constituting the definition of protocols and policies of the INTERNET. Also called INTERNET REQUEST FOR COMMENT. NOTE: For example, RFC 1521 and RFC 1522 provide the definition of MIME. RFCs serve as the "laws" of the Internet.

RERADIATION - (1) The radiation of signals amplified in a radio receiver. (2) The radiation of a signal intended to replicate in every detail a received signal, and transmitted as nearly as possible at the instant the signal is received.

RESIDUAL OBSERVABLES - OBSERVABLES which remain after a target has departed a location. Examples include wake, slicks, contrails, and flotsam.

RESIN-COATED COPPER (RCC) - A dielectric-coated copper foil that may be laminated to a printed-circuit core to form a MICROVIA layer. See also TRENCH.

RESOLUTION - A measurement of the smallest detail, which can be distinguished by a sensor system under specific conditions. See also BEARING RESOLUTION, RANGE RESOLUTION, TARGET DISCRIMINATION.

RESONANT MICROWAVE ABSORPTION - The decrease in reflectivity of microwaves at a specific (resonant) frequency caused by a coating of material designed to produce an out-of-phase condition between reflected and emerging waves, thus effecting cancellation at the resonant frequency. See also ANTIREFLECTION OVERCOAT.

RESPONSIVE REPLACEMENT VEHICLE (RESERVE) - Spacecraft using standardized payloads held in reserve for rapid launching to replace military satellites destroyed by an enemy.

RESPONSOR - An electronic device used to receive an electronic challenge and display a reply thereto. See also TRANSPONDER.

RETICLE SYSTEM - An optical detection system employing a reticle to modulate incoming light. A reticle is positioned in a FOCAL PLANE of the system and moved through the light beam, giving the beam a periodic amplitude modulation.

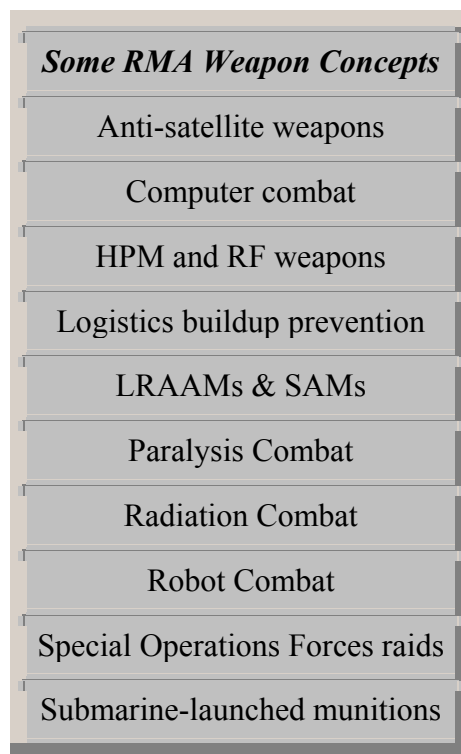
RETRIEVABLE TETHERED OPTICAL FIBER (RTOF) - A submarine communications buoy consisting of a tethered fiber wire allowed to float freely. As soon as it is fully deployed, the wire is retrieved. The interval between the start and end of deployment provides the submarine a communications window of a few minutes. See also SLOT BUOY.

RETROREFLECTION - The reflection of electromagnetic energy in a direction close to that at which it is incident, whatever the angle of incidence.

REVISIT TIME - The time between sensor observations.

REVOLUTION IN MILITARY AFFAIRS (RMA) - An emerging (1999) school of thought by China's People's Liberation Army (PLA) that emphasizes the use of information technology for future warfare. Also called THIRD MILITARY TECHNICAL REVOLUTION.

NOTE: Under RMA, the development of long-range air-to-air missiles (LRAAMs) and surface-to-air missiles (SAMs) that could be used to target special support aircraft such as AWACS and other systems such as JSTARS and other command, control, intelligence and electronic warfare (C³IEW) aircraft.



REVOLUTIONARY CONCEPT (REVCON) - A NASA project involving three advanced aeronautical concepts: the *AeroCraft* (a piloted, partially buoyant airship), the *Blended Wing Body* (to improve fuel efficiency, maximum takeoff weight and direct operating costs for commercial and airline carriers), and the *Pulse Detonation Engine*.

NOTE: One purpose of REVCON is to encourage the development of ideas that could lead to revolutionary experimental planes.

REWRITABLE OPTICAL DISK - An optical disk on which data may be written and erased. Contrast with WRITE ONCE READ MANY (WORM). See also MAGNETO OPTICAL RECORDING.

RF MEMORY LOOP ECCM - An OFFENSIVE ECCM technique used against RF memory loop ECM. The victim radar transmits a short spoof or cover pulse immediately with the actual radar transmitter pulse so that the jammer operates against the wrong frequency. [Derived from 10:2446]

RF SIGNATURE CONTROL - See RADIO FREQUENCY (RF) SIGNATURE CONTROL.

RING AIRFOIL GRENADE (RAG) - A NONLETHAL WEAPON resembling a small radiator hose. It comes in two versions: the STING RAG, which is a kinetic-type energy device that gives a painful blow on impact, and the SOFT RAG, which breaks open on impact and spreads a three-foot-wide cloud of tear-gas-like CS powder. The projectiles for both types are made of a soft rubber-like substance and are launched from a rifle adapter.

NOTE: It is claimed that neither version of the RAG will cause lethal or hazardous injury, even at point-blank range. Its shape permits high accuracy against individual targets and its velocity is great enough to negate dodging. The range of the RAG is beyond the missile-throwing ability of rioters, for example.

RING OF FIRE - An "end-to-end" battlefield operational concept using a series of Land Attack Weapons Systems (LAWS) to link together a group of naval platforms within range of a given objective area ashore to provide a seamless integration among the available weapons launchers. [NAVWAR Joint Warfighting Science and Technology Plan (*circa* 2000)]

NOTES: **(1)** Data on target location can come from a number of sources. For example, forward observers in the field using a hand-held computer configured to digitally pass preformatted messages through a radio can quickly and accurately call for fires. Other theater sensors like UAVs or JSTARS could provide SURVEILLANCE and RECONNAISSANCE locating data on enemy formations directly to commanders at sea. **(2)** With the development of long-range munitions, multimission ships interconnected via LAWS will not be restricted to engaging targets for a single mission. In the NETWORK CENTRIC concept, when a platform reports to the "ring", its ordnance inventory is entered into the LAWS data base containing the overall force inventory to be made available for apportionment to different mission areas in accordance with the operational commander's guidance. Thus, a ship may be assigned simultaneously to more than one warfare or component commander for operational use and the ordnance (*e.g.*, cruise missiles) of that ship may also be used for more than one operational task.

RIPPLE FIRE - Launching of multiple missiles to strike a target simultaneously from different directions.

RISK MANAGEMENT - A cyclic process to reduce uncertainty associated with a desired outcome. Risk management entails Risk Identification, Risk Analysis, and Risk Response.

RIVET JOINT (RJ) - Code name for surveillance aircraft equipped with extensive arrays of sophisticated intelligence gathering equipment enabling military specialists to monitor the electronic activity of adversaries, locating, recording and analyzing activity in the electromagnetic spectrum. Synonymous with HOG NOSE and HOG CHEEKS.

NOTE: The RC-135V/W Rivet Joint reconnaissance aircraft supports theater and national level consumers with near real time on-scene intelligence collection, analysis and dissemination capabilities. Click to view a photo of RIVET JOINT. [NAVAIR Fact Sheet]

ROAD PATRIOT - A NONLETHAL WEAPON which permanently disables vehicle electronics and ignition systems using an ELECTROMAGNETIC PULSE. The Road Patriot is propelled from a pursuing vehicle via a rocket propelled sled fired at the pursued vehicle.

ROAD SENTRY - A NONLETHAL WEAPON which permanently disables vehicle electronics and ignition systems using an ELECTROMAGNETIC PULSE. The Road Sentry is stationary and may be disguised as a garbage can lid, road patch, or sewer cover.

ROAD STAR - A NONLETHAL WEAPON consisting of a four-pointed star made of steel, that punctures vehicle tires when the tire passes over the star.

ROBO-BUG - See FLY ON THE WALL.

ROBOT COMBAT - The use of military robots for vehicle emergency handling, minelaying, minesweeping, reconnaissance, transportation, unmanned "intelligent" tanks, UAVs, and other activities that can replace the human operator.

NOTE: Despite the prevalent use of this term in the context of computer games, ROBOT COMBAT is a concept under the PRC's Revolution in Military Affairs (RMA).

ROLLING AIRFRAME MISSILE (RAM) - A quick reaction, high firepower missile system designed to provide defense against anti-ship missiles.

ROLLOVER PLUS - A defense program in which technology is continually developed, tested and demonstrated on a systems level until a threat demands rapid fielding of that technology.

ROPE - An element of CHAFF consisting of a long roll of metallic foil or wire, which is designed for broad, low- frequency responses. See also REMOTELY OPERATED PLATFORM - ELECTRONIC.

ROTARY JOINT - The link between the stationary and movable parts of a RADAR or microwave communication system, *e.g.*, between the transmitter/receiver and the moving (rotating, nodding, etc.) antenna.

ROTAXANE - A chemical compound grown in a crystalline structure with potential for use in molecular-size computers. Rotaxanes are thread-like molecules encircled by one or more ring-like molecules in such a way that the two ends of the thread are projected well away from the center of the ring and are terminated by bulky groups (somewhat like a dumb-bell) which do not allow the passage of the ring(s) over them, and thus the components are mutually interlocked. The term is derived from the Latin *rota*, wheel; *axis*, axle. See also CARBON NANOTUBE, MOLECULAR ELECTRONICS.

ROTODOME - A rotating RADOME which houses a radar antenna, generally aboard an aircraft.

ROUTE - The path that NETWORK traffic takes from its source to its destination.

ROUTER - See GATEWAY.

ROUTING - The process of selecting the correct interface and next HOP for a packet being forwarded in a NETWORK.

RUBBER-BALL LAUNCHING SYSTEM - A vehicle-mounted NONLETHAL WEAPON which fires up to 1,400 rubber-matrix balls with steel particles. The system consists of two launch units, with 10 cartridges to a unit (each cartridge contains 70 balls).

RUBBER DUCK - A floating decoy used to imitate a ship to a radar operator. See also GULL.

RUGGED EQUIPMENT - Rugged equipment is equipment designed for a specific environmental application. In addition, such equipment is designed to withstand an 18-inch drop, representing the height at which it is hand-carried in the field. Compare with RUGGEDIZED EQUIPMENT.

RUGGEDIZED EQUIPMENT - Off-the-shelf equipment satisfying the requirements of a severe environment application. Ruggedized equipment should be able to withstand a 9-inch drop. Compare with RUGGED EQUIPMENT.

RULE OF TWOS - A concept to provide redundancy and mutual support in military tasking; *e.g.*, two runners; two vehicles for tactical missions; two occupants for each vehicle; two men on security; *etc.* . . .

RULES OF ENGAGEMENT (ROE) - Principles and guidelines relating to the degree of force to be applied by military units, individual servicemen or law enforcement officials in the carrying out of their duties. NOTE: The following are sample ROEs from:

RAMP RULE - *Return fire* (respond to hostile act); *Anticipate attack* (respond to clear hostile intent), *Measure your force* (use force of magnitude,

intensity, duration measured to the threat); and ***Protect only lives with deadly force.***
[U.S. Army ROE Training Newsletter 96-6, Section 5]

VEWPRIK - Verbal warning; Exhibit weapon; Warning shot; Pepper spray; Riot control/rifle butt; Injure with fire (shoot to wound); and Kill with fire. [U.S. 1st Infantry Division ROE Template]

Five Ss - ***Shout*** (verbal warning); ***Show*** (weapons or threat of force); ***Shove*** (use physical force to restrain threat); ***Shoot to warn*** (warning shot); ***Shoot to wound***, or shoot to kill. [1st Cavalry Division ROE]

- ***1.*** You may use minimum force, including opening fire;
- ***2.*** Fire no more rounds than required. [SFOR, Operation Constant Guard, and 26th Marine Expeditionary Unit ROEs]

-- ***WARN*** them (verbal warnings); ***SCARE*** them (show of force, including use of riot control formations and positioning of armored vehicles - blocking of access); ***FORCE*** them (Use of riot control agents when authorized, Warning shots after an order to halt is given, Deadly force (absolute last resort). [Marine Corps]

RUNNING GEAR ENTANGLEMENT SYSTEM (RGES) - A NONLETHAL WEAPON designed to provide a rapidly deployable rope that can stop a boat by entangling its propellers.

S

SACRIFICIAL WINDOW - A replaceable filter in a night vision device that is provided to protect the objective lens from abrasive and adverse conditions. It is especially useful in blowing-sand environments, where the objective lens could be damaged permanently.

SALVAGE FUZE - A fuze designed to cause an aircraft bomb to detonate (at a preset altitude, say) in the event the carrying aircraft is disabled. See also SPECIAL WEAPONS EMERGENCY SEPARATION SYSTEM (SWESS).

SALVO INTERVAL - The time between salvos or bursts of decoys. Contrast with EJECTION INTERVAL.

SANCTUARY BASE - A secure, LOW OBSERVABLE (LO), all-weather forward operating base having minimal assets requiring protection from attack; *e.g.*, the runway, power systems, ordnance storage, aircraft maintenance assets, and C⁴I systems are self-maintaining and self-repairing. Chemical/biological hazards are cleaned up by NANOBOTS and biotechnology. Robots perform refueling, weapons loading, maintenance, security, and explosive ordnance disposal. [USAF 2025 Study]

SANDBOX - An isolated computer system in which administrators can safely test new software.

SATELLITE AND MISSILE SURVEILLANCE - The systematic observation of aerospace for the purpose of detecting, tracking, and characterizing objects, events, and phenomena associated with satellites and in-flight missiles, friendly and enemy. See also SURVEILLANCE.

SATELLITE COMMUNICATIONS (SATCOM) SYSTEM - A system consisting of *space elements* and *ground elements*. The space elements comprise satellites, either in geo-synchronous earth orbit (GEO) or low earth orbit (LEO), as well as all of the equipment required for their electronic and station-keeping operations. The ground elements consist of a transmitter and a receiver, which may be combined into a single transceiver, an antenna, power supplies and appropriate packaging and transport in the case of mobile units.

SCAN - (1) The path periodically followed by a radiation beam. (2) In ELINT, the motion of an electronic beam through space searching for a target. Scanning is produced by the motion of the antenna or by LOBE SWITCHING. (3) To examine sequentially part by part.

SCANNING - A repetitive motion given to the major lobe of an antenna.

SCANNING DETECTOR - A detector that observes successive portions of its field of view in accordance with a sequential system of scan. Contrast with STARING DETECTOR.

SCAN ON RECEIVE ONLY (SORO) - A generic term for an ECCM technique for use on conical scan or track-while-scan radars. It consists of degrading hostile SELF-SCREENING ECM techniques that exploit amplitude modulation.

SCAN PERIOD - The period taken by a radar, sonar, etc., to complete a scan pattern and return to a starting point.

SCAN RATE - The rate at which individual scans are recorded.

SCAN SCHEDULE - The DWELL TIME and the REVISIT TIME of a sensor.
NOTE: The SCAN SCHEDULE for a rotating radar antenna is defined by the antenna beam width and the mechanical rotational rate. See also ADAPTIVE SCHEDULER.

SCAN TYPE - The path made in space by a point on the radar beam; for example, circular, helical, conical, spiral, or sector.

SCATTERING - A process in which the energy of a traveling wave is dispersed in direction due to inhomogeneities of the medium. See also BACKSCATTERING, RADAR SCATTERING.

SCATTERING WITH ANGULAR LIMITATION PROJECTION ELECTRON BEAM LITHOGRAPHY (SCALPEL) - A technique used in the manufacture of transistor circuits.

SCENARIO - A narrative describing a chronological sequence of events expected to take place immediately prior to and during a conflict between opposing military forces. A scenario contains the following: A Geographical Location (e.g., Eastern Mediterranean); A general description of the objectives, missions and intentions of both sides; The OPERATIONAL SETTING; and A chronology of activities.

SCIENTIFIC AND TECHNICAL INTELLIGENCE - The product resulting from the collection, evaluation, analysis, and interpretation of foreign scientific and technical information which covers: a. foreign developments in basic and applied research and in applied engineering techniques; b. scientific and technical characteristics, capabilities, and limitations of all foreign military systems, weapons, weapon systems, and materiel, the research and development related thereto and the production methods employed for their manufacturer. See also FOREIGN INSTRUMENTATION AND SIGNALS INTELLIGENCE.

SCINTILLATION JAMMING - An ECM technique that operates by generating a signal which is both equal in amplitude to and 180 degrees out of phase with the actual SKIN PAINT signal from the jamming platform, and is returned to the victim radar simultaneously with the skin-return signal to provide a zero composite return to the radar.

SCREEN - (1) In SURVEILLANCE, CAMOUFLAGE and concealment, any natural or artificial material, opaque to surveillance sensor(s); interposed between the sensor(s) and the object to be camouflaged or concealed. (2) A security element

whose primary task is to observe, identify and report information, and which only fights in self-protection. (3) A computer display terminal.

SCREEN SCRAPING - The use of a computer program to translate between LEGACY application programs and new user interfaces so that the logic and data associated with the legacy programs can continue to be used.
[<http://www.whatis.com/screencsc.htm>] Also called ADVANCED TERMINAL EMULATION.

NOTE: A program that does screen scraping must take the data coming from the legacy program that is formatted for the screen of an older type of "green on black" display terminal and reformat it for a Windows user or for a web browser.

SCRIPT KIDDY (plural: SCRIPT KIDDIES) - An inexperienced HACKER who employs prepackaged software to conduct attacks against well-known vulnerabilities.

SEA BOUNCED JAMMING - A JAMMING signal reflected from the sea surface.

SEA POWER 21 - The current (2002) U.S. Navy vision to guide it in national defense. SEA POWER 21 is comprised of the triad *Sea Strike* - the projection of precise and persistent offensive power, *Sea Shield* - the projection of global defensive assurance, and *Sea Basing* - the projection of joint operational independence. This triad is integrated and enabled with an operational construct and architectural framework called **ForceNet**.

NOTES: (1) *Sea Strike* includes the following capabilities: Persistent intelligence, SURVEILLANCE, and RECONNAISSANCE, Time-sensitive STRIKE, ELECTRONIC WARFARE (EW)/information operations, Ship-to-objective maneuver (STOM), and covert strike; *Sea Strike* employs the following technologies: Autonomous, organic, long-dwell SENSORS, Integrated national, theater, and force sensors, Knowledge-enhancement systems, Unmanned combat vehicles, Hypersonic missiles, ELECTROMAGNETIC RAIL GUNS (EMRs), and HYPER-SPECTRAL IMAGING.

(2) *Sea Shield* includes the following capabilities: Homeland defense, Sea / littoral superiority, Theater air missile defense, and Force entry enabling; *Sea Shield* employs the following technologies: Interagency intelligence and COMMUNICATIONS REACH-BACK SYSTEMS, Organic MINE COUNTERMEASURES, Multi-sensor cargo inspection equipment, Advanced hull forms and modular mission payloads, DIRECTED-ENERGY WEAPONS, Autonomous unmanned vehicles, Common undersea picture, Single integrated air picture, Distributed weapons coordination, and Theater missile defense.

(3) *Sea Basing* includes the following capabilities: Enhanced afloat positioning of joint assets, Offensive and defensive power projection, Command and control (C²), Integrated joint logistics, and Accelerated deployment and employment timelines. *Sea Basing* employs the following technologies: Enhanced sea-based joint command and

control, Heavy equipment transfer capabilities, Intra-theater high-speed sealift, Improved vertical delivery methods, Integrated joint logistics, Rotational crewing infrastructure, and International data-sharing networks.

SEARCH ENGINE - Web-based software, which locates Web sites, which satisfy user queries (*e.g.*, keywords). Well-known search engines (1999-2000) include *AltaVista*, *AOL Search*, *Ask Jeeves*, *Excite*, *Google*, *HotBot*, *Infoseek*, *Lycos*, *MSN Search*, *Netscape Search*, *WebCrawler*, and *Yahoo* (there are many others).

NOTE: Search engines may be classified into two search-technique groups: keyword search engines (*e.g.*, *Yahoo*), and natural language search engines (*e.g.*, *Ask Jeeves*).

SEARCHLIGHTING - Continuous illumination with a radar beam, for a period of time, of a target.

SEA SHADOW - A small waterplane area, twin-hull (SWATH) boat originally built to explore low-observable technology. The craft resembles a wingless STEALTH aircraft. [Navy News & Undersea Technology, 5/24/93, pp. 1,8]

SEA SKIMMER - A missile designed to transit at less than 50 feet (or 15 meters) above the surface of the sea.

SEA SURVEILLANCE - The systematic observation of surface and subsurface sea areas by all available and practicable means primarily for the purpose of locating, identifying and determining the movements of ships, submarines, and other vehicles, friendly and enemy, proceeding on or under the surface of the world's seas and oceans. See also AIR SURVEILLANCE, COMBAT SURVEILLANCE, SURVEILLANCE.

SECONDARY MASS STORAGE - Mass storage media, which is neither random-access hard drive nor streaming tape, but is characterized by large sequential data transfer. See also MAGNETO OPTICAL RECORDING.

SECONDARY RADAR - (1) A radar in which the return signals are obtained from a beacon, transponder, or repeater carried by the target. (2) A RADIODETERMINATION system based on the comparison of reference signals with radio signals retransmitted from the position to be determined. Contrast with PRIMARY RADAR. Synonymous with SECONDARY SURVEILLANCE RADAR.

SECONDARY SURVEILLANCE RADAR - See SECONDARY RADAR.

SECOND GENERATION LANGUAGE (2GL) - A programming language that corresponds closely to the instruction set of a given computer, allows symbolic naming of operations and addresses, and usually results in a one-to-one translation of program instructions into machine instructions. Synonymous with ASSEMBLY LANGUAGE. See also FIRST GENERATION LANGUAGE, THIRD GENERATION LANGUAGE, FOURTH GENERATION LANGUAGE.

SECOND GENERATION RADAR SIGNAL - A generic classification of radar signal sophistication. Second generation radar signals feature modulation on carrier, pulse repetition interval staggering/jittering/coding, mixtures of mechanical and electronic beam scanning, frequencies in the A through J bands of the ELECTROMAGNETIC SPECTRUM, and FREQUENCY AGILITY.

See also FIRST, THIRD, and FOURTH GENERATION RADAR SIGNALS.

SECURITY LEVELS - The following are excerpts relating to security ratings per the National Computer Security Center's "Orange Book" (1993):

- **Level D** - *Minimal Protection*; no built-in security.
- **Level C1** - *Discretionary Security Protection*; systems provide separation of users and data....
- **Level C2** - *Controlled Access Protection*; makes users individually accountable for their actions through log-in procedures and audit trails.
- **Level B1** - *Labeled Security Protection*; all the protection of C2 level. In addition, access control beyond password protection,...
- **Level B2** - *Structured Security Protection* ("relatively resistant to penetration"); B2 level protection extended to all system resources. Systems must be structured from the outset to be penetration resistant....
- **Level B3** - *Security Domain* "highly resistant to penetration"); B3 systems must exclude any code that is not essential to security policy enforcement....
- **Level A1** - *Verified Design Protection*; functionally equivalent to B3, but formally documented, and the security policy of the system must be proven - mathematically if need be - to be consistent with stated security goals....

SECURITY ROBOT - A mobile automaton, or robot, consisting of a navigating system (to move in an obstacle environment) and a sensor array, or security patrol instrumentation (SPI). The SPI may include sensors for detecting fires, smoke, gas, and intruders, monitoring air quality, temperature, humidity, and identifying persons encountered. Sensors can include cameras, infrared, ultraviolet, and microwave detectors. The security robot can be made to record data as a function of time and location, activate alarms, and track multiple targets. Several robots may be controlled in a facility through use of Multiple Robot Host Architecture (MRHA) that can accommodate (1994) as many as 32 robots.

SEDUCTION - The successful transfer of homing guidance (track lock) of a weapon from own ship to an expendable device such as CHAFF, IR FLARE, or other DECOY. See also DISTRACTION.

SEDUCTION CHAFF - CHAFF used to present a decoy of comparable (or larger) RADAR CROSS SECTION to a missile radar which has already acquired the target ship. See also DISTRACTION CHAFF.

NOTE: SEDUCTION CHAFF must be deployed very close -- less than a missile radar pulse width - to the target ship.

SEEKER - A device that orients a munition's sensor to survey, acquire, lock-on, and track a target. Example: A homing device carried aboard a missile.

SEEKERLESS WEAPON - A standoff weapon capable of maneuvering to hit moving targets based on GLOBAL POSITION SYSTEM (GPS) satellite data. It features a two-way datalink that provides continuous connectivity to the GPS, permitting it to accurately strike a target without a seeker device.

NOTE: The seekerless weapon employs Precision Navigation (PNAV) technology to permit the weapon to land within four meters of its target.

SEISMOACOUSTIC ARRAY - A set of sensitive sound devices used to monitor wave and current dynamics and beach surf conditions.

NOTE: Seismoacoustic arrays located as far as 2.2 miles offshore have been found to be capable of detecting and tracking land and vehicle activity.

SELECTIVE AVAILABILITY (SA) - Measures taken to prevent an enemy from using the GLOBAL POSITIONING SYSTEM (GPS) against the U.S. To thwart such usage, the ground-control station can deliberately introduce satellite timing and position errors into satellite transmissions to reduce the accuracy of civilian and unauthorized users to 100 meters 80% of the time - enough for navigation but inadequate for weapons delivery.

NOTE: The effects of selective availability can be virtually eliminated in a local area through differential GPS (DGPS), a technique requiring two receivers, one of which is at a known location.

SELECTIVE CALL (SELCAL) - A paging system mainly employed between aeronautical ground stations and aircrafts. The system is widely used on commercial aeronautical HF (3-30 MHz) radio circuits and by some military aeronautical stations, Canada being an example. The SELCAL code is comprised of a series of 4 letters representing a specific sequence of audio tones that much resemble those of a TouchTone™ telephone. The SELCAL is transmitted by the ground station to an aircraft's HF radio set. Upon successful reception of a SELCAL page, the aircraft's SELCAL visual indicator and annunciator alert the pilot/communications officer that the aircraft's HF radio has been addressed and that a ground station wishes to communicate with it. [*Richard LaCroix's Military Communications Home Page* at <http://www.milspec.ca/>]

SELECTIVE IDENTIFICATION FEATURE (SIF) - A capability which, when added to the basic Identification Friend or Foe (IFF) system, provides the means to transmit, receive, and display selected code replies.

SELECTIVE LASER SINTERING (SLS) - A process that converts heat-fusible powders into solid objects through the external application of optical (laser) energy. See also STEREOLITHOGRAPHY.

SELF-ASSEMBLY - A manufacturing process for NANOPHASE MATERIAL that exploits the inherent tendency of molecules and molecular clusters to interact and organize themselves into larger-scale structures.

NOTE: Self-assembly is a rapid process because molecules naturally arrange themselves in seconds or minutes.

SELF-FORGING FRAGMENT (SFF) - Any of explosively formed penetrator (EFP) warheads that penetrate an armored vehicle, say through the bottom (*e.g.*, from a tank mine). After penetrating the bottom of the vehicle hull, a kinetic-energy slug creates spalling effects that can ignite ammunition and fuel, or a number of submunitions are fired at short intervals (*e.g.*, 5 ms). These devices generate overpressure within sealed vehicles, amplifying injuries to personnel.

SELF-HEALING MATERIALS - See AUTONOMIC HEALING

SELF-HEALING MINEFIELD - A minefield designed to resist breaching. It reacts to breaching attempts by reorganizing itself to cover the breach by automatic relocation of the mines (*i.e.*, the mines move themselves to cover the breached area). See also SELF-REPOSITIONING MINE.

SELF-PROTECTION - A mission area in which electronic warfare systems provide platform self-protection through active transmission or reflection of electromagnetic energy or destruction of enemy command, control, and communications or weapons systems. See also MISSION SUPPORT, THREAT WARNING.

SELF-PROTECTION ESM/ECM - ESM/ECM performed by a platform to protect itself against hostile terminal threat weaponry. Contrast with TACTICAL SUPPORT ESM/ECM. See also COUNTER-HOMING and COUNTER-FUZING.

SELF-REPOSITIONING MINE - A land mine that has an awareness of the battlefield and the status of other (self-repositioning) mines via a simple "intranet". If one region is cleared of mines, others nearby would move quickly into place to reconstruct the field. One mine repositioning approach involves a small piston on the underside of each mine. An explosive charge or other device drives the piston out to propel or hop the mine in a certain direction. Another approach is to equip the mines with small treads or crawlers to provide mobility. See also SELF-HEALING MINEFIELD.

SELF-SCREENING ECM - An ECM technique used by a potential target to protect itself against external electronic systems, such as those carried by missiles or weapons systems.

SEMANTIC ATTACK - A form of HACKING in which the perpetrator provides bad or false data to the system under attack in such a way that the victim will not be able to detect the intrusion.

NOTE: An example of semantic attack is the providing false data about the existence of an earthquake, to a system, which is programmed to shut down during an earthquake. In the commercial world, example semantic attacks include feeding false claims to a claims processor; false loan information to banking systems, etc.

SEMI-ACTIVE HOMING GUIDANCE - A system of HOMING GUIDANCE wherein the receiver in the missile utilizes radiation from the target, which has been illuminated by an outside source.

SEMIAUTOMATED IMAGERY INTELLIGENCE PROCESSING (SAIP) - A system of integrated IMAGERY INTELLIGENCE (IMINT) exploitation software tools and associated hardware designed to pre-process imagery from airborne platforms and CUE image analysts to potentially exploitable events. SAIP provides the tools needed to rapidly and accurately analyze high volume SURVEILLANCE IMAGERY, and permits the rapid generation of reports and image products in support of the warfighter. [NAVWAR Joint Warfighting Science and Technology Plan (*circa* 2000)]

NOTE: SAIP brings together template-based SYNTHETIC-APERTURE RADAR (SAR) AUTONOMOUS TARGET RECOGNITION, cluster analysis, object-level change detection, interactive target recognition, ELECTRO-OPTIC (EO) and SAR site monitoring, and force structure analysis to provide commanders with greatly improved SITUATIONAL AWARENESS (SA).

SEMICONDUCTOR BRIDGE (SCB) INITIATOR - A timing device used to ignite low-voltage explosive devices. It produces a low-energy pulse, which causes a doped region on a polysilicon substrate to burst into a bright plasma. This plasma discharge causes an ignition, which produces an explosive output within microseconds, depending on the material used and the initiator geometry.

SENSITIVE COMPARTMENTED INFORMATION (SCI) - Security controls over and above the usual security classifications (*e.g.*, Confidential, Secret, Top Secret). SCI information (and material) bear special community controls indicating restricted handling within present and future community intelligence collection programs and their end products for which community systems of compartmentation have been or will be formally established.

NOTE: Designations of SCI compartments, such as UMBRA (particularly sensitive communications intelligence), RUFF (intelligence based on satellite imagery), and BYEMAN (a control system to protect information related to NRO collection systems - as opposed to their products, budget, structure, etc., were once classified themselves.

SENSITIVE RADAR - A radar capable of detecting LOW OBSERVABLE targets. EXAMPLES: BISTATIC, OTH, WIDEBAND RADAR; LADAR.

SENSITIVITY - See RECEIVER SENSITIVITY.

SENSOR - (1) An equipment which detects, and may indicate, and/or record objects and activities by means of energy or particles emitted, reflected, or modified by

objects. (2) A device that responds to physical stimulus and produces a resulting signal.

SENSORCRAFT - An unmanned combat aerial vehicle (UCAV) designed around its sensor suites. Its configuration is such that no part of the aircraft obstructs the sensors' field of view (FOV).

SENSOR-FUZED WEAPON (SFW) - A weapon designed to attack multiple targets (*e.g.*, armored vehicles) in a single pass, in all weather, day or night, from altitudes ranging from 200 to 20,000 feet. The SFW dispenser houses ten bombs, each with four target-sensing submunitions with a built-in INFRARED sensor that searches for a target matching a designated set of IR characteristics, and fires an explosively-formed projectile at the qualifying target. See also SKEET.

SENSOR SEEDING - The dropping (by an aircraft, for example) of a number of small battery-powered sensing devices (perhaps the size of a golf ball). Each device is made to blend into its surroundings, and contains acoustic, motion, light, and full-spectrum radio frequency sensors, as well as GPS (to determine the exact location when they land). The devices would detect gunfire, flashes, radio communications, etc., and report sensed data to the monitoring activity.

NOTE: Such seeds could be dropped in a line to form a security "fence" to detect individual "foot tripping" of border and secured zones.

SENTIENT - A descriptor for a BRILLIANT MUNITION that is aware of itself and its surroundings.

SENTIENT MUNITION - A type of "brilliant" munition that is aware of itself and its surroundings; for example, a brilliant munition that responds to its environment, or communicates with others among the same payload or salvo to seek out the targets and maximize interception or destruction probability. Also called CORRELATED MUNITION.

SENTINEL - A network intrusion detection system that searches for the characteristics of attacks to predict security problems and monitor network activities. The system is able to identify attacks that have similar characteristics as previous threats and detect new ones through its "learned" intelligence.

SEQUENTIAL LOBING - See LOBE SWITCHING.

SERRODYNE JAMMING - A method of "pulling off" the velocity gate of a Doppler radar by using a voltage-controlled phase shifter, usually a TRAVELING WAVE TUBE (TWT). This introduces a frequency shift that pulls the Doppler tracking gate away from the SKIN ECHO.

SERVER - A computer that provides a service for other computers connected to it via a network. NOTE: A *file server* consists of a computer and associated hardware

and software that provides file-handling and storage functions for multiple users on a network.

SESSION COOKIE - A COOKIE that expires as soon as you log out, or a short time thereafter as set by the web site. Contrast with PERSISTENT COOKIE.

SET BEAM HIGH INTENSITY HAND-HELD SEARCHLIGHT SYSTEM - A NONLETHAL WEAPON which generates six million candles of light power with an effective range at high strobing level of 100 yards.

SET-ON RECEIVER - A receiver/jammer designed to automatically detect, prioritize, and jam multiple frequencies simultaneously on a time-shared basis.

SHALLOW-WATER ASSAULT BREACHING SYSTEM (SABRE)
- A single-rocket-deployed demolition line-charge system, used primarily to clear mines in the surf zone that is effective in water depths between three and 10 feet.

Compare with DISTRIBUTIVE EXPLOSIVE TECHNOLOGY (DET).

See also AIRBORNE MINE-NEUTRALIZATION SYSTEM (AMNS), RAPID AIRBORNE MINE-CLEARANCE SYSTEM (RAMICS), and SHALLOW-WATER INFLUENCE MINE SWEEP (SWIMS) SYSTEM.

SHALLOW WATER INFLUENCE MINE SWEEP (SWIMS) SYSTEM - A self-contained system designed to carry out high-speed magnetic or magnetic/acoustic influence mine-sweeping missions in shallow waters. The system consists of a towed magnetic and acoustic source, a tow/power delivery cable, a power conditioning-and-control subsystem, and an external or palletized power supply. It is capable of being towed at speeds up to 40 knots, which provides for a large area-coverage rate.

See also AIRBORNE MINE-NEUTRALIZATION SYSTEM (AMNS), DISTRIBUTIVE EXPLOSIVE TECHNOLOGY (DET), RAPID AIRBORNE MINE-CLEARANCE SYSTEM (RAMICS), and SHALLOW-WATER ASSAULT BREACHING (SABRE) SYSTEM.

SHAPE MEMORY ALLOYS (SMA) - Materials such as PIEZOELECTRIC materials, ELECTROSTRICTIVE ceramics and MAGNETOSTRICTIVE materials.

SHAPING - A method of radar cross section reduction. Shaping positions target surfaces and edges so that radar energy is reflected away from the radar.

SHARED-APERTURE ANTENNA - An antenna utilizing an existing antenna structure for the transmission of two or more electromagnetic signals.

See also CONFORMAL ANTENNA, DOUBLY CONFORMAL ANTENNA, MICROSTRIP ANTENNA.

NOTE: The sharing of the aperture may be accomplished by the incorporation of several feed devices or by the design of a broadband, dual-or-more-frequency radiation structure. Sharing an aperture provides the advantage of minimizing the number of discontinuities in the surface to the structure or platform.

SHIELDING - A barrier of attenuating material used to reduce radiation hazards. Shielding involves surrounding a circuit with metal or coating its enclosure with metallic paint, and providing a low-resistance path to ground.

See also NUCLEAR ELECTROMAGNETIC PULSE COUNTERMEASURES (NEMPCM).

SHIP CONTROL SYSTEM (SCS) - A sub-system of the INTEGRATED BRIDGE SYSTEM (IBS) which provides command and control signals to ship control and propulsion systems and monitors the performance of these systems.

SHOCK RADAR - See IMPULSE RADAR.

SHOE-HORN INSTALLATION - Reference to the cramming of new EW avionics systems into aircraft that had little or no room to spare, often forcing use of pod-mounted devices. Shoe-horn installations generally cause EMC and RFI problems.

SHOOT-AND-SCOOT - A tactic in which a firing unit moves into position, fires at its target(s), then departs quickly for another site before the enemy can return fire. NOTE: SHOOT-AND-SCOOT tactics are often used by self-propelled howitzers which resemble tanks but are not designed to fight in fast-moving, close combat like tanks. This tactic is also used in air defense, complicating the SUPPRESSION OF ENEMY AIR DEFENSE (SEAD) problem.

SHORAN - A precise short-range electronic navigation system which uses the time of travel of pulse-type transmission from two or more fixed stations to measure slant-range distance from the stations. Also, in conjunction with a suitable computer, used in precision bombing. (This term is derived from the words "SHort RAnge Navigation.")

SHORT PULSING - An ECCM technique used by radars. The transmitted pulse is less than the expected turnaround time of the repeater jammer.

SHORT-RANGE UNMANNED AERIAL VEHICLE (SRUAV) - The SRUAV has a range of 150 km or more ahead of the forward line of troops (FLOT), and is used for reconnaissance and surveillance, target spotting, EW, nuclear, biological and chemical (NBC) reconnaissance, meteorology, and Command and Control (C²) missions. Designed with a cruising speed of less than 90 knots, the SRUAV has an endurance of 8-12 hours, and can carry sensors for day/night imaging, communications relay, SIGNALS INTELLIGENCE (SIGINT), MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT), target designating and EW.

Contrast with CLOSE-RANGE UNMANNED AERIAL VEHICLE (CRUAV). See also IMAGERY, IMAGERY INTELLIGENCE, UNMANNED AIR VEHICLE (UAV).

SHORTSTOP - See SHORTSTOP ELECTRONIC PROTECTION SYSTEM (SEPS).

SHORTSTOP ELECTRONIC PROTECTION SYSTEM (SEPS) - (1)

A device, which employs a passive detection system to automatically counter different types of proximity-fused artillery and mortar shells by emitting RF signals that prematurely detonate detected fuses several meters above the ground, outside of their effective range. **(2)** Electronic parasols that detect and prematurely detonate munitions during flight to render them harmless. See also ACTIVE ARMOR.

SHROUDING BMD COUNTERMEASURES - High-altitude STEALTH TECHNIQUES to reduce the re-entry vehicle RADAR CROSS SECTION, or to hide a warhead in a CHAFF cloud, or to create multiple clouds of CHAFF, some containing warheads. An alternative approach is that of infrared stealth -- making the warhead invisible to heat-seeking homing sensors by, for example, cooling it with liquid nitrogen. See also EVASIVE MANEUVERS BMD COUNTERMEASURES, FALSE-TARGET BMD COUNTERMEASURES, SUBMUNITION BMD COUNTERMEASURES, TRAJECTORY BMD COUNTERMEASURES.

SHUTTER CONTROL - The ability to block earth imaging systems from observing specified geographic areas.

SIDE LOBE - A radiation LOBE in any direction other than that of the MAJOR LOBE. See also BACK LOBE, MINOR LOBE.

SIDE LOBE CANCELING - An ECCM technique to counter high-power noise jammers. It uses an additional 20 dB of electronic canceling above that, which is provided by the basic low SIDE LOBE design.

SIDE-LOOKING AIRBORNE RADAR (SLAR) - (1) An airborne radar, viewing at right angles to the axis of the vehicle, which produces a presentation of terrain or moving targets. **(2)** A surveillance radar that illuminates two narrow swaths that generally run at right angles to the line of flight, one on each side of the aircraft.

NOTE: The forward motion of the aircraft sweeps the swaths over the terrain, producing an image that resembles an aerial photograph in perspective. The SLAR image, however, differs from an aerial photograph since the SLAR has larger coverage but poorer resolution. The SLAR image is unimpeded by cloud cover, rain and dust, which often reduce the effectiveness of aerial photography.

SIGINT - See SIGNALS INTELLIGENCE.

SIGNAL - **(1)** Any transmitted electrical impulse. **(2)** A distinctive energy impulse transmitted within the ELECTROMAGNETIC SPECTRUM which possesses useful

characteristics. Contrast with NOISE. NOTE: A SIGNAL for one system may concurrently represent NOISE to another system.

SIGNAL COMPROMISE REDUCTION - Techniques to prevent the interception of a signal, or to allow reception of a signal by deny interpretation of the modulation. Techniques to prevent interception include:

- Permit no stray radiation (e.g., ducted transmission by cables, waveguides, optical fibers);
- Minimize stray radiation (e.g., controlled beam width using laser systems, antenna patterns with SIDELOBE CANCELLATION or NULL STEERING, exploiting propagation losses with MILLIMETER WAVE (MMW) systems);
- Make detection difficult (e.g., burst-mode communications, FREQUENCY HOPPING, SPREAD SPECTRUM).

Techniques that allow detection but deny interpretation involve cryptology.

SIGNALS INTELLIGENCE (SIGINT) - A category of intelligence information comprising either individually or in combination all COMMUNICATIONS INTELLIGENCE, ELECTRONICS INTELLIGENCE, and FOREIGN INSTRUMENTATION AND SIGNALS INTELLIGENCE.

See also MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT).

NOTE: SIGINT signals include the following:

<u>SIGINT Signals</u>	
Radar	Pulsed RF; Stacked Beam; Log Swept
Communications	Frequency Shift Keying (FSK); Modem Signals; Machine-to-Machine Interchanges
Sonar	Passive; Active; Higher Frequency Mine Detection Applications

SIGNALS MANAGEMENT - A SPACE AND ELECTRONIC WARFARE (SEW) warfare support discipline that encompasses measures to protect force signals and includes signals security, communications security, computer security, transmission security, and emission control management.

SIGNALS SECURITY (SIGSEC) - A generic term that includes both COMMUNICATIONS SECURITY and ELECTRONICS SECURITY.

SIGNAL-TO-JAMMING RATIO (SJR or S/J) - The ratio of the desired signal level to the jamming signal level in the signal's BANDWIDTH.

SIGNAL-TO-NOISE RATIO (SNR or S/N) - (1) The ratio of the amplitude of the desired signal to the amplitude of noise signals at a given point in time. (2) The ratio of the value of the signal to that of the noise. NOTE: This ratio is usually in terms of peak values in the case of impulse noise and in terms of the root-mean-square values in the case of random noise.

SIGNATURE - An OBSERVABLE which permits identification of the generating object. See also SPECTRAL SIGNATURE.

SIGNATURE CONTRIBUTOR - A source of SIGNATURE TRANSIENT of a vehicle or aircraft.

SIGNATURE CONTROL - The manipulation of a platform's emission and physical characteristics, such as radar cross section, infrared modulation, radar pulse repetition rate, etc. in order to reduce an adversary's ability to detect, track, and engage friendly units during combat operations.

Synonymous with SIGNATURE MANAGEMENT and LOW OBSERVABLES.

NOTE: SIGNATURE CONTROL may be partitioned into the following: ACOUSTICS SIGNATURE CONTROL, INFRARED SIGNATURE CONTROL, LASER SIGNATURE CONTROL, MAGNETIC SIGNATURE CONTROL, MULTISPECTRAL SIGNATURE CONTROL, OPTICAL SIGNATURE CONTROL, RADIO FREQUENCY (RF) SIGNATURE CONTROL, and WAKE SIGNATURE CONTROL.

SIGNATURE DETECTION - A type of INTRUSION DETECTION that recognizes a HACKER attack on the basis of known attack characteristics or signatures; also called ATTACK DETECTION.

Contrast with ANOMALY DETECTION. See also HOST-BASED INTRUSION DETECTION, NETWORK-BASED INTRUSION DETECTION, PORT SCAN.

SIGNATURE MANAGEMENT - See SIGNATURE CONTROL.

SILENT ATTACK WARNING SYSTEM (SAWS) - A passive infrared, wide-angle missile warning system to provide long-range, multispectral hemispherical warning of launches and trajectories of surface-to-air and air-to-air missiles.

NOTE: A "second generation" SAWS is being developed, which uses MULTICOLOR SPECTRAL and track processing algorithms to detect threats in high background clutter environment, while limiting false alarms to less than 1 per hour.

SILENT GRIDLOCK - Establishing a GRIDLOCK by passive means only.

SILENT RADAR - A radar that operates on the principle of frequency modulated continuous wave (FMCW) and is virtually undetectable by ESM by virtue of its very low radiated power and absence of pulses. See also LOW PROBABILITY OF INTERCEPT (LPI) RADAR.

NOTE: The power output of a silent radar is only a few watts vs. the tens of thousands of watts of peak power generated by conventional pulsed power radars.

SILENT SOUND DEVICE - A NONLETHAL WEAPON consisting of a device, which can transmit ultrasound signals which are understood by the brain but not detectable by the human ear. See also ACOUSTIC WEAPON. Compare with NEURO-ELECTROMAGNETIC DEVICE.

SILICON ON INSULATOR (SOI) - A layered structure consisting of a relatively thin stratum of silicon - from 50 nm to 100 nm, depending on the application - in which circuitry is fabricated, separated from a supporting semiconductor substrate (typically silicon) by an insulating layer of silicon dioxide 80 nm to 1nm thick.

SIMULATION PROGRAM with INTEGRATED CIRCUIT EMPHASIS (SPICE) - A circuit network simulation program.

SIMULATIVE COMMUNICATION DECEPTION - That type of COMMUNICATION DECEPTION that consists of actions to simulate friendly, notional, or actual capabilities to mislead hostile forces. [Adapted from the definition of SIMULATIVE ELECTROMAGNETIC DECEPTION]

SIMULATIVE ELECTROMAGNETIC DECEPTION - That type of ELECTROMAGNETIC DECEPTION that consists of actions to simulate friendly, notional, or actual capabilities to mislead hostile forces.

SIMULATIVE ELECTRONIC DECEPTION - Actions to represent friendly notional or actual capabilities to mislead hostile forces.

SIMULTANEOUS LOBING - See MONOPULSE.

SINGLE STATION LOCATION - The geographic position fixing of an emission source from a single detecting site.

SINUOUS COURSE CLOCK - A mechanical device positioned near the helm on the bridge of a ship. The device is associated with a number of cams of various shapes. When one of these cams is inserted in the sinuous course clock, it will rotate at a fixed rate, causing a pointer to move over a gyroscope repeater. The helmsman then adjusts the ship's rudder to maintain the position of the sinuous course clock's pointer at a fixed azimuth. See also ZIG-ZAG COURSE.

NOTE: Use of the sinuous course clock causes the ship to vary its course continuously along a base course, thus making it difficult for a tracking submarine to

compute a torpedo solution. In a multi-ship formation, the clocks are synchronized so that all ships maneuver together to maintain relative formation positions.

SITUATIONAL AWARENESS (SA) - Knowledge of one's status relative to the threat in a tactical environment.

SITUATIONAL AWARENESS BEACON WITH REPLY (SABER) -

A system which allows tactical commanders and shipborne and airborne platforms to locate and identify friendly forces. It can opt for either line-of-sight connectivity or satellite communications links enabling over-the-horizon operations. SABER taps the GLOBAL POSITIONING SYSTEM (GPS) for location data on each of its platforms. A miniature beacon package broadcasts location information as well as platform identifier data to SABER terminals. Since beacon traffic is two-way, the commander can tailor the position query rate to support operational needs.

NOTE: Equipped with SABER, attacking aircraft sent into a battlespace can query the ground below to determine if any friendly forces are in the vicinity of their targets. Data from SABER-equipped units can be merged with other situational awareness systems such as the Army's enhanced position location reporting system (EPLRS).

SITUATION AWARENESS FROM ENHANCED THREAT

INFORMATION (SAFETI) - The real-time fusion of SYNTHETIC APERTURE RADAR (SAR) and SIGNALS INTELLIGENCE (SIGINT) data to provide enhanced intelligence products for precision targeting and target identification.

SKAT SHELL - A NONLETHAL WEAPON shell capable of dispersing continuous tear smoke for crowd control. It releases multiple individual burning projectiles from a single cartridge. Each projectile burns for 30 seconds. Its effective range is more than 130 meters.

SKEET - A warhead which may be a component of a submunition. One type of parachute-deployed submunition (BLU-108/B SFW) carries four skeet warheads, which are detached in pairs from the spinning submunition cylinder (flipped away like a trapshooting skeet) when the submunition is aligned over the target area. Each skeet carries an INFRARED (IR) sensor and a warhead. When the skeet's IR sensor identifies a target it fires a wadded-up copper plate through the armor, sending splinters throughout the interior. See also SENSOR-FUZED WEAPON (SFW).

NOTES: (1) Because of the nature of the skeet charge, REACTIVE ARMOR (RA) is ineffective against it. (2) If a skeet doesn't find a target after a specified length of time, it will explode into fragments as a harassment measure and to prevent it from becoming hazardous unexploded ordnance (EXO).

SKIN ECHO - See SKIN PAINT.

SKIN PAINT - A radar indication caused by the reflected radar signal from an object.

SKIN RETURN - See SKIN PAINT.

SKIN TRACKING - The tracking of an object by means of a skin paint.

SKIRT JAMMING - JAMMING a MONOPULSE radar at frequencies on the skirts of the response curve of the radar. NOTE: The skirts of a frequency response curve are the ranges of frequencies above and below the intended frequency of radar reception, but within the detection range of the receiver.

SKY WAVE - A radio wave propagated toward, and returning from, an IONOSPHERE. Contrast with GROUND WAVE

SLANT DISTANCE - (1) The distance between two points that are not at the same elevation. Used in contrast to ground distance. (2) The line of sight distance between two points, nor at the same level relative to a specific distance. Synonymous with SLANT RANGE.

SLANT RANGE - See SLANT DISTANCE.

SLEEP AGENT - See CALMATIVE AGENT.

SLEEPER WEAPON - A weapon clandestinely positioned deep in enemy territory to be activated and employed when a threat emerges or a target to be neutralized comes within its range.

SLID - Acronym for SMALL LOW-COST INTERCEPTOR DEVICE, a FOCAL PLANE ARRAY INFRARED sensor-based TERMINAL DEFENSE system intended to kill incoming anti-armor missiles, and artillery and mortar rounds. The interceptor device is a ROLLING AIRFRAME MISSILE (RAM), approximately 21 inches long and 4 inches in diameter that incorporates impulse divert thrusters (i.e., positioning jets) for lateral maneuvering. The threat warning system, operating in the MID-INFRARED wavelength, detects and hands over the target to the mid-infrared narrow FIELD-OF-VIEW (FOV) tracking system to place the crosshairs of the sight on the incoming weapon. Once the tracker acquires the threat, a bore-sighted LASER DESIGNATOR illuminates the target, and the interceptor missile is launched. The interceptor carries a LASER SEEKER in its nose to home on the designator's energy.

SLOCUM-GLIDER - An AUTONOMOUS UNDERWATER VEHICLE (AUV) which is powered by different temperature layers in the ocean. The Slocum Glider employs a heat engine that draws energy from the ocean thermocline (an ocean layer where the temperature changes rapidly with a small change in depth), the result being that by cycling indefinitely between the surface and a programmed depth, it can get the energy needed to change its buoyancy from the temperature of the surrounding water. The Slocum Glider can be used to collect high-resolution profiles of physical, chemical and bio-optical properties of the ocean. (e.g., measure salinity and temperature, plot currents and eddies, count microscopic plants, and record sounds such as whale songs).

SLOT BUOY - See SUBMARINE LAUNCHED ONE-WAY TRANSMISSION (SLOT) BUOY.

SLOW WALKER - A military space mission, originally to detect and track aircraft afterburner emissions, then evolving to that of real-time detection of first-stage missile exhausts. See also FAST WALKER, JOGGER.

SMALL AEROSTAT SURVEILLANCE SYSTEM (SASS) - An AEROSTAT mounted radar. The balloon is held in position by cables that come down to ground-based moorings. An umbilical cord is used to provide power to the radar and convey radar display data to the ground.

SMALL CRAFT ADVANCED TACTICAL RADAR (SCATR) - An Inverse Synthetic Aperture Radar (ISAR) which creates a three-dimensional image of a target. This is done in real time to create a series of radar frames as the target moves in three dimensions. SCATR employs a software-based NEURAL NETWORK analysis system to identify major structural components and generate approximate line drawings to match the radar-generated silhouette.

SMALL DIAMETER BOMB (SDB) - A Precision-Guided Munition (PGM) of smaller diameter than conventional bombs, thus enabling fighters and bombers to carry more bombs and attack more targets with fewer planes. [Govcon.com News - 10/01] Also called SMALL SMART BOMB (SSB). See also SWING WING ADAPTER KIT (SWAK). NOTE: The small diameter bomb is a Small Bomb System (SBS) and part of the Miniature Munition Capability Program.

SMALL LOW-COST INTERCEPTOR DEVICE - See SLID.

SMALL SMART BOMB (SSB) - See SMALL DIAMETER BOMB (SDB).

SMALL UNIT RIVERINE CRAFT (SURC) - A small rigid-hull craft designed to provide tactical waterborne lift for conventional military operations in a riverine environment. The SURC is designed to carry up to 18 combat-loaded Marines, plus a crew of two, and remain afloat as a survival platform even when filled with water. Powered by a hull propulsion system, the SURC has a draft of 24 inches and can maintain an average speed of 30-35 knots. It is capable of beaching bow-first on unobstructed shoreline with mud, sand, silt or gravel surfaces at one-quarter cruising speed. It can be fitted with multiple gun mounts for both medium and heavy machine guns. It can be lifted by a heavy-lift helicopter and will be C-130 transportable with its organic trailer.

SMART AIRCREW INTEGRATED LIFE SUPPORT SYSTEM (SAILSS) - A system designed to monitor the pilot's physiological data (e.g., pulse and breathing rates, oxygen flow, brain wave and muscle activity) via sensors embedded in undergarments and the helmet. These data are used to adjust the life support equipment, including the antigravity, or "G", suit, and the normal and positive pressure-breathing oxygen systems for the G-force and flight altitude that the aircraft is experiencing.

SMART AMMUNITION - A generic classification. Smart ammunition requires target designation by an auxiliary system either external or internal to the munition/missile or delivery system. Contrast with BRILLIANT AMMUNITION, DUMB AMMUNITION.

NOTE: Examples of smart ammunition are laser beam riders and missiles, which home in on laser designation or radar designation.

SMART ARMOR - A form of ACTIVE ARMOR which uses sensors to detect a round as it hits and then determine its critical parameters. Embedded microprocessors then initiate the appropriate charge-momentum transfer to blunt the effectiveness of the incoming penetrator round or raises bars to break up the penetrator.

See also ELECTROMAGNETIC ARMOR, REACTIVE ARMOR.

SMART BULLET - See BARREL-LAUNCHED ADAPTIVE MUNITION (BLAM).

SMART CHAFF - CHAFF which is enhanced by external radiation or cross-section modulation. See also PASSIVE EXPENDABLES.

SMART CARD - A credit-card sized plastic card having an embedded semiconductor containing user information. The smart card employs an embedded read/write device that can decipher data within the card and add to that data by reading and storing data as the card is being used. Also called INTEGRATED CIRCUIT CARD.

See also MEMORY CARD, MICROPROCESSOR CARD.

SMART DUST - A collection of MICROELECTROMECHANICAL SYSTEMS (MEMS) wired up to form a simple computer contained in a "mote", light enough to remain suspended in air (like dust), buoyed by the currents. Each mote contains a solar-powered thick film battery, a GPS receiver and various sensors and is able to communicate with other motes and control stations using optical transceivers. Also called DIGITAL DUST.

NOTE: Smart dust has potential for use in locations, which are hazardous to humans, including space and hostile military areas.

SMART FLUID - A fluid which will instantly turn solid with no change in temperature when an electric current is passed through it, and which will again liquefy when the current is removed.

SMART JAMMER - A JAMMER having extensive signal-analysis capability to provide for efficient use of jamming resources.

NOTE: A smart jammer features accurate frequency measurement, precise direction-of-arrival information, breaking of spread spectrum codes, nearly instantaneous following of frequency hopping patterns, determination of modulation types,

encryption techniques, data format, diversity technique and combining method, and knowledge of any multiple access scheme used by the target radar.

SMART MARKER - A nuclear/Biological/Chemical (NBC) hazard sensor, which may be delivered or implanted as a "stay-behind" or "remotely-emplaced" to detect and monitor NBC hazards in areas of interest. The GPS-carrying marker would be fitted with INFRARED (IR) and visual beacon strobe, a digital storage/retrieval module, and perhaps an anti-tampering device. [*U.S. Army Concept Experimentation Program #0301, 12/10/1999*]

SMART MATERIALS - See SMART STRUCTURES.

SMART MATTER - See SMART STRUCTURES.

SMART METALS - Special metals, formed with chemical additives or blended in a particular form, used to control certain activities while allowing legitimate ones. For example, a metal designed to perform satisfactorily in a legitimate chemical plant might be designed to fail or emit tell-tale signs to inspectors if the plant is used for other purposes.

SMART MINE - A mine which self-destructs after a preset period of time. Contrast with DUMB MINE.

SMART MUNITION - A "many-on-many" munition with a minimal target selection capability that does not require an operator in the loop. Contrast with BRILLIANT MUNITION and GUIDED MUNITION.

NOTE: There are two prime categories of SMART MUNITIONS: terminally guided ("hit-to-kill") and sensor fuzed ("shoot-to-kill").

SMART OPTICS - Gradient refractive index (GRIN) material used to bend, join, divide, direct and guide light beams in a predictable, integrated manner.

SMART POWER SUPPLY - An ECM system power supply, which matches the output power to the requirements of the incoming threat.

SMART RADIO - A radio system that actively senses the ELECTROMAGNETIC ENVIRONMENT and uses free, unassigned portions of the SPECTRUM for message transmission. See also SPECTRUM MANAGEMENT.

SMART SENSOR - Sensors which merge electronic data processing with the sensing devices. See also BIOMETRIC DEVICE.

NOTE: SMART SENSORS include multi-sensors, which handle inputs from two or more sensors simultaneously, and vision-based sensors for positioning, inspection, and identification.

SMART SENSOR-FUZED WEAPON - A generic term for a SMART WEAPON class of munitions to exploit armor penetration techniques to overcome ACTIVE ARMOR and reactive armor. Such munitions can search for targets, and possess fragment generators to produce the number of fragments most effective against the type of target detected. These fragments can then be steered to the target.

SMART SKIN - A vehicle (e.g., aircraft) surface composed of various sensors embedded into composite material. See also CONFORMAL ANTENNA, CONFORMAL AVIONICS, EMBEDDED AVIONICS.

NOTES: (1) Smart skin contains, in effect, a nervous system consisting of sensing systems, such as fiber-optic sensors, to monitor and measure vibrations, temperature, strain, chemical activity, impact energy, magnetic anomalies, acceleration, and acoustic emissions. In aircraft, smart skins provide real-time measurements and reports to aircraft crews of the aircraft structural integrity.

(2) Do not confuse with "SmartSkin™," a new technology employed in divers wet suits that offers thermal protection in a wide range of environments by responding to both external and internal conditions. SmartSkin™ involves a hydrogel, a hydrophilic/hydrophobic copolymer embedded in an open-cell foam layer bonded to the inside of a closed-cell neoprene layer in a composite wet suit fabric with nylon or nylon/Lycra® outer and inner layers. SmartSkin™ absorbs cold water that has flushed into the suit and expands to close openings at the hands, feet and neck, preventing more water from entering. Water trapped inside the suit heats up upon body contact. If the water warms up past a transition temperature determined by the proportion of hydrophilic to hydrophobic components, the hydro gel releases water and contracts, allowing more water to flush through the suit. This passive system constantly regulates the internal temperature without the need for batteries or mechanical action.

Source: Rodie, Janet Bealer, "Quality Fabric of the Month," *Textile World*, March 30, 2003 (textileworld.com).

SMART SLEEVE - A system of embedded sensors and active elements employed in torpedoes to reduce the noise caused by torpedo movement through the water, which can interfere with the weapon's sensors. The objective is the ability of a torpedo to cancel vibrations caused by boundary layer turbulence before they reach the torpedo's sonar sensor.

SMART STRUCTURES - Structures made of composite materials, which can be programmed to deform as required to achieve certain aerodynamic, vibration, or acoustic characteristics. Smart structures can sense external stimuli and respond with active controls in REAL or NEAR-REAL TIME. Typical smart structures, or materials, include SHAPE MEMORY ALLOYS.

NOTE: Applications of SMART STRUCTURES (or SMART MATTER) include miniature air valves that can exert small changes in airflow (e.g., to move paper quickly in copiers) and microscopic tuning forks to perform jet engine diagnosis.

SMART WEAPON - A weapon system which can automatically detect and classify its target and which can then automatically decide to attack it and execute the attack. [] See also AUTONOMOUS TARGET RECOGNITION.

SMART WIRE - A wire and cable testing system, which continuously monitors the cable's health and corrects faults as they occur. One envisioned system would include a Frequency Domain Reflectometer (FDR), on-board processor, environmental sensor, and wireless communications system integrated into a single miniaturized unit, hundreds of which could be embedded in the wiring system (of an aircraft, for example). See also REFLECTOMETRY.

SMELL SEEKER - An electronic device, which can provide guidance for a weapon to home in on the aroma or scent of a given target.

NOTE: This relates to Air Force 2025 concept #900567 called "I Can Smell You".

SMOKELESS STUN GRENADE - A NONLETHAL WEAPON consisting of a grenade, which produces a deafening blast, but with little smoke so that visibility of the user will not be impaired.

SMOKEY SAM - A simple and cheap Surface-to-Air Missile (SAM) simulation rocket used to provide a realistic visual SAM threat in air warfare exercises. Smokey Sam is actually launched at the "attacking" aircraft, and leaves a thick white trail of smoke (hence the name "smokey Sam). [*Naval Weapons Center announcement*]

NOTE: Smokey Sam is supposedly harmless to, even if it collides with, the exercise aircraft because it is made of light easily-destructible material.

SNEAKERNET - A humorous reference to the method of data transfer between computers by which data are placed on a removable media (such as disk, tape, etc.) at the host computer, which are then removed and carried to another computer to be copied there.

NOTE: *Sneaker* implies the notion that the operator would be putting on his or her sneakers in order to carry the media from the current station to its destination.

SNIFFER - A generic term for computer programs which allow individuals to gather information regarding the status of the components of a network system. See also PACKET SNIFFER.

SNIFFERSTAR - A small airborne sensor capable of detecting chemical or gas attacks. It consists of a series of miniature sensors on a platform roughly the size of a pat of butter. The platform is located atop a microprocessor board smaller than a credit card. The UNMANNED AERIAL VEHICLE's (UAV) flight forces air into the sensors where samples are concentrated. The sample material is thermally released over thin stripes of coating material on a quartz surface, which vibrates at pre-set frequencies when a small electric current is applied. Chemical agents will temporarily stick to the coating, changing the frequencies of each stripe. The data are then passed to a processing unit on the SNIFFERSTAR module and are relayed to a processor on

the drone or to a ground-based processor. The data are compared against entries in a library of known gas patterns.

NOTE: The sampling process takes about 20 seconds - 15 seconds for sampling and five seconds for analysis. The incoming air then cleans the sensors in preparation for the subsequent reading.

SNIFFING - An ECCM technique used on tunable radars. The RF bandwidth for an ensuing series of radar transmissions is monitored to determine if jamming or interference is present in order to determine whether a successful radar transmission can be made at that frequency. See also FREQUENCY AGILITY.

SNIPER ACOUSTIC DETECTION SENSOR (SADS) - A real-time acoustic system to detect, identify and localize sniper firing at ranges to 3,000 feet. The system may be carried by a single soldier and yields bearing accuracy of 3 in azimuth and 10 in elevation.

SNIPER FACE VEIL - An accessory to the GHILLIE SUIT. It is a camouflaged mesh which employs a variety of dark, drab colors (*e.g.*, forest green, brown, sand), blending with the environment, yet allows the individual to see out of it. See also DRAG BAG, BALACLAVA.

SNOW - (1) In air intercept, a term meaning SWEEP JAMMING. (2) In video display systems, noise that is uniformly distributed in a spotty or mottled fashion on a screen, such as a radar or television screen. The speckled background is caused by random noise on an intensity-modulated CATHODE RAY TUBE (CRT) display. (3) The effect on a radio or radar screen that is caused by sweep jamming and that has a uniformly crosshatched or speckled appearance.

SOFT INFORMATION - Information derived from unstructured data that it may be unreliable because of inconsistencies and duplication.

NOTE: An example of soft information is a large bibliography extracted from a group of scientific papers, where, for example, citations to a single source may have been expressed differently (*e.g.*, the same author cited in one paper with last name, first name and in another paper with last name, first and middle initial), implying two or more sources.

SOFT KILL - (1) Temporary disruption of the victim's equipment in order to seriously compromise that system's operation in critical areas. (2) The rendering of a weapon harmless to its intended target through use of non-destructive EW techniques.

NOTE: After a SOFT KILL with respect to a target, the weapon may yet pose a threat to some other potential target. Contrast with FIRM KILL, HARD KILL.

SOFT KILL WEAPON SYSTEM (SKWS) - A naval multi-purpose DECOY launcher system designed to handle various types of decoys that protect the unit against incoming missiles and torpedoes. SKWS uses an algorithm to optimally

select the launch tube with the appropriate decoy to counter a sudden upcoming threat.

SOFT RAG - A NONLETHAL WEAPON consisting of a rubber bullet fired from an M-16 assault rifle. It is designed to knock an individual to the ground upon impact.

SOFTCOPY - Digital imagery processed by computers for high-resolution display on color monitors.

SOFTWARE - A set of computer programs, procedures and associated documentation concerned with the operation of a data processing system, e.g. compilers, library routines, manuals, circuit diagrams.

SOFTWARE AGENT - See AGENT.

SOFTWARE ARCHITECTURE - The structure and relationships among the components of a computer program. The software architecture may also include the program's interface with its operational environment. Synonymous with PROGRAM ARCHITECTURE. See also ARCHITECTURAL DESIGN.

SOFTWARE DEFINED RADIO (SDR) - A radio which provides SOFTWARE control of its functions, such as wide- or narrow-band operation, MODULATION techniques, security functions (such as FREQUENCY HOPPING), and other functions.

SOFTWARE STORMING - A method based on the brainstorming problem-solving technique to rapidly produce software prototypes.

SOLAR BLIND - The part of the spectrum (in the ultraviolet range), which is almost completely absorbed by the earth's ozone layer.

SOLAR BLIND DETECTOR (SDB) - A detector that can detect within its designed range and is not overwhelmed by solar radiation.

SOLAR ENERGY OPTICAL WEAPON (SEOW) - A constellation of space-based mirrors, which allow solar radiation to be focused on specific ground, air, or space targets. [USAF 2025 Study]

NOTE: The lethality of this system is limited due to optical diffusion; however, it may have potential for disruption or weather control.

SOLAR SUNRISE - A term assigned to a set of INFORMATION SECURITY (INFOSEC) incidents consisting of intrusion attempts into DoD computer and network systems using a multi-faceted, organized approach that targeted many U.S. services and scientific sites. See also MOONLIGHT MAZE.

SOLDIER INTEGRATED PROTECTIVE ENSEMBLE (SIPE) - A clothing and helmet system with microclimate control and enhanced sensory capabilities.

SOLDIER-MACHINE INTERFACE (SMI) - Considerations, through systems analysis and psychophysiology of equipment designs and operational concepts, to insure that they are compatible with capabilities and limitations of operators and maintenance personnel. Synonymous with SOLDIER-MATERIEL INTERFACE, SOLDIER-MATERIEL INTERACTION.

SOLDIER-MATERIEL INTERACTION - See SOLDIER-MACHINE INTERFACE.

SOLDIER-MATERIEL INTERFACE - See SOLDIER-MACHINE INTERFACE.

SOLITON - A pulse with a certain ratio of intensity and width, whose shape is maintained by the balance of negative group dispersion and the self-phase modulation arising from the Kerr non-linearity (*i.e.*, the change in a medium's index of refraction caused by intense optical radiation). In a transmission line, such as silicon dioxide glass optical fiber, solitons can propagate essentially without distortion over long distances.

SONAR - A sonic device used primarily for the detection and location of underwater objects. (This term is derived from the words "Sound Navigation And Ranging").

SONATA - A SPACE AND ELECTRONIC WARFARE (SEW) collective term for the following three themes underlying SEW: WELTANSCHAUUNG, COPERNICUS ARCHITECTURE, and CROESUS STRATEGIES.

SONIC BULLET - A NONLETHAL ACOUSTIC WEAPON which propels packets of sonic energy toward the target. See also ACOUSTIC BULLET.

NOTE: The Russians apparently have a portable device that can propel a 10-Hertz sonic packet the size of a baseball hundreds of yards.

SONIC SEARCH - See PHONETIC SEARCH ENGINE (PSE)

SONOBUOY - A sonar device used to detect submerged submarines which when activated relays information by radio. It may be active directional or non-directional, or it may be passive directional or non-directional.

SOPSMAN - See SPACE OPERATIONS SCHEDULING & MANAGEMENT SYSTEM

SOUND NAVIGATION AND RANGING - See SONAR.

SOUND SURVEILLANCE SYSTEM (SOSUS) - An integrated system of hydrophones located on the ocean floor. NOTE: SOSUS is designed to detect acoustic emissions from passing submarines.

SOURCE-REGION ELECTROMAGNETIC PULSE (SREMP) - An intense gamma-ray pulse from a nuclear explosion. The SREMP strips electrons from air molecules. These electrons create a strong current in the air that induces a return current through the ground, local currents within military hardware, and magnetic fields. Subsequent gamma rays from the explosion pulse the magnetic field, producing strong local ELECTROMAGNETIC PULSES.

SOUTH BRIDGE - A circuit in a computer chip which connects the central processing unit (CPU) to the Integrated Drive Electronics (IDE) BUS, Universal System Bus (USB), "plug-n-play", keyboard controller, mouse controller, power management, etc.

Also called SOUTHBRIDGE CHIP. Contrast with NORTH BRIDGE.

SOVIET MASKIROVKA - See MASKIROVKA.

SPACE AND ELECTRONIC COMBAT (SEC) - Military action to seize control of that portion of the ELECTROMAGNETIC SPECTRUM required for achieving a military objective, while simultaneously denying the adversary use of whatever portion of the electromagnetic spectrum he might seek to employ to counter friendly forces. See also ELECTRONIC WARFARE, RADIO-ELECTRONIC BATTLE MANAGEMENT.

SPACE AND ELECTRONIC WARFARE (SEW) - The surveillance, neutralization or destruction of enemy targets and the enhancement of friendly force battle management through the integrated employment and exploitation of the electromagnetic spectrum and the medium of space.

It encompasses all the measures that are employed to: **(1)** Coordinate, correlate, fuse and employ aggregate communications, surveillance, reconnaissance, data, correlation, classification, targeting, and electromagnetic attack capabilities; **(2)** Deny, deceive, disrupt, destroy or exploit the enemy's capability to communicate, survey, reconnoiter, classify, target and attack; **(3)** Direct and control employment of friendly forces. [DoD presentation, 12/7/90]

Alternate definition of SEW: **(a)** As warfare, the destruction or neutralization of enemy SEW targets. **(b)** As warfare support, the enhancement of friendly force battle management through the integrated employment and exploitation of the electromagnetic spectra and the medium of space. It encompasses measures that are employed to: Coordinate, correlate, fuse, and employ active and passive systems to optimize individual and aggregate communication, surveillance, reconnaissance, data correlation, classification, targeting and electromagnetic attack capabilities; Destroy, deny, degrade, confuse, or deceive the enemy's capabilities to communicate, sense, reconnoiter, classify, target, and direct an attack; and Direct and control the

employment of friendly forces and the information necessary to provide for the administration and support of those forces. See also ELECTRONIC WARFARE.

SPACE AND ELECTRONIC WARFARE DISCIPLINES - SEW comprises the following warfare and warfare support disciplines: SEW Warfare Disciplines: OPERATIONAL DECEPTION, COUNTER-SURVEILLANCE, ELECTRONIC COMBAT. SEW Warfare Support Disciplines: OPERATIONAL SECURITY, SURVEILLANCE, C⁴I, and SIGNALS MANAGEMENT. See also SPACE AND ELECTRONIC WARFARE.

SPACE-BASED WIDE AREA SURVEILLANCE SYSTEM (SB-WASS) - A surveillance system for tracking ships and aircraft on a global basis, using either active RADAR or passive INFRARED (IR) sensors, or both.

SPACE CONTROL - The means by which space superiority is gained and maintained. It is achieved through COUNTERSPACE OPERATIONS. [AFDD 2-2 (Draft), 6.]

SPACE DEFENSE INTERFACE NETWORK (SDIN) - The Space Defense Interface Network (SDIN) provides the Space Surveillance C³ Interface via the Defense Satellite Communications System (DSCS) and non-DSCS leased data/voice communications that link Cheyenne Mountain's Space Defense Operations Center (SPADOC) to worldwide sensor sites and satellite owners/operators.

SPACE DETECTION AND TRACKING SYSTEM (SPADATS) - A system capable of detecting and tracking space vehicles from the earth, and reporting the orbital characteristics of these vehicles to a central control facility. See also SPASUR.

NOTE: SPADATS includes the SPACE SURVEILLANCE NETWORK (SSN) and SPASUR.

SPACE LATTICE PASSIVE REPEATER (SLPR) - A passive (i.e., unpowered) device used to re-direct and amplify radio wave propagation. See also PASSIVE REPEATER.

NOTE: SLPRs are used to redirect digital RF transmissions within structures (e.g., around corners), to improve cellular communications from vehicles, and to extend the range of transmission around buildings and other obstacles.

SPACE MANEUVER VEHICLE (SMV) - A small reusable unmanned spacecraft designed to support a variety of military space missions.

NOTE: SMV missions range from satellite deployment to terrestrial and on-orbit support.

SPACE MINE - An anti-satellite (ASAT) satellite intended to reside near its assigned target satellite, either covertly or overtly, and designed to maintain a strict

position near its target by possessing identical orbital parameters. Also called NEARSAT. Compare with HYBRID SPACE MINE.

NOTE: The space mine poses a continual threat to its victim satellite because it may be activated at any time on signal.

SPACE OPERATIONS SCHEDULING & MANAGEMENT

(SOPSMAN) SYSTEM - SOPSMAN is an automated system for real-time, optimal spacecraft control network scheduling and analysis. It can (2001) optimally schedule 165 network antennas to give 1000 commands to 250 spacecraft in less than 30 seconds on a Pentium II class PC with a Windows 98, 2000, or NT operating system and MS Office running in the background. [*NASA RFP*]

SPACE OPERATIONS VEHICLE (SOV) - A space-access lift vehicle, probably to be vertically launched, that can lift a payload into space on demand without a long leading time. The reusable craft would have a turnaround time of one day or less.

SPACE SURVEILLANCE NETWORK (SSN) - A network of 25 sites worldwide of U.S. Army, Navy and Air Force operated ground-based radars and optical sensors.

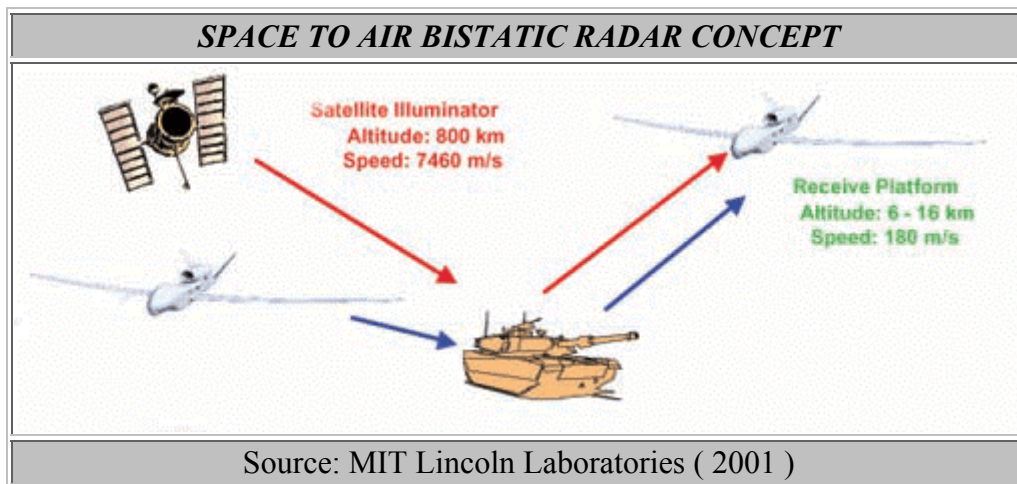
NOTE: SSN, along with the Naval SPACE SURVEILLANCE SYSTEM (SPASUR), is part of the SPACE DETECTION AND TRACKING SYSTEM (SPADATS).

SPACE SYSTEM - A system with a major functional component, which operates in the space environment. It has three elements: **(1)** the space element, commonly known as a satellite; **(2)** the terrestrial element, or ground-based assets and operations; and **(3)** the link element, the means by which the space and terrestrial elements pass information back and forth. [Air Force Doctrine Document (AFDD) 2-2 (Draft), *Space Operations*, Feb 1997, 24.]

NOTE: Although not always the case in the past, the link today is almost exclusively a two-way electronic data transmission link. Early US photo reconnaissance satellites ejected film canisters from orbit, which reentered the atmosphere, were recovered in mid-air and developed on the ground.

SPACE TO AIR BISTATIC RADAR - A BISTATIC RADAR in which the transmitter, or illuminator, platform is a satellite, and the receive platform is an aircraft. This system may be used to extend a radar coverage area, improve target localization.

NOTE: Since the aircraft carries no transmitter, there is a reduction in size, weight, and power requirements, and the STEALTHINESS of the aircraft is improved.



SPADATS - See SPACE DETECTION AND TRACKING SYSTEM.

SPASUR - An orbital space surveillance system with the mission to detect and determine the orbital elements of all man-made objects in orbit of earth. The mission is accomplished by means of a continuous wave energy beamed vertically across the continental United States and an associated computer facility. It is the Navy portion of the North American Air Defense Command Space Detection And Tracking System (SPADATS). SPASUR employs a BISTATIC RADAR consisting of three transmitter sites and six receiver sites and an operational control center. The transmitters illuminate the target and the signal is reflected back to the separately-located receivers. The observations from two or more receivers are combined to calculate the position of the target.

NOTES: **(1)** Transmitter antennas may be as much as two miles in length. NAVSPASUR was assigned to SPADATS under operational control of CINCNORAD in February 1961, and is currently (1999) an integral component of the US Space Command Detection and Tracking System. **(2)** The NAVSPASUR transmitters and receivers form an electronic "fence" across the southern United States. It extends from Georgia to California (4,800 km), 1,600 km off each coast, and 24,100 km into space. The NAVSPASUR fence provides continuous surveillance and unalerted detection, warning and tracking of low-to-medium orbit space objects. Also called NAVAL SPACE SURVEILLANCE SYSTEM (NAVSPASUR).

SPATIAL ALLOCATION - In EMISSION CONTROL, the allocation of active (radiating) or passive (search) sectors of responsibility in space and time to concentrate radiated energy, reduce interference, maximize search coverage, or achieve some other objective. Contrast with SPECTRUM ALLOCATION.

SPECIAL-EFFECTS SMALL-ARMS MARKING SYSTEM

(SESAMS) - A conversion kit for the M16 weapon that allows it to fire rounds that burst on impact - marking a target with a non-toxic washable paint. The projectile, which has a range of up to 25 meters, will not penetrate the skin and is used for close-quarters battle (CQB) training and to provide realism in force-on-force exercises.

SPECIAL FUNCTION MATERIALS - That category of MATERIALS TECHNOLOGY which addresses those materials such as high-temperature lubricants, hydraulic fluids, anti-fouling coatings required for U.S. military hardware to operate reliably at superior levels of performance.

SPECIALIZED DIGITAL SUBSCRIBER LINE (xDSL) - A modulation technique that exploits unused bandwidth in copper cables.

SPECIAL MATERIAL - See PYROPHORIC MATERIAL.

SPECIAL-MATERIAL DECOY (SMD) - An INFRARED (IR) DECOY consisting of PYROPHORIC metal (*i.e.*, Special Material) in an airtight sealed package mounted on the aircraft dispenser. The IR payload packet seal contains an integral tear strip that is attached to a drag device called a "sail". When released into the air stream the sail acts as a parachute which generates a drag force that tears open the seal of the payload packet, allowing the pyrophoric payload to be released into the airstreams and dispersed aerodynamically as HOT CHAFF in the same manner as other types of CHAFF.

SPECIAL OPERATIONS (SPECOPS or SO) - Operations conducted by specially trained, equipped, and organized DoD forces against strategic or tactical targets in pursuit of national military, political, economic, or psychological objectives. These operations may be conducted during periods of peace or hostilities. They may support conventional operations, or they may be prosecuted independently when the use of conventional forces is either inappropriate or infeasible. NOTE: Visit the various special operations sites.

SPECIAL WEAPONS EMERGENCY SEPARATION SYSTEM (SWESS) - A SALVAGE FUZE that automatically detonates (below a preset altitude) armed (nuclear) weapons over enemy territory in the event the carrying aircraft and/or crew become incapacitated during a combat mission. Also called DEAD MAN'S SWITCH. NOTE: The Soviets had a similar system called "Dead Hand".

SPECIFIC EMITTER IDENTIFICATION (SEI) - The capability to identify a specific radar through its unique electronic signature. SEI data can be used to re-identify emitters with high confidence and can provide location, identification, and tracking information for friendly or enemy emitters.

SPECKLE - See LASER SPECKLE.

SPECKLE TRACKING - A radar technique used to measure a target's angular dynamics.

SPECTRA RECOGNITION - Target analysis through use of pattern recognition techniques to identify jamming modulations, JET ENGINE MODULATION, and true Doppler.

SPECTRAL DIVERSITY - That attribute of a device that allows it to operate in two or more SPECTRAL REGIONS (e.g., IR and RF).

SPECTRAL REFLECTANCE - The ratio of the reflected radiant power to the incident radiant power at a particular wavelength, or within a small band of wavelengths about a particular wavelength.

SPECTRAL REGION - A band of frequencies having common characteristics relating both to the physics and sources of radiation and the technology needed for sensing the radiation. The spectral regions are: Acoustic (1 Hz - 10kHz); RF (LF through EHF, MMW); Infrared; Visible Light; Ultraviolet Light; Nuclear Particles; and Non-Nuclear Particles.

SPECTRAL SIGNATURE - Characteristic radiation in the SPECTRAL REGION by an object.

SPECTROZONAL PHOTOGRAPHY - A photographic technique whereby the natural spectral emissions of all objects are selectively filtered in order to image only those objects within a particular spectral band or zone and eliminate unwanted background.

SPECTRUM - See ELECTROMAGNETIC SPECTRUM.

SPECTRUM ALLOCATION - In EMISSION CONTROL, the assignment of active (radiating) or passive (search) responsibilities in specific bands or regions of the ELECTROMAGNETIC SPECTRUM - to reduce the possibility of detection, or maximize search coverage, for example. Contrast with SPATIAL ALLOCATION.

SPECTRUM MANAGEMENT - Planning, coordinating, and managing joint use of the ELECTROMAGNETIC SPECTRUM through operational, engineering, and administrative procedures, with the objective of enabling electronic systems to perform their functions in the intended environment without causing or suffering unacceptable interference.

SPECULAR REFLECTION - Reflection from a smooth surface. Contrast with DIFFUSE REFLECTION.

SPIDER - A type of software robot, or BOT, which searches the Internet for documents and their HYPERLINKS to associated UNIVERSAL RESOURCE LOCATORS (URLs). It retrieves information to build a database or index related to the word or phrase, which generated the search. Also called CRAWLER, WANDERER, WEB SPIDER. NOTE: Spiders may retrieve large amounts of the located documents, titles only, or perform other tasks, such as validating references, etc....

SPIDER HOLE - A camouflaged foxhole.

SPIN ELECTRONICS - See MAGNETOELECTRONICS

SPINTRONICS - See MAGNETOELECTRONICS

SPONGE GRENADE - A NONLETHAL WEAPON which marks its target with dye contained in the sponge.

SPOOFER - A platform employing ELECTRONIC DECEPTION or tactical deception measures.

SPOOFING - Deceiving - spoofing generally refers to tricking the adversary into believing false information. LISTEN to Crypto Spoofing. LISTEN to Frequency Shift Keying (FSK) Spoofing.

SPOT JAMMING - See NARROWBAND JAMMING.

SPOT NOISE JAMMING - See NARROWBAND JAMMING.

SPRAY-ON ANTENNA - A metal or carbon-based paint, which is sprayed over a template having an antenna pattern on it, onto a surface (e.g., plastic form, wall, window, tent, etc.). NOTE: A transparent paint may be used so that the antenna is unobtrusive, or must be transparent, such as on a windshield.

SPREAD SPECTRUM - (1) A modulation technique for multiple access, or for increasing immunity to noise and interference. (2) A generic term for techniques which employ a bandwidth for transmission larger than theoretically needed to send information and which employ an independent spreading code for controlling the bandwidth spreading. (3) Any modulation scheme that produces a spectrum for the transmitted signal much wider than the bandwidth of the information to be transmitted independently of the bandwidth of the information bearing signal. Examples of SPREAD SPECTRUM are DIRECT SEQUENCE SPREADING, FREQUENCY HOPPING, and TIME HOPPING.

SPUR - Harmonics generated by digital RF memories (DRFMs) in its digitizing process. NOTE: Spurs are detectable and recognizable as outputs of DRFMs.

SPUTNIK - The world's first artificial satellite. It was spherical in shape, with four antennas about 8-9 feet in length, 23 inches in diameter, and weighed 183.4 lbs. It circled the globe every 96 minutes at a speed of 18,000 mph for 92 days until January 4, 1958, when it re-entered the atmosphere and burned up.

STACKED BEAM RADAR - A RADAR that forms two or more simultaneous beams at the same azimuth but at different elevation angles. The beams are usually contiguous or partly overlapping. Each stacked beam feeds an independent receiver.

STANDARD GENERALIZED MARKUP LANGUAGE (SGML) - An early form of the HYPERTEXT MARKUP LANGUAGE (HTML).

STANDFORWARD JAMMING - An ECM tactic where the jamming platform is positioned between the hostile missile system and the protected friendly forces. Contrast with COLINEARITY.

STAND-IN EW SUPPORT - Mission support in which EW platforms remain in friendly territory or air space just outside the enemy border or combat zone. Contrast with DIRECT EW SUPPORT, STAND-OFF EW SUPPORT.

STANDING WAVE REFLECTOMETRY (SWR) - A REFLECTOMETRY technique using sine waves. SWR sends a sine wave down the wire; a reflected sine wave is returned from the end of the wire and the two signals add to form a standing wave on the line. The peaks and nulls of this standing wave provide information on the length and termination load on the cable; a healthy cable's wave pattern will differ from that of a line with an open or short circuit. See also SMART WIRE, FREQUENCY DOMAIN REFLECTOMETRY (FDR), and TIME-DOMAIN REFLECTOMETRY (TDR).

STAND-OFF EW SUPPORT - Mission support in which EW platforms remain in friendly territory at some distance greater than that for STAND-IN EW SUPPORT.

STAND-OFF JAMMING SUPPORT - That part of TARGET AREA JAMMING SUPPORT in which the jamming aircraft remains in friendly territory, a safe distance from enemy fire. Contrast with CLOSE-IN JAMMING SUPPORT. See also AREA JAMMING SUPPORT, CORRIDOR JAMMING SUPPORT, DIRECT JAMMING SUPPORT, STANDOFF JAMMING (SOJ).

STANDOFF JAMMING (SOJ) - A SUPPORT ECM TACTIC where the JAMMING is effected by escort vehicles rather than by the platform to be protected. The escort vehicles frequently stand off at a distance from the target, out of range of the target defenses. See also CLOSE SUPPORT JAMMING.

STARFLASH STUN GRENADE - A NONLETHAL WEAPON which produces a loud blast, an intense flash of light and produces a shower of white-hot sparkles.

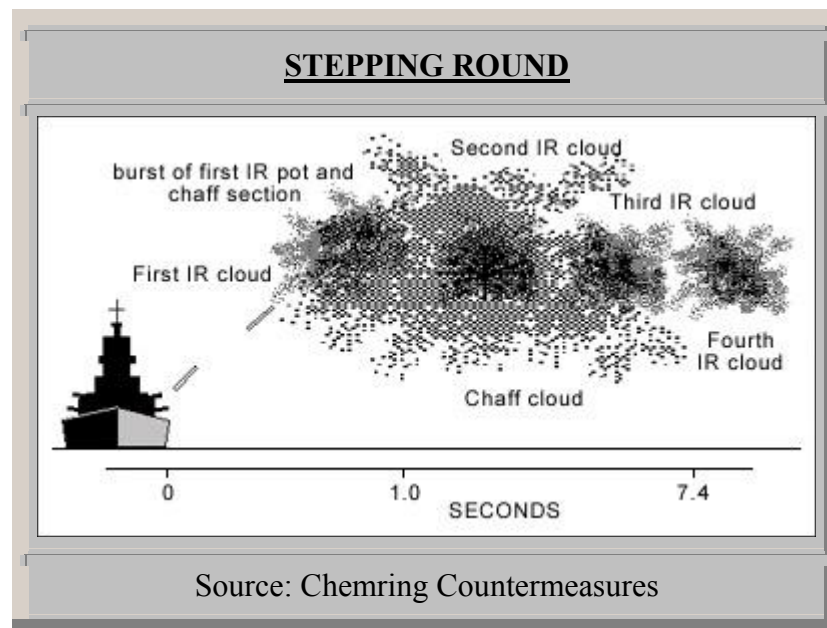
STARING DETECTOR - A detector that maintains a constant vigil over the area in which it is pointed. Sometimes called a FOCAL PLANE ARRAY (FPA). Contrast with SCANNING DETECTOR. NOTE: The staring detector brings the advantage of few, if any, moving parts and continuous coverage of the field of view (FOV). It depends upon a mosaic of detector elements placed at the focal plane of the optical system and "sees" the complete scene in a single view. This arrangement produces a spatial as well as temporal differentiation of the target and thus produces more data for possible target identification and clutter rejection.

STEALTH TECHNIQUES - Techniques which enhance the ability of a platform or weapon to pass imperceptibly through areas protected by sensors and weapons systems. Synonymous with LOW OBSERVABLES TECHNIQUES. See also OBSERVABLES.

STEALTHY SHIP ANTENNA - See MULTIFUNCTION ELECTROMAGNETIC RADIATING SYSTEM (MERS).

STEGANOGRAPHY - The art and science of communicating in a way, which hides the existence of the communication. NOTE: Steganography attempts to hide messages inside other harmless messages in such a way that third parties cannot detect the existence of the concealed message.

STEPPING ROUND - A mortar-launched DECOY device which produces a sequential blooming of INFRARED (IR) (or DISTRACTION CHAFF) clouds in order to simulate a moving target and SEDUCE enemy rounds away from the launching platform (usually a ship). See the figure below.



STEREOLITHOGRAPHY - A process which generates plastic forms or parts directly from CAD/CAM/CAE data. See also SELECTIVE LASER SINTERING.

STEREOSCOPIC TRACKING - Target tracking through simultaneous use of data from two or more sensors.

STICKY FOAM - A NONLETHAL WEAPON consisting of polymer agents that will hopelessly stick a person to anything. NOTE: Sticky foam is also used to reinforce obstacles.

STICKY SHOCKER - A NONLETHAL WEAPON consisting of wireless, self-contained projectile that contains a battery pack and associated electronics that can impart a short burst of high-voltage pulse to disable a human target temporarily (e.g., a few minutes). NOTE: The projectile is encased in a sticky substance, similar to STICKY FOAM, which causes it to stick to its target, and contains barbs that can penetrate thick clothing and leather in order to bring the electrodes near the skin. [Jaycor press release - 2001 <http://www.jaycor.com/eme/sticky.htm>]

STING NET - A NONLETHAL WEAPON which launches two projectiles connected by a tether which, upon contact, immobilizes the targeted individual(s).

STINGBAG - A NONLETHAL WEAPON gun round consisting of a cloth bag containing a small amount (1-oz.) of lead shot.

STINGBALL STUN IMPACT GRENADE - A NONLETHAL WEAPON consisting of a hand-thrown spherical grenade which produces a loud blast and a bright flash of light while dispersing 100 soft rubber, marble-sized stingballs. NOTE: The stingball stun impact grenade can be configured to also release a quantity of CS tear gas.

STINGSHOT - A NONLETHAL WEAPON gun round loaded with rubber projectiles (either 18 pellets, 3 balls, or a rubber rocket).

STORAGE and TRANSPORTATION FRAME (STF) - Storage frames, resembling shark cages, designed to fit snugly inside standard 8 x 8 x 20 foot ISO (International Standardization Organization) containers (five STFs can be placed in the standard ISO container). A smaller STF, termed V-STF (Vehicle Storage and Transportation Frame) is designed to fit inside a High Mobility Multipurpose Wheeled Vehicle (HMMWV, "Hummer", or "Humvee") NOTE: Replacing the traditional wooden boxes, STFs and V-STFs eliminate the need to remove blocking and bracing lumber. In addition, they can be folded flat for later re-use.

STOVEPIPE - (1) An EW acquisition community group. The five stovepipes are warfighters, acquisition and program management staff, industry, developmental testers, and operational testers.

(2) A non-integrated system in which data flows vertically, *i.e.*, intrasystem *versus* intersystem, or within a department, or independent acquisition program, or a system designed to engage a specific threat, not crossing boundaries with other systems. NOTE: Although it is generally thought that stovepipes should be supplanted by integrated systems, it may be more effective, at times, to employ a stovepipe; for example a mission-critical system that should not integrate across culturally different (such as highly differing security classification levels) or fiercely independent systems having their own budgets, constituencies, and LEGACY systems.

STOVEPIPE STABILIZER - A mechanical configuration of two solid cylindrical trapezoids to produce a variable elevation coverage for a rotating radar antenna.

STOVEPIPE SYSTEM - An intelligence system characterized by a vertical organization for collecting, processing, analyzing & disseminating a single category of intelligence without integrating other types of intelligence into the final product.

STRATEGIC ECM - The use of ECM equipment and techniques by strategic platforms to increase probability of strategic mission success.

STRATEGIC ELECTRONIC INTELLIGENCE (STRATEGIC ELINT) - ELINT relating to **a.)** establishing the state-of-the-art in the threat; **b.)** movement of a significant emitter or emitters; or **c.)** defining the direction of ECM research and development programs. Contrast with TACTICAL ELECTRONIC INTELLIGENCE.

STRATEGIC MILITARY DECEPTION - MILITARY DECEPTION planned and executed to result in foreign national policies and actions, which support the originator's national objectives, policies, and strategic military plans. Strategic Military Deception is a category of Military Deception. Contrast with TACTICAL MILITARY DECEPTION. See also DECEPTION, DEPARTMENT / SERVICE MILITARY DECEPTION.

STRATEGIC WARNING - A warning prior to the initiation of a threatening act. Contrast with TACTICAL WARNING.

STRATEGY - The art and science of developing and using political, economic, psychological, and military forces during peace and war, to afford the maximum support to policies, in order to increase the probabilities and favorable consequences of victory and to lessen the chances of defeat.

STREAK-TUBE IMAGING LIDAR (STIL) - An underwater mine detection system carried by underwater vehicles and used to gather high resolution 3-dimensional imagery of the ocean bottom to detect and identify man-made objects. NOTE: The STIL uses a pulsed blue-green LASER and a fixed cylindrical lens to project a fan-shaped beam beneath the vehicle onto the ocean floor. Conventional optics image the illuminated stripe onto a slit photocathode of the streak tube and further processing produce 2-D and 3-D images for analysis.

STREAM - Dispensing of CHAFF (solid/random interval/bursts).

STRIKE WARFARE (STW) - Attack by aircraft and ships, not in direct support of amphibious operations, against enemy land targets, including ships and water craft in harbors and anchorages, and aircraft and other vehicles on the ground.

STRIPING - A method for spreading data across multiple disks. See also REDUNDANT ARRAYS OF INEXPENSIVE DISKS.

STRIPLINE DEVICE - A CONFORMAL ANTENNA consisting of a sandwich of three parallel conducting layers separated by two thin dielectric substrates, the center conductor of which is analogous to the center conductor of a coaxial transmission line. If the center conductor couples to a resonant slot cut orthogonally (i.e., at right angles to) in the upper conductor, the device is said to be a stripline radiator. Contrast with MICROSTRIP ANTENNA. See also CONFORMAL ANTENNA ARRAY, DOUBLY CONFORMAL ANTENNA, SHARED-APERTURE ANTENNA.

STRUCTURAL AMORPHOUS METAL (SAM) - A new (2002) class of materials that exhibit unique combinations of properties such as hardness, strength, damage tolerance and corrosion resistance. NOTE: Structural amorphous metals are produced at low cooling rates resulting in an amorphous or "glassy" structure.

STRUCTURAL MATERIALS - That category of MATERIALS TECHNOLOGY which addresses a broad range of materials classes used for the fabrication of military systems. This category is subdivided into **(1) high-strength materials**, which encompass those materials used for fabrication of military vehicles of virtually every shape and description, and **(2) high-temperature materials**, which are used primarily for propulsion purposes and hypersonic airframes.

STUB NETWORK - A NETWORK which carries PACKETS to and from local hosts. Even if it has paths to more than one other network, a stub network does not carry traffic for the other networks. See also BACKBONE, MID-LEVEL NETWORK, TRANSIT NETWORK.

STUN DISTRACTION DEVICE - A NONLETHAL WEAPON which produces a bright light and a loud noise, enabling the user to confuse, disorient and momentarily distract a potentially threatening individual or group.

SUB-LETHAL WEAPON - See NONLETHAL WEAPON.

SUBMARINE LAUNCHED MOBILE MINE (SLMM) - A submarine-laid bottom mine consisting basically of a modified torpedo. SLMM is intended for use in areas inaccessible to other mine deployment techniques, or for covert mining of hostile environments. [See logo at Navy CHINFO press release] See also CAPTOR and QUICKSTRIKE.

SUBMARINE LAUNCHED ONE-WAY TRANSMISSION (SLOT) BUOY - An untethered buoy (about the size of a sonobuoy), which can be ejected from a submarine; the device carries a tape-recorded message to be transmitted when the buoy reaches the surface. See also RETRIEVABLE TETHERED OPTICAL FIBER.

SUBMUNITION BMD COUNTERMEASURES - Techniques to overwhelm ballistic missile defenses by creating multiple warheads which would be dispensed by the missile at the end of a powered flight, or by the use of multiple, independently-targeted reentry vehicles (MIRVs).

See also EVASIVE MANEUVERS BMD COUNTERMEASURES, FALSE-TARGET BMD COUNTERMEASURES, SHROUDING BMD COUNTERMEASURES, TRAJECTORY BMD COUNTERMEASURES.

SUPERBARRICADE - A rocket-propelled cargo-launch system with fixed or trainable aiming. A typical system consists of a bridge display unit, a computer to calculate optimum launch patterns based on inputs from the vessel's log, gyro, wind measurement, and ESM systems. Superbarricade can launch either infrared decoys

(FLAREs) or radar DECOYs (CHAFF), as well as torpedoes and limited hard-kill rounds. Superbarricade receives its CUEING automatically from an external ESM system and can react by firing the protective decoys in as little as 150 milliseconds.

SUPER CAUSTICS - Acid agents that can be stored in harmless binary form. They can be used against weapons, tires, roads, roofs, optical systems, or even shoes. NOTE: A super caustic may be considered a NONLETHAL WEAPON if used to deny human contact.

SUPERCONDUCTING QUANTUM INTERFERENCE DEVICE (SQUID) - A device which, together with signal-processing techniques, is used to detect sea mines on the seabed or buried in the seabed. SQUID calculates the position of the sea mine based on the distortion of the earth's magnetic field caused by metallic objects on or in the ocean floor.

SUPERCONDUCTIVITY - A property of a material that is characterized by zero electric resistivity and, ideally, zero permeability. NOTE: Superconductivity is a phenomenon in which the electrical resistance of a substance ceases. When discovered in 1911, superconductivity occurred only at extremely low temperatures - a few degrees above absolute zero. Recently, however, superconductivity has been demonstrated at much higher temperatures, and scientists are searching for room-temperature superconductors.

SUPER HIGH-POWER LASER (SHPL) - A LASER capable of delivering output energy exceeding 1 kilojoule within 50 milliseconds, or having an average or CW power exceeding 20 kilowatts.

SUPPLY CHAIN MANAGEMENT (SCM) - The integration of key business processes from end-user through original suppliers, that provides products, services, and information that add value for customers and other stakeholders. [See information from *Business Week*, at www.businessweek.com]

SUPPORT ECM TACTIC - JAMMING tactics, which include STANDFORWARD JAMMING, STANDOFF JAMMING (ESCORT JAMMING), and ACCOMPANYING JAMMING.

SUPPORT ECM TECHNIQUE - An ECM technique used by a support platform to protect another platform from electronic systems external to both the protected and support platforms. Contrast with SELF-SCREENING ECM.

SUPPORT JAMMING - (1) The JAMMING of hostile electronic systems by a platform in order to protect other friendly vehicles. (2) The accompanying of a jamming aircraft with strike aircraft into an enemy target area. Contrast with SELF-PROTECTION. See also ACCOMPANYING JAMMING, DIRECT EW SUPPORT, STANDOFF JAMMING (ESCORT JAMMING), STANDFORWARD JAMMING.

SUPPRESSION OF ENEMY AIR DEFENSE (SEAD) - The activity which neutralizes, destroys, or temporarily degrades enemy air defenses in a specific

area by physical attack, deception, and/or electronic warfare. See also IRON HAND, WILD WEASEL.

SURFACE ACOUSTIC WAVE CHEMICAL AGENT DETECTOR

(SAWCAD) - A small UAV-mounted sensor intended to collect ambient atmospheric data and detect, identify, and report the presence of chemical vapors downwind from an emission source.

SURFACE-EMITTING LASER - Laser light shining through the circular grating from a broad area on top of the structure parallel to the active layer. NOTE: The grating collimates the beam so that is circular in cross-section and has 1/60 the divergence of a traditional edge-emitting laser.

SURF-ZONE ARRAY (SZA) - An explosive clearing system used to clear mines at a beach from three feet to the mean high water mark. See also BEACH-ZONE ARRAY (BZA), LINE CHARGE (LC).

SURGICAL COUNTERMEASURES - The closed-loop process of electromagnetically operating on an electronically controlled system from a remote moving EW platform.

SURVEILLANCE - (1) The systematic observation of aerospace, surface or subsurface areas, places, persons, or things, by visual, aural, electronic, photographic, or other means. (2) A SPACE AND ELECTRONIC WARFARE (SEW) warfare support discipline that includes the tactical management of all technical surveillance as a force system across the entire multi-dimensional battle space, including all sensors, regardless of location (whether national, theater, or platform) or ownership (whether component, joint or combined). See also AIR SURVEILLANCE, COMBAT SURVEILLANCE, SEA SURVEILLANCE.

SURVEILLANCE GRID - A SPACE AND ELECTRONIC WARFARE (SEW) concept in which sensors are considered to be a "grid of capabilities overlaying the battle space instead of a series of single sensors". See also COMMUNICATIONS GRID, TACTICAL GRID.

SURVEILLANCE SEDUCTION - A strategic countermeasure involving simulated operations or simulation of a large force and intended to mislead an enemy about major planned operations. See also SIMULATIVE COMMUNICATION, ELECTRONIC, ELECTROMAGNETIC DECEPTION, IMITATIVE COMMUNICATION, ELECTRONIC, ELECTROMAGNETIC DECEPTION, MANIPULATIVE COMMUNICATION, ELECTRONIC, ELECTROMAGNETIC DECEPTION, COMMUNICATION DECEPTION, ELECTROMAGNETIC DECEPTION, ELECTRONIC DECEPTION.

SURVIVABILITY ENHANCEMENT - Techniques or devices, which increase the probability of survivability of the using entity.

SUSCEPTIBILITY - A measure of an electronic system's design that determines the effect of ECM on system performance. See also ACCESSIBILITY, INTERCEPTIBILITY and VULNERABILITY.

SUSTAINABILITY - The component of MILITARY CAPABILITY that relates to the ability to maintain the necessary level and duration of operational activity to achieve military objectives. Sustainability is a function of providing for and maintaining those levels of ready forces, materiel, and consumables necessary to support the military effort.

SWARF - Technically, the metallic filings and dust resulting from grinding operations. The term is also used to refer to space debris.

SWEEP JAMMING - A narrow band of JAMMING that is swept back and forth over a relatively wide operating band of frequencies.

SWEPT NOISE JAMMING - See SWEEP JAMMING.

SWEPT SPOT JAMMING - See SWEEP JAMMING.

SWING WING ADAPTER KIT (SWAK) - A temporary wing attachment used to provide the SMALL DIAMETER BOMB (SDB) a standoff of greater than 25 nautical miles from high altitude release. The wing is jettisoned at a midcourse waypoint if penetration is required, so that velocity can be increased after wing release. For soft targets (e.g., personnel, structures, non-armored vehicles) the wing continues to extend the bomb's glide range until small arms threat altitude is reached. At this point the wings are released.

SWITCHED VIRTUAL CIRCUIT (SVC) - A VIRTUAL CIRCUIT set up (provisioned) for a communications session and torn down when the session is over.

SYNAPTIC ANTENNA - A grid of radio frequency conducting segments joined by small electro-optical, computer-controlled switches. This arrangement allows the computer to rapidly change the antenna's characteristics (e.g., frequency, beam forming, steering and POLARIZATION). See also PHASED ARRAY ANTENNA, SMART SKIN.

SYNCHRONOUS COMMUNICATIONS - A communication PROTOCOL in which each data bit is transmitted according to a given time sequence. Contrast with ASYNCHRONOUS COMMUNICATIONS.

SYNCHRONOUS JAMMING - Transmission of jamming pulses or other waveforms in synchronism with the victim radar's pulse repetition frequency.

SYNCHRONOUS OPTICAL NETWORK (SONET) - An international standard for high-speed data communications over FIBER-OPTIC media. NOTE: SONET is a ring consisting of nodes connected by high-capacity optical links to form a cycle. This configuration affords high survivability since every

pair of nodes is connected by a physically diverse route. Consequently no single link failure will disconnect the ring.

SYNTHETIC APERTURE RADAR (SAR) - A RADAR system that generates the effect of a long antenna by signal processing means rather than by actual use of a long physical antenna. NOTE: The long antenna is synthesized through the motion of a small antenna relative to the target with either the antenna or the target or both moving. The synthesized antenna length is given by the trajectory traversed by the small antenna relative to the target during the time the signal received by the antenna is processed (i.e., the coherent integration time).

SYNTHETIC APERTURE SONAR (SAS) - A multi-frequency SONAR which employs a multi-element linear array and a data acquisition system to record phase and amplitude information for each element. SAS uses low frequencies to detect objects at long ranges and those buried just beneath the ocean floor, medium frequencies to detect and classify targets, and higher frequencies to facilitate object discrimination and identification at short ranges (*e.g.*, imagery revealing the rib and spar structure inside a submerged wrecked aircraft). See also MOBILE UNDERWATER DEBRIS SURVEY SYSTEM (MUDSS). NOTE: SAS provides high-resolution detection, classification, and identification of proud and buried mounds in water depths to 25 meters.

SYNTHETIC MULTIFUNCTION MATERIALS (SMFM) - Composite materials incorporating morphological arrangements that can provide structural capability plus one or more of the following features: energy generation, self-repair, sensing, ballistic and/or blast protection.

SYNTHETIC THEATER OF WAR (STOW) - An advanced distributed simulation system to improve joint training, mission rehearsal, and experimentation. It may be populated with intelligent synthetic forces operating within an interactive natural environment and then interact with the simulation from distributed locations across the country using a simulation network. NOTE: Advances in computer technology, networking, and computer-generated forces make it possible to create a virtual battlefield, representative of any location in the world.

SYSTEM - (1) Any organized assembly of resources and procedures united and regulated by interaction or interdependence to accomplish a set of specific functions. (2) A set of interconnected elements constituted to achieve a given objective by performing specified functions. NOTE: A SYSTEM performs a function not possible with any of the individual parts. Complexity of the combination is implied.

SYSTEM ARCHITECTURE - The structure and relationship among the components of a system. The system architecture may also include the system's interface with the operational environment.

SYSTEM ERROR - A FAULT TOLERANCE term. That part of the system state, with respect to the computation process, that is liable to lead to a FAILURE. See also FAULT, FAULT LATENCY.

SYSTEM-GENERATED ELECTROMAGNETIC PULSE (SGEMP)
- The re-radiation of an ELECTROMAGNETIC PULSE (EMP) by a system or device. NOTE: For example, when the metal skin of a spacecraft is struck by gamma rays, it acts as a secondary radiator due to the FORWARD and BACKSCATTER of its own electrons. See also INDUCED ELECTROMAGNETIC PULSE (IEMP).

T

TACAN - An ultra-high frequency electronic air navigation system, which provides a continuous indication of bearing and distance (SLANT RANGE) to the TACAN station, common components being used in distance and bearing determination. The term is derived from "TACTical Air Navigation".

TACTICAL AIR NAVIGATION - See TACAN.

TACTICAL AUTOMATED MISSION PLANNING SYSTEM

(TAMPS) - A computerized method of planning and optimizing aircraft mission routes to hostile targets.

TACTICAL BUBBLE - A tactical formation, practiced by personnel engaged in Military Operations in Urban Terrain (MOUT), which provides a 'spherical security' environment in which there are no fronts, flanks, or rear. Such a formation is capable of reacting to enemy contact at any point, or multiple points simultaneously.

NOTE: For example, inside a building, fire teams must maintain observation of all entries to a room and to the building they occupy so as not to be surprised by enemy movements within the building or reinforcements coming to the building.

TACTICAL CRYPTOLOGIC ELECTRONIC WARFARE

SUPPORT MEASURES - CRYPTOLOGIC ELECTRONIC WARFARE SUPPORT MEASURES which supports and is under the direct control of the tactical commander.

TACTICAL ELECTRONICS INTELLIGENCE (TACTICAL

ELINT) - ELINT relating to **a) establishing** the ELECTRONIC ORDER OF BATTLE prior to a mission; **b) updating** EW system libraries; or **c) directing** the operational application of ECM. Contrast with STRATEGIC ELECTRONIC INTELLIGENCE.

TACTICAL EXPLOITATION SYSTEM (TES) - A modular down-sized scalable ground station that provides deployed tactical commanders with assured receipt of all-weather, day/night intelligence, surveillance and reconnaissance (ISR) information for national, theater and tactical platforms. TES receives, processes, exploits and disseminates imagery and SIGNALS INTELLIGENCE (SIGINT) data through all phases of military operations, providing a real-time, correlated imagery and SIGINT picture directly to the tactical warfighter. NOTE: TES can be mounted on HMMWVs or 30-foot shelters, and is transportable via C-130 or larger aircraft.

TACTICAL GRID - A SPACE AND ELECTRONIC WARFARE (SEW) concept of a wide area combat direction system (CDS), a network of small communications links that tie all of the force together regardless of platform or component. See also COMMUNICATIONS GRID, SURVEILLANCE GRID.

TACTICAL MILITARY DECEPTION - MILITARY DECEPTION

planned and executed by and in support of operational commanders against the pertinent threat, to result in opposing operational actions favorable to the originator's plans and operations. Tactical Military Deception is a category of Military Deception. [1] Contrast with STRATEGIC MILITARY DECEPTION. See also DECEPTION, DEPARTMENT/SERVICE MILITARY DECEPTION, ELECTRONIC DECEPTION.

TACTICAL MISSILE PENETRATOR - A missile which provides high availability and has all-weather, survivability and short response time characteristics. It is designed for destruction of hard and deeply buried targets.

TACTICAL PROPULSION - Solid rocket motors, pyromechanisms and gas generator systems for tactical weapon systems (*e.g.*, rockets and missiles), and cruise missiles.

TACTICAL RADAR IDENTIFICATION AND LOCATING

SYSTEM (TRILS) - A system mounted under armor in the Canadian BISON Light Armoured Vehicle (LAV). The system normally operates in four detachments to form a DF/Intercept baseline.

TACTICAL SUPPORT ESM/ECM - ESM/ECM assets dedicated to the support of group, force, or higher echelon operations. Contrast with SELF-PROTECTION ESM/ECM.

TACTICAL TOMAHAWK (TACTOM) - A low-cost follow-on missile to the Tomahawk Land Attack Missile (TLAM). TACTOM is expected (2000) to have an initial operational capability (IOC) in 2003. NOTE: The sixth successful test flight for Tactical Tomahawk took place at White Sands Missile Range on May 16, 2003. The Tactical Tomahawk was launched vertically from a ground test stand that simulated the normal shipboard Vertical Launching System (VLS). It is claimed that all Tomahawk test objectives were successfully demonstrated. The Tactical Tomahawk will field several enhancements, including mission planning aboard the launch platform, in-flight retargeting, loiter and BATTLE DAMAGE ASSESSMENT (BDA) capability, and in-flight health and status reports. These capabilities increase fleet effectiveness while significantly reducing acquisition and life cycle costs.

TACTICAL WARNING - A warning after initiation of a threatening or hostile act based on an evaluation of information from all available sources. Contrast with STRATEGIC WARNING.

TACTILE SITUATIONAL AWARENESS SYSTEM (TSAS) - A vest containing dozens of small air-pulsed vibrators. A computer tied into the aircraft's own attitude indicator pulses the vibrators that are directly under the pilot relative to the earth, no matter which way is "down" relative to his possibly confused sense. NOTE: Other uses of the TSAS include assisting in target or threat location in hostile situations and mapping points in the environment to confirm information about pitch, roll, airspeed and altitude.

TAIL WARNING FUNCTION (TWF) - A defensive system consisting of a PULSED DOPPLER RADAR to detect missiles which are approaching the aircraft from behind and the means to dispense defensive countermeasures to defeat the missile attack.

TARGET - In radar, **(a) generally**, any discrete object which reflects or retransmits energy back to the radar equipment; **(b) specifically**, an object of radar search or surveillance. NOTE: In this context, the term "target" is used in a benign sense, and does not necessarily refer to a military target.

TARGET ACQUISITION - The detection, identification, and location of a target in sufficient detail to permit the effective employment of weapons.

TARGET ANALYSIS - An examination of potential targets to determine military importance, priority of attack, and weapons required to obtain a desired level of damage or casualties.

TARGET ANGLE - The relative bearing of the reference point from the target. For example, if a ship is at the 9 o'clock position from a given aircraft, then the target (from the viewpoint of an observer on the ship) is 270 degrees; if the aircraft is heading toward the ship, then the target angle is 360 degrees.

TARGET AREA JAMMING SUPPORT - An ECM tactic in which the jamming aircraft flies directly to the target area to jam defensive systems immediately around the target's perimeter. It includes STAND-OFF JAMMING SUPPORT, CLOSE-IN JAMMING SUPPORT, and DIRECT JAMMING SUPPORT. See also AREA JAMMING SUPPORT, CORRIDOR JAMMING SUPPORT.

TARGET CLASSIFICATION - Distinguishing between categories of platform: ship vs. aircraft; friendly vs. neutral vs. hostile; combatant vs. non-combatant. Compare with TARGET IDENTIFICATION.

TARGET DESIGNATION - The selection of targets that are to be taken under fire and the transmission of the required information for acquisition to the selected fire control station or stations. It may be classified by originating station or by means used.

TARGET DISCRIMINATION - The ability of a surveillance or guidance system to identify or engage any one target when multiple targets are present. See also BEARING RESOLUTION, RANGE RESOLUTION.

TARGET IDENTIFICATION - Determining the name or hull/aircraft number of a target. Compare with TARGET CLASSIFICATION. See also INDIRECT TARGET IDENTIFICATION, NON-COOPERATIVE TARGET IDENTIFICATION.

TARGETING - The process of selecting targets and matching the appropriate response to them taking account of operational requirements and capabilities.

TARGET INTELLIGENCE - Intelligence which portrays and locates the components of a target or target complex and indicates its vulnerability and relative importance.

TARGET RESOLUTION AND DISCRIMINATION

EXPERIMENT (TRADEX) - A high power radar located on the island of Kwajalein in the western Pacific. Originally designed to track and gather signature data on a single target, TRADEX now has two missions: Anti-Ballistic Missile (ABM) testing in support of the Western Space and Missile Center (WSMC) and space surveillance. NOTE: TRADEX is one of the 25 sites worldwide of U.S. Army, Navy and Air Force operated ground-based radars and optical sensors composing the Space Surveillance Network. Two other radars are the ARPA Long-range Tracking and Identification Radar (ALTAIR) and the ARPA Lincoln C-Band Observable Radar (ALCOR).

TARGET SIGHT SYSTEM - An advanced ELECTRO-OPTIC / INFRARED (EO/IR) system consisting of a suite of high-performance sensors which provides target detection, recognition and identification at extremely long ranges during day and night operations.

TARGET SIGNATURE - The characteristic pattern of a target displayed by detection and identification equipment. See also SIGNATURE CONTROL.

TASER - A NONLETHAL WEAPON that fires prods which, on contact, disable the targeted individual (TI) with a jolt of electrical energy.

TECHNICAL CHARACTERISTICS - Those characteristics of equipment which pertain primarily to the engineering principles involved in producing equipment possessing desired military characteristics, e.g., for electronic equipment, technical characteristics include such items as circuitry, and types and arrangement of components. Contrast with OPERATIONAL CHARACTERISTICS.

TECHNICAL INFORMATION - Information, including scientific information, which relates to research, development, engineering, test, evaluation, production, operation, use, and maintenance of munitions and other military supplies and equipment.

TECHNICAL INTELLIGENCE - Intelligence concerning foreign technological developments, and the performance and operational capabilities of foreign material, which have or may eventually have a practical application for military purposes.

TECHNICAL SPECIFICATION - A detailed description of technical requirements stated in terms suitable to form the basis for the actual design development and production processes of an item having the qualities specified in the operational characteristics. See also OPERATIONAL CHARACTERISTICS.

TECHNOLOGICALLY FEASIBLE THREAT (TFT) - An excursion from the PROJECTED THREAT intended to provide decision makers with a basis for judgment about the impact on a specific U.S. system if the THREAT evolves in a direction other than that considered most likely by the intelligence community. The TFT, although not constrained by the intelligence projections, must be consistent with an adversary's technology, production capacity, and economic capability.

TEFLON CONFETTI - A NONLETHAL WEAPON which is a granulated form of ANTI-TRACTION LUBRICANT.

TELECOMMUNICATION - Any transmission, emission, or reception of signs, signals, writings, images, sounds, or information of any nature by wire, radio, visual, or other electromagnetic systems.

TELEDESIC SYSTEM - A constellation of 288 low-earth-orbit (LEO) satellites in 12 different planes forming a data network. Envisioned for circa 2002, it will be an "Internet in the sky."

TELEMATICS - The convergence of telecommunications and computing.

TELEMETRY INTELLIGENCE (TELINT) - Technical and intelligence information derived from the intercept, processing, and analysis of foreign telemetry. Telemetry intelligence is a category of FOREIGN INSTRUMENTATION AND SIGNALS INTELLIGENCE.

TELE-OPERATED VEHICLE (TOV) - A remotely operated vehicle operated from a remote location with fiber-optic cable and an RF backup.

TELEPRESENCE - The viewing of remote locations through cameras mounted on robots. NOTE: Telepresence is similar to virtual reality.

TELERAN - A navigational system which **(a)** employs ground-based search radar equipment along an airway to locate aircraft flying near that airway; **(b)** transmits, by television means, information pertaining to these aircraft and other information to the pilots of properly equipped aircraft; and **(c)** provides information to the pilots appropriate for use in the landing approach.

TELESCOPED AMMUNITION - See CASED TELESCOPED AMMUNITION.

TELEVISION IMAGERY - Imagery acquired by a television camera and recorded or transmitted electronically.

TELEVISION RANGING AND NAVIGATION - See TELERAN.

TEMPEST - (Transient Electromagnetic Pulse Emanations Standard) A National Security Agency (NSA) program, which governs the development, test, and operation of electronics used in highly classified projects.

TENTATIVE OPERATIONAL REQUIREMENT (TOR) - An acquisition document consisting of a cover sheet plus a maximum of 3 pages and no attachments. A TOR emphasizes key capabilities - in general terms without goals or thresholds - and affordability; it must address EMC and frequency spectrum planning, and contain an estimate of what the Resource Sponsor is willing to pay.

TERMINAL DEFENSE - Defensive actions taken by an intended target in its own vicinity. See also COUNTER-HOMING and COUNTER-FUZING.

TERMINAL THREAT WARNING - An alert (alarm) resulting from essentially instantaneous intercept and identification of an electromagnetic signal associated with the launch, or imminent launch, and subsequent flight of a missile.

TERRAIN AVOIDANCE SYSTEM - A system which provides the pilot or navigator of an aircraft with a situation display of the ground or obstacles which project above either a horizontal plane through the aircraft or a plane parallel to it, so that the pilot can maneuver the aircraft to avoid the obstruction. See also TERRAIN CLEARANCE SYSTEM, TERRAIN FLIGHT, TERRAIN FOLLOWING SYSTEM.

TERRAIN BOUNCE - See BOUNCE JAMMING.

TERRAIN CLEARANCE SYSTEM - A system which provides the pilot, or autopilot, of an aircraft with climb or dive signals such that the aircraft will maintain a selected height over flat ground and clear the peaks of undulating ground within the selected the selected height in a vertical plane through the flight vector. This system differs from terrain following in that the aircraft need not descend into a valley to follow the ground contour. See also TERRAIN FLIGHT, TERRAIN AVOIDANCE SYSTEM, TERRAIN FOLLOWING SYSTEM.

TERRAIN FLIGHT - Flight close to the earth's surface during which airspeed, height and/or altitude are adapted to the contours and cover of the ground in order to avoid enemy detection and fire. Also called NAP-OF-THE-EARTH FLIGHT. See also TERRAIN AVOIDANCE SYSTEM, TERRAIN CLEARANCE SYSTEM, TERRAIN FOLLOWING SYSTEM.

TERRAIN FOLLOWING SYSTEM - A system which provides the pilot, or autopilot, of an aircraft with climb or dive signals such that the aircraft will maintain as closely as possible, a selected height above a ground contour in a vertical plane through the flight vector. Contrast with TERRAIN CLEARANCE SYSTEM. See also TERRAIN AVOIDANCE SYSTEM, TERRAIN FLIGHT.

TERRESTRIAL PLANET FINDER (TPF) - A space borne system intended to search for, detect and characterize earth-like planets using a suite of precision optical and spectroscopy instruments to study the brightest 1,000 stars in our solar neighborhood and to look for celestial bodies displaying such signs of life as water, carbon dioxide, ozone and methane.

TERRORISM - The unlawful use or threatened use of force or violence against individuals or property to coerce or intimidate governments or societies, often to achieve political, religious, or ideological objectives.

TETHERED SATELLITE - A half-ton research satellite connected to a space shuttle with a thin tether about 13 miles long. One possible use is to generate electricity in orbit as the tether passes through the Earth's magnetic field.

TETRODE - A VACUUM TUBE containing four elements: CATHODE, two GRIDS, and a plate (ANODE). See also DIODE, PENTODE, TRIODE.

THEATER BATTLE MANAGEMENT CORE SYSTEM (TBMCS) - A system which integrates previously discrete applications such as force and unit-level operations and intelligence systems into a common-core systems environment to give users an integrated command and control system for carrying out air campaigns.

THEATER HIGH-ALTITUDE AERIAL DEFENSE (Thaad) - A theater missile defense system using a hit-to-kill warhead for upper-tier, or mid-course, defense in the BALLISTIC MISSILE DEFENSE (BMD) concept. Thaad is intended to destroy a maneuvering ballistic missile by hitting it dead on, above the atmosphere, with a ground-launched missile. It relies on the impact of a non-explosive interceptor stage propelled from its booster. See also AIRBORNE LASER (ABL).

THEATER INJECTION POINT SYSTEM (TIPS) - A mobile satellite broadcast management and uplink system that transmits highspeed data, voice and video files to the battlefield. COMMENT: TIPS sends specific scheduled information to designated units only, saving time when crucial decisions must be made by warfighters.

THERMAL BLOOMING - A phenomenon that can degrade LASER performance. When a laser beam heats cool air, the air column expands radially outward, and air density along the central axis drops. As the beam travels hundreds of kilometers through non-uniform air, it diverges, as if passing through lenses. The greater the divergence, the less power the beam can deliver.

THERMAL CROSSOVER - The natural phenomenon, which normally occurs twice daily when temperature conditions are such that there is a loss of contrast between two adjacent objects on infrared imagery.

THERMAL DETECTOR - A device which converts invisible electromagnetic energy into voltages or resistive changes, so that these may be made apparent to the human observer or other device (such as movement of a needle, sounding of an alarm, computer display, etc.). See also THERMAL IMAGING, THERMAL WEAPON SIGHT. NOTE: Thermal detectors include bolometers, thermistors, thermocouples, thermopiles and pyroelectric devices.

THERMAL GUN - A microwave device, which may or may not be a NONLETHAL WEAPON, that can create heat in the human body, generating very high fevers, acute illness, and even death. See also ACOUSTIC WEAPON.

THERMAL IMAGING - (1) **The sensing and recording** of the thermal energy emitted or reflected from the objects, which are imaged. (2) **The detection** of emitted infrared energy from both target and background, the conversion of the infrared wavelengths to the visual spectrum, and the presentation of the observed scene on a television monitor in real time. Thermal imaging allows one to see in total darkness and through mist or smoke without being blinded by the glare of the sun, muzzle flashes, flares or searchlights. See also LIGHT AMPLIFICATION, INFRARED IMAGING, UNCOOLED THERMAL IMAGERY.

THERMAL SHADOW - The tone contrast difference of infrared linescan imagery, which is caused by a thermal gradient, which persists as a result of a shadow of an object that has been moved. See also INFRARED IMAGERY, INFRARED LINESCAN SYSTEM.

THERMAL WEAPON SIGHT (TWS) - AN INFRARED (IR) device, which can provide vision through complete darkness, adverse weather conditions, blowing dust and smoke. The TWS utilizes several modern technologies to fulfill the lightweight, low-power, rugged infrared sensor requirements: silent-running, thumbnail-sized thermoelectric cooler, binary optics requiring 40% fewer lens components, low power LIGHT-EMITTING DIODE (LED) display, and VLSI electronics.

THERMIONIC EMISSION - The liberation of electrons or ions from a solid or liquid as a result of its thermal energy. See also CATHODE, VACUUM TUBE.

THERMITE GRENADE - See INCENDIARY GRENADE

THERMOBARIC WEAPON - A weapon which first introduces an aerosol cloud of volatile gases in the target area, and is then ignited to create a fireball that sucks air out of the atmosphere and produces lethal effects, such as severe burns and lung collapse, to individuals in the target area. Also called FUEL AIR EXPLOSIVE (FAE), HEAT & PRESSURE WEAPON, VACUUM BOMB. (NOTE: Thermobaric weapons were first developed in 1970, by the Soviets. One is called the RPO-A Shmel (Bumblebee), and is a disposable shoulder-fired thermobaric weapon.)

HERMOELECTRIC (TE) MODULE - See PELTIER DEVICE

THERMOVIEWER - A device, about the size of a pair of binoculars that can "see" in absolute darkness. It creates images by sensing minute temperature differences between the object sought and its background, and was designed to find enemy troops and vehicles at night.

THIN FILM PYROTECHNICS - CD destruction systems consisting of pyrotechnic sheets glued onto media (e.g., CD-ROM) that can be ignited to catastrophically destroy the data-holding portion of the media.

THIRD GENERATION LANGUAGE (3GL) - A programming language that includes features such as nested expressions, user-defined data types, and parameter passing not normally found in lower-order languages, that does not reflect the structure of any one given computer or class of computers, and that can be used to write machine independent source programs. Synonymous with HIGH-ORDER LANGUAGE. See also FIRST-GENERATION LANGUAGE, SECOND GENERATION LANGUAGE, FOURTH GENERATION LANGUAGE.

THIRD GENERATION RADAR SIGNAL - A generic classification of radar signal sophistication. Third generation radar signals feature SPREAD SPECTRUM, pulse, Doppler, and operation in the A through K bands of the ELECTROMAGNETIC SPECTRUM. See also FIRST, SECOND, and FOURTH GENERATION RADAR SIGNAL.

THIRD MILITARY TECHNICAL REVOLUTION - See REVOLUTION IN MILITARY AFFAIRS (RMA).

THREAT - **(1)** The sum of the potential strength, capabilities, and intentions of any enemy which can limit or negate mission accomplishment or reduce force, system or equipment effectiveness. **(2)** A menacing indication of danger to a nation's military forces, industrial base, territory, possessions, or population. **(3)** A menacing indication of imminent danger to friendly forces.

NOTE: A threat in the sense of definition **(2)** generally arises from an adversary nation's military power manifested by technological capability, military budget, military industrial production capacity, military alliances, and the maintenance of conventional and strategic forces at levels beyond that required for legitimate defense. A threat in the sense of definition **(3)** generally arises from the employment of an adversary's offensive or defensive forces in an area of military operations. See also PROJECTED THREAT, TECHNOLOGICALLY FEASIBLE THREAT (TFT)

THREAT KILL CHAIN - The sequence of events that must occur for a threat to successfully engage and kill its target (e.g., an aircraft). NOTE: Threat kill chain elements include SURVEILLANCE, IDENTIFICATION, acquisition, guidance, and ENDGAME.

THREAT SYSTEM CHANGE - Any change in electromagnetic parameters and/ or operating procedures of a threat system which causes it to: **(1)** not be recognized as that system by intelligence collection or ELECTRONIC WARFARE SUPPORT systems, or **(2)** not be recognized or countered by ELECTRONIC WARFARE systems that normally would do so. Such changes may be intentional or unintentional, and may or may not be the result of employment of WARTIME RESERVE MODES.

THREAT WARNING - (1) A visual, aural, or tactile indication of imminent danger. (2) A mission area in which electronic warfare systems provide platform threat warning or targeting support through passive reception of electromagnetic energy. See also MISSION SUPPORT, SELF-PROTECTION.

THUNDER ROD STUN GRENADE - A NONLETHAL WEAPON made to be insertable through holes in doors. It produces a loud blast and an intense flash of light.

THUNDERSTRIP STUN MUNITION - A NONLETHAL WEAPON, which can be slid under a door, used to produce a blast that will stun individuals inside a room or enclosure.

TIME DIVISION DUPLEXING (TDD) - The use of time to separate transmit and receive signals on a single frequency, as compared to FREQUENCY DIVISION DUPLEXING (FDD), which employs two frequencies for the transmit and receive functions.

TIME-DOMAIN REFLECTOMETRY (TDR) - A REFLECTOMETRY technique using rectangular pulses. TDR sends a short pulse down the cable; the cable's length, impedance and termination provide a unique signature. A trained technician can detect faults by observing deviations from the cable's "normal" signature. See also SMART WIRE, FREQUENCY DOMAIN REFLECTOMETRY (FDR) and STANDING WAVE REFLECTOMETRY (SWR).

TIME-FREQUENCY ANALYSIS - The decomposition of a signal into components with a range of locations, durations, and frequencies. Time-frequency analysis, which employs WAVELET packets, is used to visualize how the frequency behavior of a signal changes over time.

TIME HOPPING - (TH) A SPREAD SPECTRUM technique in which data bits are shortened to a small fraction of their original duration and placed pseudorandomly in the original data bit slot. Since the intended receiver of the data knows the details of the pseudo- random spreading code, it can use matched filter detection of the spread signal to supply an exact replica of the transmitted signal except for the values of the data bits themselves. Contrast with DIRECT SEQUENCE SPREADING, FREQUENCY HOPPING.

TISSUE-BASED BIOSENSORS - Sensors which use cells and tissues to detect biological threats in the environment. NOTE: Such cells will be able to differentiate between pathogenic and non-pathogenic species as well as separate live from dead pathogens.

TONE DOWN - In camouflage and concealment, the process of making an object or surface less conspicuous by reducing its contrast to the surroundings and/or background. See also YEHUDI.

TOP LEVEL WARFARE REQUIREMENT (TLWR) - The required operational capability necessary to accomplish the naval missions embodied in the maritime strategy across the full threat spectrum.

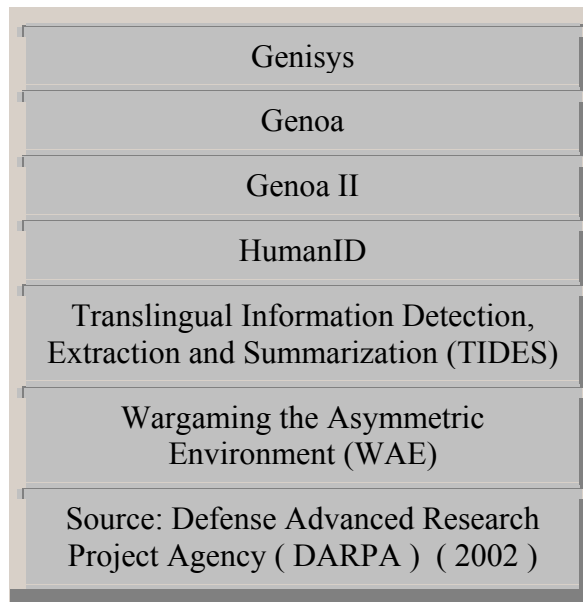
TOROIDAL VOLUME SEARCH SONAR (TVSS) - A SONAR, employed by UNMANNED UNDERWATER VEHICLES (UUVs) in mine detection. TVSS produces a 360-degree beam pattern to provide volume search as well as surface and bottom coverage with narrow beam-width patterns.

TOTAL INFORMATION AWARENESS (TIA) - A new (2002) DARPA program. The purpose of the TIA program is to revolutionize the ability of the United States to detect, classify and identify foreign terrorists, and to decipher their plans, thereby enabling the U.S. to take timely action to successfully preempt and defeat terrorist acts.

To that end, the TIA program objective is to create a counter-terrorism information system that: **(1) increases information** coverage by an order of magnitude, and affords easy future scaling; **(2) provides focused warnings** within an hour after a triggering event occurs or an evidence threshold is passed; **(3) can automatically queue analysts** based on partial pattern matches and has patterns that cover 90% of all previously known foreign terrorist attacks; and, **(4) supports collaboration**, analytical reasoning and information sharing so that analysts can hypothesize, test and propose theories and mitigating strategies about possible futures, so decision-makers can effectively evaluate the impact of current or future policies and prospective courses of action. [See more details at <http://www.darpa.mil/iao/TIASystems.htm>]

NOTE: The TIA program strategy (2002) is to integrate technologies developed by DARPA (and elsewhere as appropriate) into a series of increasingly powerful prototype systems that can be stress-tested in operationally relevant environments, using real-time feedback to refine concepts of operation and performance requirements down to the component level. The table below lists some of the component programs of TIA:

<u>INFORMATION AWARENESS OFFICE (IAO) PROGRAMS</u>
Babylon
Bio-Surveillance
Communicator
Effective, Affordable, Reusable Speech- to-Text (EARS)
Evidence Extraction and Link Discovery (EELD)
FutureMap



TOWED ARTILLERY DIGITALIZATION (TAD) SYSTEM - A

detachable computer system that can be removed from its associated howitzer during tactical movement. When installed, the computer allows the computer to be surveyed into position autonomously. The TAD provides the capability to navigate, locate, and orient itself and computes its own firing data.

TOWED DECOY - A SELF-PROTECTION device containing a jammer, which is deployed and towed by an aircraft to create a false target. Also called MISSILE MAGNET or LITTLE BUDDY.

TRACK - (1) A series of related contacts displayed on a plotting board. **(2)** To display or record the successive positions of a moving object. **(3)** To lock onto a point of radiation and obtain guidance therefrom. **(4)** To keep a gun properly aimed, or to point continuously a target-locating instrument at a moving target. **(5)** The actual path of an aircraft above, or a ship on, the surface of the earth. The course is the path that is planned; the track is the path that is actually taken.

TRACKING - Precise and continuous position-finding of targets by radar, optical, or other means.

TRACK TELLING - The process of communicating air surveillance and tactical data information between command and control systems or between facilities within the systems. Telling may be classified into the following types: BACK TELLING; CROSS TELLING; FORWARD TELLING; OVERLAP TELLING and RELATERAL TELLING.

TRADEX - See TARGET RESOLUTION AND DISCRIMINATION EXPERIMENT.

TRAJECTORY BMD COUNTERMEASURES - The launching of missiles, not at maximum range, but at ranges to minimize or maximize trajectories. For example, depressed trajectories would reduce detection ranges by

line-of-sight defense radars. Depressed trajectories also could be used to place missiles below minimum altitudes of high-altitude defense systems.

See also EVASIVE MANEUVERS BMD COUNTERMEASURES, FALSE-TARGET BMD COUNTERMEASURES, SHROUDING BMD COUNTERMEASURES, SUBMUNITION BMD COUNTERMEASURES.

TRANS-ATLANTIC INDUSTRIAL PROPOSED SOLUTION

(TIPS) - A "system of systems" approach centering on the joint development of an active electronically scanned array (AESA) radar integrated on board a midsize jet Alliance Ground Surveillance (AGS) aircraft.

TRANSDUCER - A device by means of which energy can flow from one or more transmission systems or media to one or more other transmission systems or media. NOTE: The energy transmitted may be of any form (e.g., electrical, acoustical, mechanical)

TRANSFLECTIVE DISPLAY - A LIQUID CRYSTAL DISPLAY which produces back-lighting, hence can be used in low ambient light conditions. Contrast with REFLECTIVE DISPLAY.

TRANSIENT SIGNATURE - That SIGNATURE of a target generated by its various SIGNATURE CONTRIBUTORS. An aircraft, for example, will have a transient signature generated each by **(1)** airframe heating (varies with Mach number and altitude), **(2)** engine plume (varies with the gas path temperature), and **(3)** hot parts (various metal plates and sections of the aircraft).

TRANSIT NETWORK - A NETWORK which passes traffic between networks in addition to carrying traffic for its own hosts. Contrast with STUB NETWORK. See also BACKBONE, MID-LEVEL NETWORK.

TRANSLINGUAL INFORMATION DETECTION, EXTRACTION AND SUMMARIZATION (TIDES) - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to develop advanced language processing technology to enable English speakers to find and interpret critical information in multiple languages without requiring knowledge of those languages. Click to view TIDES concept.

TRANSMITTER LOSSES - See PLUMBING LOSSES.

TRANSPONDER - **(1)** A receiver-transmitter, which will generate a reply signal upon proper interrogation. **(2)** A transmitter-receiver facility, the function of which is to transmit signals automatically when the proper interrogation is received. See also RESPONOR.

TRANSPORTABLE OPTICAL SYSTEM/RELOCATABLE

OPTICAL SYSTEM - The Transportable Optical System (TOS) is a transportable 22" (56 cm) optical telescope, Charge Coupled Device (CCD) camera,

and associated control system for deep space metric tracking. NOTE: The sensor was originally developed by Lincoln Laboratory as a fieldable prototype in 1989-1990 and deployed to San Vito Air Force Station in Italy. The sensor provides critical metric tracking capacity for deep space catalog maintenance, which is deployable to fill gaps in SSN deep space coverage. The TOS requires minimal site preparation and can be operational at a new site three days after arrival. The TOS can be transported in a single C-141 aircraft. TOS can be used as a pre-deployment pathfinder for the GROUND BASED ELECTRO-OPTICAL DEEP SPACE SURVEILLANCE SYSTEM (GEODSS) Upgrade Prototype System (GUPS).

TRANSPORTABLE PORT SECURITY BOAT (TPSB) - A 25-foot Boston whaler outfitted with 175-horsepower outboard engines and carrying a variety of both lethal and NONLETHAL WEAPONS, other equipment, and COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE (C³I) systems.

TRANSPUTER™ - (Trademarked by INMOS group of companies) A microcomputer-on-a-chip incorporating hardware features to support parallel processing. They can be connected like building blocks.

TRAP DOOR - See BACK DOOR.

TRAVELING WAVE TUBE (TWT) - An electron tube in which a stream of electrons interacts continuously or repeatedly with a guided electromagnetic wave moving substantially in synchronism with it, and in such a way that there is a net transfer of energy from the stream to the wave.

TREE EQUIPMENT - A non-AN/ nomenclatured series of special EW equipment used by the Fleet Tactical Readiness Group (formerly, Fleet Electronic Warfare Support Group (FEWSG)).

TRENCH - A photo-defined channel in a dielectric, subsequently plated with copper to form a conductor. See also MICROVIA, RESIN-COATED COPPER (RCC).

TRIBOELECTRIFICATION - Generating an electrostatic charge by friction.

TRIODE - A VACUUM TUBE containing three elements: CATHODE, GRID, and plate (ANODE). See also DIODE, PENTODE, TETRODE.

TRIPHIBIAN - A vehicle able to operate on land, water, and air. See, for example, HYBRID ULTRA-LARGE AIRCRAFT (HULA).

TRIPLATE - See STRIPLINE DEVICE.

TRIPLE-IMAGE ID - An identification (ID) card containing a color photo image on one side (such as that used on a driver's license or passport), and a laser-engraved image of the same photo on the other side of the card. One photo can be compared visually with the other to confirm that they are identical and no alteration

has taken place. If the two facial images do not match, then the card is invalid. A third facial image of the same photo is stored on the card in digital form and can be viewed with the aid of standard computer software. Thus, there are three versions of the same photo.

TRIPLER - With respect to LASERs, certain non-linear crystals which, in one step, produce an output beam that shorten the wavelength of the input beam three-fold. For example, with the input of a 10.6-micron laser light (FAR INFRARED), the output of a tripler will be a 3.53micron (MID INFRARED) beam. See also DOUBLER, OPTICAL PARAMETRIC OSCILLATOR.

TROJAN - See MALICIOUS SOFTWARE

TROPHY GRABBING - The act of HACKING where the intent is not to disrupt or damage a system, but to experience the thrill of proving the ability to penetrate a system. NOTE: Trophy grabbing is a badge of achievement in the hacker community. See also GRAY HAT HACKER, HONEYPOT.

TROJAN NETWORK - The overall Trojan network was designed to support intelligence operations, readiness and training. The Trojan program provides a worldwide capability that enables military-intelligence soldiers in the United States to remotely target and exploit global enemy positions in near-real-time. Using this remote capability, soldiers can enhance their language training and improve unit intelligence and electronic warfare readiness. Click for logo of Trojan Network.

TROPOSPHERE - (1) The lower layers of atmosphere, in which the change of temperature with height is relatively large. It is the region where clouds form, convection is active, and mixing is continuous and more or less complete. (2) That part of the earth's atmosphere in which temperature generally decreases with altitude, clouds form, and convection is active.

NOTE: The earth's troposphere ranges in height from about 6 km at the poles to 18 km at the equator.

TROPOSPHERIC REFRACTIVE EFFECTS PREDICTION

SYSTEM (TREPS) - An Australian software system that enables shipborne radars to use DUCTING in the TROPOSPHERE to greatly extend detection ranges. TREPS uses meteorological data to locate atmospheric ducts, and then determines which radar or other sensor system can best take advantage of the phenomenon.

TROPOSPHERIC SCATTER - The propagation of electromagnetic waves by scattering as a result of irregularities or discontinuities in the physical properties of the troposphere. See also TROPOSPHERIC SCATTER PROPAGATION.

TROPOSPHERIC SCATTER PROPAGATION - Propagation of radio waves through the atmosphere involving scattering from inhomogeneities in the REFRACTIVE INDEX of the troposphere. See also TROPOSPHERIC SCATTER.

TUNABLE LASER - A LASER which can be varied in frequency. NOTE: An example of a tunable laser is the infrared color-center laser, which uses lithium-doped potassium iodide (KI). Developed recently by the Naval Research Laboratory (NRL), it has high stability, high intensity and an extremely broad continuous tunability covering the range from 2 to 4 microns.

TURBO ELECTRIC GENERATOR (TEG) - A destroyer escort configured to provide emergency power to a shore installation. NOTE: There were seven destroyer escorts converted to this use in the 1940s. The TEG would unreel a power cable using a small craft to take the connector to the shore installation. Visit the following site for an interesting description of the TEG, as well as photographs at: <http://www.de220.com/Conversions/TEG.htm>.

TWIN-MIRROR LASER-RETARGETING SATELLITE - See LASER-RETARGETING SATELLITE.

TWIP - Acronym for "twentieth of a point"; a twip is a screen-independent measurement for computer display, used by software program developers. There are 1440 twips in one inch (567 twips per centimeter)

NOTES: **(1)** twips are independent of the "dots per inch" feature of a monitor screen. **(2)** A Windows box could be defined using twips as follows: "Left edge 2820, Top edge 3800; Height 1280; Width 3600."

U

UAV CONTROL LEVELS - Degree, or levels, of interaction between the controller and the UAV. See the table below.

UAV CONTROL LEVELS	
1	Receipt and transmission of secondary imagery or data
2	Receipt of imagery or data directly from the UAV
3	Control of the UAV payload
4	Control of the UAV, less takeoff and landing
5	Full function and control of the UAV
Source: UAV Tactical Control System (TCS) CONOPS, 13 July 1998	

ULTRA-LIGHTWEIGHT CAMOUFLAGE NET SYSTEM

(ULCANS) - A camouflage screening system intended to provide highly mobile and semi-mobile assets with protection against multispectral threat sensors. It possesses cloaking capabilities in the visual, radar, and very-near infrared (IR) spectra, including NEAR-INFRARED BACKGROUND MATCHING and enhanced concealment against thermal sensors.

ULTRA-LOW SIDE LOBES - SIDE LOBE emissions, which, because of antenna design, are more than 50% below typical values.

ULTRASENSITIVE FLOW CYTOMETER - A device which employs LASERS to characterize and sort biological cells to identify the DNA fingerprints of bacteria, including biological threat agents.

ULTRAVIOLET - The portion of the ELECTRO-OPTIC spectrum band between 0.01 and 0.4 microns. See also INFRARED, VISIBLE LIGHT.

ULTRAVIOLET COMMUNICATIONS - Communications using ultraviolet lamps for transmission and ultraviolet detectors for receivers. NOTE: Because ultraviolet light scatters well in the atmosphere, communications using ultraviolet light is virtually immune to electronic jamming and is extremely difficult to detect beyond 2 kilometers of the source.

ULTRA-WIDEBAND RADAR - See IMPULSE RADAR.

UNATTENDED GROUND SENSOR SYSTEM (UGS) - A cluster of omni-directional passive acoustic and seismic sensors along with a gateway node formed in a cluster to achieve coverage of the desired area. The gateway node collects target directional information from the sensors to determine target range, bearing, classification and feature extraction for identification. The data are sent to a command console (*e.g.*, aboard a ship or mobile command post) for monitoring and inclusion in situational displays.

UNATTENDED JAMMER - See HAND-EMPLACED JAMMER.

UNCONVENTIONAL WARFARE - A broad spectrum of military and paramilitary operations conduct in enemy-held, enemy-controlled or politically sensitive territory. Unconventional warfare includes, but is not limited to, the interrelated fields of guerrilla warfare, evasion and escape, subversion, sabotage, and other operations of a low visibility, covert or clandestine nature. These interrelated aspects of unconventional warfare may be prosecuted singly or collectively by predominantly indigenous personnel, usually supported and directed in varying degrees by (an) external source(s) during all conditions of war or peace. See also LOW INTENSITY CONFLICT (LIC), CONTINGENCY AND LIMITED OBJECTIVE OPERATIONS (CALOW or CALO).

UNCOOLED THERMAL IMAGERY - Thermal imagery, which uses uncooled transducers and produce thermal images without scanning. See also THERMAL IMAGING.

UNDERWATER SHIPS HUSBANDRY (UWSH) - The effecting of ships repairs underwater by divers, saving the time and cost of placing the ship in drydock.

UNDERWATER VIEWING MODULE (UVM) - An underwater visual-imaging system mounted on the sail of a submarine. Applications include underwater reconnaissance, inspection and monitoring own ship conditions and launches, and visual navigation under ice. See also UNMANNED UNDERWATER VEHICLE (UUV).

UNIFIED COMMAND SUITE (UCS) - A fly-away truck-portable super high frequency (SHF) multi-band satellite communications system designed for use by weapons-of-mass-destruction civil support teams.

UNIFORM CAMOUFLAGE - The use of patterns on uniforms to allow the wearer blend in with the environment, thus facilitating concealment from adversaries. Click to view various patterns for JUNGLE AND WOODLAND environments, DESERT AND URBAN environments, and new developments in DIGITAL CAMOUFLAGE.

UNINTENTIONAL FREQUENCY MODULATION ON PULSE (UFMOP) - Unintentional frequency variations of a transmitter caused by non-linearities, non-ideal transmitter tubes, modulators, high voltage components, etc.

UFMOP may also be due to production variations, aging, poor maintenance, and temperature.

NOTE: UFMOP is an inherent characteristic of high-powered transmitters, and is exploited by ESM for emitter identification. These modulation are due to *pushing* (frequency, phase or amplitude due to modulation variations in the modulator or power supply), *pulling* (caused by variations in the load impedance seen by the output tube, such as from a poor rotary waveguide joint), and *other effects* (shaping of intrapulse characteristics produced by tube warm-up drift, temperature drift and unadjusted high-voltage power supply variations.)

UNINTENTIONAL NOISE EMISSION - In underwater acoustics, noise generated by a source (e.g., a target) which can be classified as *self-noise* (i.e., noise associated with the electronic circuitry of a sonar and the mechanical operation of a ship) and *ambient noise* (i.e., all of the noises in the sea). Self-noise is produced by noisy tubes and components in the sonar circuitry, water turbulence around the housing of the TRANSDUCER, loose structural parts of the hull, machinery (i.e., power plant and the power distribution system that supplies power to the other machinery on the vehicle, such as compressors, generators, propellers, etc.), cavitation, and hydrodynamic noises caused by the motion of the ship through the water. Ambient noise is background noise in the sea due to either natural or manmade causes, and may be divided into four general categories: hydrodynamic, seismic, ocean traffic and biological.

UNINTENTIONAL RADIATION EXPLOITATION - Exploitation for operational purposes of non-information-bearing elements of electromagnetic energy unintentionally emanated by targets of interest.

UNINTENTIONAL RADIATION INTELLIGENCE (RINT) - Intelligence derived from the collection and analysis of noninformation-bearing elements extracted from the electromagnetic energy unintentionally emanated by foreign devices, equipment, and systems, excluding those generated by the detonation of nuclear weapons. NOTE: Unintentional Radiation Intelligence is encompassed under MEASUREMENT AND SIGNATURE INTELLIGENCE (MASINT).

UNIVERSAL RESOURCE LOCATOR (URL) - A web site address consisting of the following components: protocol, user, password, host, generally consisting of a three-part domain name and optional port (e.g., www.ieee.com), and a URL path.

The URL is formatted as follows:

protocol://user:password@host:port/url-path;typecode=typecode.

Some or all parts of "*user:password@*", "*:password*", "*:port*", "*/url-path*" and "*;typecode=typecode*" may be excluded from the URL. The host name is a set of domain labels separated by ".". The url-path is of the form *name1/name2/name3/...*, and resembles a standard DOS path string, except that the slashes are forward slashes (/) rather than backslashes (\).

[See <http://www.cis.ohio-state.edu/htbin/rfc/rfc1738.html> for a technical discussion on URLs]

NOTES: **(1)** In the example "<http://www.ieee.com>", *http* is the hypertext transfer protocol, *www* is world-wide web, *ieee* is the network (or company) name, and *com* is the "top-level" domain name. Other common top-level domain names include *com*, *net*, *edu*, *mil*, *gov*, *us*, and *uk*. **(2)** If a URL contains a "%" symbol, the two characters following that sign are interpreted as hexadecimal; this allows the use of otherwise illegal ASCII characters (such as a space, which may be included in the URL as "%20").

UNMANNED AERIAL VEHICLE - See UNMANNED AIR VEHICLE.

UNMANNED AIR VEHICLE (UAV) - An air vehicle having no on-board pilot, capable of receiving continuous or intermittent commands from a human operator at a distance. The vehicle is normally designed to be recoverable. NOTE: An example of a UAV is the 100-ft wingspan Raptor/Pathfinder, a solar-powered eight-motor, unmanned flying wing designed to stay aloft for weeks or months watching for ballistic missile launches or sampling air pollution.

<u>TOP US ARMY TACTICAL UAV MISSIONS</u> (1999)	
Priority and Mission	Payload Type
1. Reconnaissance	EO/IR, Search and Rescue (SAR)
2. Mine Countermeasures	IR
3. Target Designation	Laser Target Designators
4. Battle Management	EO/IR, Search and Rescuer (SAR)
5. Chemical-Biological Warfare	Point-Source Detectors
6. Signals Intelligence (SIGINT)	COMINT / ELINT
7. Counter-Camouflage	Multi-Spectral Sensors

8. Electronic Warfare (EW)	ESM / Jammers
9. Combat Search and Rescue	EO / IR, COMINT
10. Communications Data Relay	Communications Relays
11. Information Warfare (INFOWAR)	Specialized Electronic Attack (EA)
Source: US Army, <i>Unmanned Systems</i> magazine, 1999	

UNMANNED TERRAIN DOMINATION (UTD) - The use of autonomous, unmanned capability to achieve total SITUATIONAL AWARENESS (SA), evaluate data, develop courses of action and employ lethal and non-lethal SMART WEAPONS to achieve the commander's objectives. [U.S. Army Major Initiative, *circa* 2000]

UNMANNED UNDERSEA VEHICLE (UUV) - See UNMANNED UNDERWATER VEHICLE.

UNMANNED UNDERWATER VEHICLE (UUV) - An underwater vehicle launched from a torpedo tube to perform a variety of underwater scouting missions using visual imaging. Synonymous with UNMANNED UNDERSEA VEHICLE. See also UNDERWATER VIEWING MODULE (UVM).

USER AGENT STRING - An alphanumeric string containing the self-identification of a BROWSER, such as Netscape or Microsoft Explorer. See also MOZILLA. EXAMPLE (1999): Internet Explorer 4, running on Windows 98 sends the following USER AGENT STRING: *User Agent: Mozilla/4.0 (compatible; MSIE 4.01; Windows 98)*

V

VACUSOL - A spacecraft decoy. Sprayed from the protected spacecraft, it consists of a cloud of particles, which reflect light at the same wavelengths as those reflected by the spacecraft.

VACUUM FLUORESCENT DISPLAY (VFD) - A (vacuum tube) TRIODE consisting of a thermionic CATHODE, a control GRID, and a phosphor-coated ANODE which produces the display.

VACUUM TUBE - An electronic device in which conduction by electrons takes place in a vacuum or gaseous medium within a gas-tight envelope (tube). Vacuum tubes generally consist of a heating element (unless it is of the COLD CATHODE variety), CATHODE, zero or more control elements (or GRID), and a plate (or ANODE). Except for electronic displays, such as the CATHODE RAY TUBE, and certain high power applications, vacuum tubes have largely been replaced by solid state devices. Also called VALVE.

NOTES: (1) One way of classifying vacuum tubes is according to the number of elements contained in the tube. Thus, a DIODE contains two elements (cathode and plate), TRIODE contains three elements (cathode, grid, and plate), TETRODE contains four elements (cathode, two grids, and plate), and PENTODE (cathode, three grids, and plate). (2) Several types of otherwise obsolete vacuum tubes are still being manufactured in Eastern Europe (1998) for use by entertainers in guitar and other instrument amplifiers, e.g., 6L6 beam power tetrode introduced by RCA in 1936, 12AT7 dual triode, and the 12AX7 dual triode.

VALUE ADDED NETWORK (VAN) - A private service that securely routes data from one organization to another for a fee.

VALVE - See VACUUM TUBE.

VAN ECK ATTACK - See VAN ECK MONITORING.

VAN ECK DEVICE - A device which monitors RF radiation from computer monitors and connecting cables.

VAN ECK MONITORING - The monitoring of the activity of a computer or other electronic equipment through detection of low levels of electromagnetic emissions from the device. Named after Dr. Wim van Eck who published on the topic in 1985. Also called VAN ECK ATTACK

VAPOR TRACING - Exploitation of the natural airflow phenomenon called "the human convection plume" to detect microscopic traces of nitroglycerin, TNT, cocaine, heroin and other explosives and narcotics. NOTE: Current (2003) devices used at airports, for example, are claimed to be able to detect traces of such contraband within seconds on individuals being scanned. For example, a passenger steps inside, gets a brief blast from 16 air jets, and an overhead analyzer sucks up the

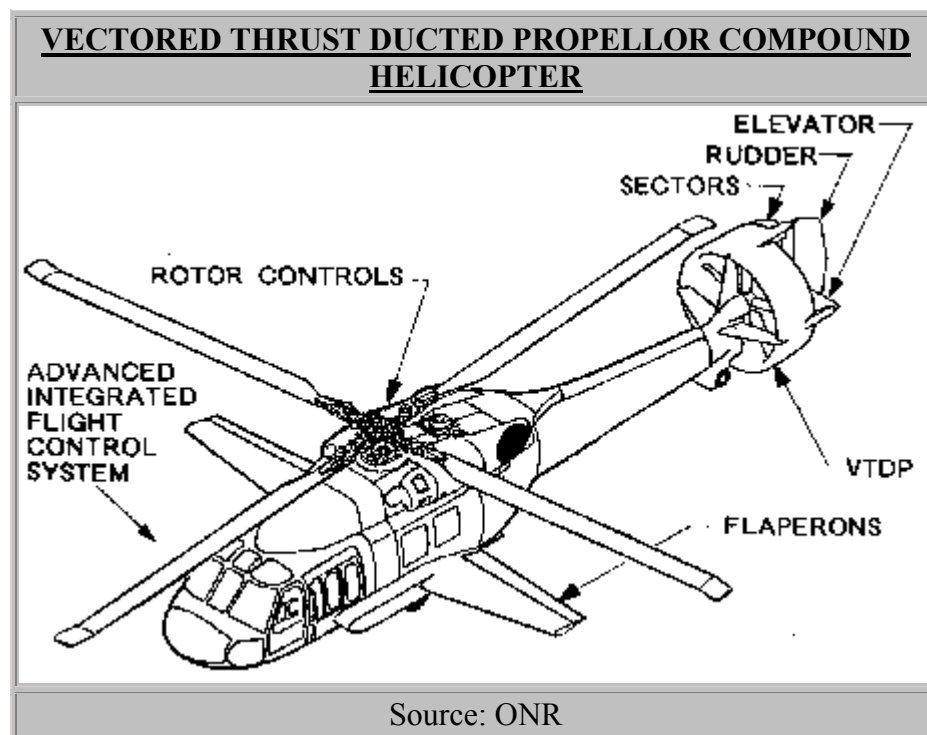
human convection plume that naturally exhausts from the human body. After a few seconds, a clean passenger gets a green light to proceed; otherwise, an alarm will sound.

VARIABLE POLARIZATION - An ECCM technique for use against a main-beam on-target or STANDOFF JAMMER. It controls the POLARIZATION of the radar antenna to maximize SIGNAL-TO-JAMMING RATIO in the radar receiver.

VARIABLE VELOCITY RIFLE SYSTEM (VVRS) - A rifle which vents propellant gas to vary projectile velocity for either lethal or non-lethal effects. See also NONLETHAL WEAPON. NOTE: Certain VVRS weapons allow the user to dial up the velocity of the bullet depending on the situation. Using a cartridge based on the standard shotgun shell, the propellant exploits the explosive interaction between aluminum and water.

VECTORED THRUST DUCTED PROPELLOR (VTDP)

COMPOUND HELICOPTER - A specialized helicopter for airborne mine countermeasures (MCM) towing missions. It features a ducted propeller for forward thrust and small wings for added lift.



VEHICLE ACTIVE DEFENSE SYSTEM (VADS) - A NONLETHAL WEAPON system consisting of a vehicle equipped with mounted flash, bang, and smoke grenades to distract, allowing the vehicle to then evade ambushers.

VEHICLE-DISABLING WEAPON (VDW) - A NONLETHAL WEAPON system, which employs LASER beams to directly inject radio-frequency (RF) electrical current into the electronic circuits of the target vehicle. The disabling current is transmitted through two channels of highly ionized air for a (theoretical)

range of up to two kilometers. See also ANTI-PERSONNEL BEAM WEAPON (APBW).

VEHICLE MANAGER - An individual who manages the flight profile of several unmanned combat aerial vehicles (UCAVs) and/or unmanned reconnaissance aerial vehicles (URAVs) simultaneously, and is envisioned (1996) as part of a team consisting also of a weapons officer, and an intelligence analyst, all involved with the missions of these pilotless air vehicles.

VEHICLE MANAGEMENT SYSTEM (VMS) - A vehicle control system characterized by a high degree of physical and functional integration of manual and automatic flight controls, propulsion controls, and airframe utility subsystem controls.

VEHICLE MOUNTED MINE DETECTOR (VMMD) - A vehicle-mounted system, which is capable of detecting, within 0.25 meters, both surface and underground mines buried to a depth of 8 inches. The VMMD is equipped with a forward-looking infrared sensor, a mission control computer, and a ground-penetrating standoff mine detection radar.

VELA - A set of nuclear detonation (NUDET) detection satellites (Vela-5A, 5B, 6A, 6B) deployed in the period 1969-1979. Probably named after the star Vela ("The Sail")

VELOCITY GATE PULL OFF (VGPO) - A SELF-SCREENING ECM technique used against velocity tracking radars. It captures the victim radar's velocity gate, walks it off in velocity, then turns OFF, leaving the velocity gate with no signal, causing a break in the velocity track. The process is repetitive. Synonymous with VELOCITY GATE WALK-OFF.

VELOCITY GATE WALK OFF - See VELOCITY GATE PULL OFF.

VERDIN - See VLF DIGITAL INFORMATION NETWORK

VERTICAL CAVITY SURFACE-EMITTING LASER (VCSEL) - A laser device constructed using ATOMIC-LEVEL MANUFACTURING. The VCSEL is composed of multiple NANOMETER - thick layers of different semiconducting materials that are sandwiched together. The specific wavelength and intensity of the emitting light can be tuned by controlling the spacing between material layers in the fabrication process. NOTE: VCSELs have applications in high-bandwidth, optics-based telecommunications networks.

VERTICAL COVERAGE DIAGRAM - See FADE CHART.

VERTICAL LAUNCH ASROC (VLA) - An ASROC launched from a fixed vertical launcher. (View the VLA Program logo)

VERTICAL SITUATION DISPLAY - An electronically generated display on which information on aircraft attitude and heading, flight director commands, weapon aiming and TERRAIN FOLLOWING can be presented, choice of presentation being under control of the pilot. See also HEAD-UP DISPLAY, HORIZONTAL SITUATION DISPLAY.

VERY HIGH FREQUENCY OMNI-DIRECT RADIO-RANGE

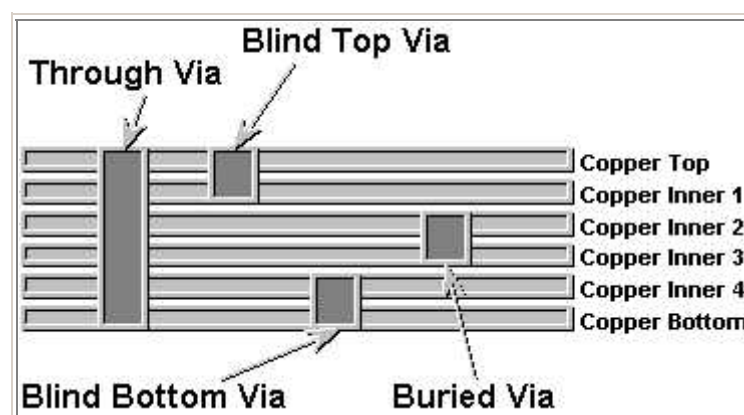
(VOR) - A ground-based electronic navigation aid that transmits VHF omni-directional radio signals, 360 degrees in azimuth, oriented from magnetic north. NOTE: The primary radio navigation aid in the National Airspace System, VOR is the internationally designated standard short-distance radio navigation aid for air carrier and general aviation Instrument Flight Rules (IFR) operations. It provides a bearing from the aircraft to the VOR transmitter. Distance to the ground station is provided by a co-located Distance Measuring Equipment (DME) or TACAN. If the VOR is co-located with a TACAN, the configuration is called VORTAC.

VERY LONG INSTRUCTION WORD (VLIW) - A computer instruction word, which encodes four or more operations in a single instruction.

VERY LOW FREQUENCY DIGITAL INFORMATION NETWORK - See VLF DIGITAL INFORMATION NETWORK

VESSEL STOPPER SYSTEM (VSS) - A non-lethal means to render a suspect vessel inoperable for a sufficient period of time to enable a boarding party to reach and board the vessel.

VIA - A vertical plated-thru hole, usually drilled, in a multi-layered Printed Circuit Board (PCB) used to provide electrical connection between two or more layers. If the via connects two or more layers within the PCB, not including either outer layer, it is called a BURIED VIA. If the via connects two or more layers to include one of the outer layers, it is called a BLIND VIA (BLIND TOP VIA or BLIND BOTTOM VIA). If a via connects all layers it is called a THROUGH VIA; see the figure below.



Also called FEED-THRU (FEED-THROUGH) and VIA-HOLE. See also MICROVIA.

VIBRATION SENSOR - A device used to provide vibration information. There are three basic types of vibration sensors: *displacement transducer*, which is a non-contact device measuring minute distances between the observed equipment and the sensor; *velocity sensor* (e.g. spring-held magnet moving through a coil of wire) which measures vibration as either horizontal or vertical motion; and *accelerometer*, a piezoelectric device.

VIDEO BLANKING INTERVAL - A television (TV) broadcast area reserved for data. Internet data are delivered to the PC by using the video blanking interval in a broadcast or cable TV signal. The signal is then received by a TV tuner card, and the incoming video is displayed in a full or one-quarter screen.

VIDEO COMPRESSION - Techniques which allow television pictures to be transmitted over relatively narrow bands. NOTE: Some video compression systems incorporate baseline picture frame techniques. A single frame is digitized and stored in memory. Subsequent picture frames are compared to this baseline and only the differences between the two frames are transmitted. Other techniques involve removal of alternate lines of pixels or the use of parallel processors and compression algorithms to simultaneously handle "sub-pictures".

VIRCATOR - See VIRTUAL-CATHODE OSCILLATOR.

VIRTUAL ANTENNA - A method by which a single radiating element achieves radar antenna characteristics through the use of digital processing and movement of the radiating element, target, or both.

VIRTUAL-CATHODE OSCILLATOR (VIRCATOR) - A broadband tunable device capable of producing intense electron beams, and therefore suitable for use as a DIRECTED ENERGY WEAPON.

VIRTUAL CIRCUIT (VC) - A PACKET SWITCHING technique in which a logical connection is established between two stations. Communications over a virtual circuit differs from connectionless communication in that all PACKETS follow the same route, may carry less header information, and arrive in the order they were sent.

VIRTUAL ENVIRONMENT (VR) - A computer-generated, three-dimensional representation of a setting, which unlike VIRTUAL REALITY, need only suggest a real or imagined space, and does not have photo-realism and a sense of total immersion a primary goal. See also DISTRIBUTED VIRTUAL ENVIRONMENT.

VIRTUAL HEIGHT - The apparent height of an ionized layer determined from the time interval between the transmitted signal and the ionospheric echo at vertical incidence, assuming that the velocity of propagation is the velocity of light over the entire path. See also IONOSPHERE.

VIRTUAL PRIVATE NETWORK (VPN) - (1) A computer connection in a shared network that has the appearance of a dedicated link. (2) A community of users

who communicate securely within a public network, (e.g., the INTERNET). **(3)** The use of encryption in the lower PROTOCOL layers to provide a secure connection through an otherwise unsecure network such as the Internet. [*Free On-Line Dictionary of Computing*]

VIRTUAL REALITY (VE) - A combination of technologies whose interfaces with the human user can so dominate the senses that the person intuitively interacts with the immersive and dynamic computer-generated environment. Contrast with VIRTUAL ENVIRONMENT. NOTE: Virtual reality provides a full immersion of the user(s) in an interactive computer-generated environment.

VIRTUAL WORLD - A loose way of describing any DISTRIBUTED VIRTUAL ENVIRONMENT, whether separately or in combination. See also CYBERSPACE.

VIRUS - See MALICIOUS SOFTWARE

VISIBLE LIGHT - ELECTROMAGNETIC RADIATION which can be detected by the human eye. It is commonly used to describe wavelengths, which lie in the range between 0.4 and 0.7 microns. See also ELECTRO-OPTIC, INFRARED, ULTRAVIOLET.

VISUALIZATION - An image- processing technique that combines the use of image processing, graphics, multi-dimensional (volume) rendering and photo-realistic rendering.

VLF DIGITAL INFORMATION NETWORK (VERDIN) - A very low frequency (VLF)/low frequency (LF) communications system to provide secure command and control (C²) to strategic and tactical submarine forces and airborne VLF relay "Take charge and move out" (TACAMO) aircraft.

VOICE SYNTHESIS DEVICE - A NONLETHAL WEAPON which has the ability to clone a persons voice so that a synthesized message in that person's voice can be transmitted (e.g., by satellite) to a selected audience.

VOICE TO SKULL (V2K) DEVICE - NONLETHAL WEAPONS which include **(1) A NEURO-ELECTROMAGNETIC DEVICE** that employs microwave transmission of sound into the skull of persons or animals by way of pulse-modulated microwave radiation. Depending upon the frequency and power densities used, such transmissions may be perceived by humans due to the ELECTROPHONIC EFFECT, which manifests itself as a buzzing or clicking sound in the back of the head. **(2) A SILENT SOUND DEVICE** which can transmit sound into the skull of person or animals. Also called ARTIFICIAL TELEPATHY, MICROWAVE HEARING, FREY EFFECT. NOTE: The sound modulation may be voice or audio sub-liminal messages. One application of V2K is use as an electronic scarecrow to frighten birds in the vicinity of airports.

VOLATILE RAM - Computer Random Access Memory in which data cannot be retained without continuous power dissipation. Contrast with NON-VOLATILE RAM.

VOLCANO - A multiple mine delivery system, which can deploy GATOR MINES from various vehicles and helicopters.

VORTEX WEAPON - A NONLETHAL WEAPON that generates an explosive charge which creates a massive shock wave traveling at hundreds of miles per hour to its target. NOTE: This weapon can knock down people or even aircraft, and could be used in combination with gases or chemical agents.

VORTAL - A Web site that contains news, links and other information specific to one particular industrial sector.

VOYAGE MANAGEMENT SYSTEM (VMS) - A computerized system, which includes an electronic chart display and information system. It determines the ship's position and movement by integrating input from GLOBAL POSITIONING SYSTEM (GPS) sensors, navigation radars, depth sounder, speed log, gyrocompass, and other systems. VMS can provide a display showing surface radar contacts superimposed on an electronic nautical chart display. The system includes an advanced steering function to drive the ship automatically, and allows the ship to follow the course of a programmed voyage plan.

VULNERABILITY - (1) **The characteristics of a system** which cause it to suffer a definite degradation (incapability to perform the designated mission) as a result of having been subjected to a certain level of effects in an unnatural (manmade) hostile environment. (2) **An electronic system measure** expressed as a composite of ACCESSIBILITY, INTERCEPTIBILITY, SUSCEPTIBILITY. See also GRACEFUL DEGRADATION.

W

WAKE SIGNATURE CONTROL - SIGNATURE CONTROL designed to reduce an adversary's ability to detect, track, and engage friendly units through analysis of surface and underwater wakes. Sensor systems that can detect wakes include visual, conventional and IR photography, IR radiometry, and microwave radiometry.

WAKE VORTEX - The air turbulence generated behind an aircraft.

WANDERER - See SPIDER.

WAR BREAKER - A research program initiated by the Advanced Research Projects Agency (ARPA). War Breaker addresses automated surveillance, targeting, intelligence, and planning to target and destroy time-critical targets such as mobile missile systems and advanced command and control centers. [JED "Washington Report 5/93]

WARDIALER - A computer program, used by CRACKERS, which dials a specified list of telephone numbers and records those which answer with HANDSHAKE tones, distinguishing among modem, fax, and PBX tones. NOTE: WARDIALERS have evolved from DEMON DIALERS.

WARFIGHTER PHYSIOLOGICAL STATUS MONITORING

(WPSM) - A next-generation combat uniform featuring a configurable array of miniaturized wireless sensors to monitor heart rate, metabolic energy cost of walking or marching, core skin temperatures, and activity or inactivity. The WPSM uniform will also feature GLOBAL POSITIONING SYSTEM (GPS) geolocation data and a low-power PERSONAL AREA NETWORK (PAN).

NOTE: All WPSM data will be transmitted to a central hub device the size of a pager worn on a soldier's belt to be stored or passed on to command communications networks or even the Internet. The WPSM will provide command with information about a soldier's energy expenditure, physiological stress and alertness levels. If a soldier is injured, the sensors will provide medics with the capability to perform accurate battlefield triage.

WARFARE SYSTEMS ARCHITECT (WSA) - (Navy) An individual responsible for designing SYSTEM ARCHITECTURE for naval forces of the future based on requirements provided by OPNAV.

WARFIGHTER'S TACTICAL ASSOCIATE (WTA) - A server-like station mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV - "Hummer", or "Humvee") used to relay and link to the Individual Warfighter Systems (IWS) on "electronically enhanced soldiers".

WAR GAME - A simulation, by whatever means, of a military operation involving two or more opposing forces, using rules, data, and procedures designed to depict an actual or assumed real life situation.

WARGAMING THE ASYMMETRIC ENVIRONMENT (WAE) - A Defense Advanced Research Project Agency (DARPA) Total Information Awareness (TIA) program to develop predictive technology to better anticipate and act against terrorists. Click to view the WAE concept. NOTE: WAE is a revolutionary approach to identify predictive indicators of attacks by and the behavior of specific terrorists by examining their behavior in the broader context of their political, cultural and ideological environment.

WARTIME RESERVE MODE (WARM) - Characteristics and operating procedures of sensor, communications, navigation aids, threat recognition, weapons, and countermeasures systems that **a.)** will contribute to military effectiveness if unknown to or misunderstood by opposing commanders before they are used, but **b.)** could be exploited or neutralized if known in advance. Wartime reserve modes are deliberately held in reserve for wartime or emergency use and seldom, if ever, applied or intercepted prior to such use.

WATER HAMMER - A weapon used for underwater combat or mine clearing. The device employs a phase array of shock tubes to generate and focus underwater shock waves into a pressure pulse exceeding 2,000 psi. In effect, it is an underwater attack trumpet, destroying objects hundreds of meters distant with sound. NOTE: The explosive wave generator for the water hammer is powered by a reactant mixture of finely granulated aluminum and seawater. A horn forms the exit vehicle for the energy waves out of the source tube. Converging waves reinforce each other in a zone away from the front of the source. This ability to focus shock waves differentiates the water hammer from conventional methods of dropping explosives in the water.

WATER HARVESTING - The efficient production of water on demand from non-traditional sources for the individual or small group by extraction from local atmospheric moisture, breath, perspiration, urine, wet earth, mud, combusted hydrocarbons, etc. NOTE: Water harvesting can potentially produce more than 3.5 quarts per day per person. See also CONTINUOUS ASSISTED PERFORMANCE (CAP), ENERGY HARVESTING, PERSISTENCE IN COMBAT (PIC).

WATER-JET MINE CLEARING - The destruction of land and sea mines or other unexploded ordnance (UXO) by firing high-pressure (2,000-100,000psi) water jets at the target in order to penetrate the casing and destroy the main explosive charge. See also AIR-CHISEL MINE CLEARING.

WATTENBERG PLOW (WP) - A strongback with vertical cutting knives at 4-inch spacings, behind a blanket of cross-linked chains. It is towed from a distance of about 600 feet by a helicopter at speeds up to 20 knots to clear land mines. See also CLAUSEN POWER BLADE.

WAVE - A disturbance propagated through a medium or through space. NOTE: Disturbance, in this definition, is used as a generic term indicating not only mechanical displacement but also voltage, current, electric field strength, temperature, etc.

WAVE CLUTTER - CLUTTER caused by waves from the sea.

WAVE DETECTION - The sensing of sub-audible atmospheric waves. An example is the detection of clandestine nuclear explosions and rocket plume products that roll across the atmosphere and produce waves and vertical undulations as well. Such waves travel a long way, and provide potential for detection by suitable detection devices.

WAVE DISTURBER - JAMMING transmitter.

WAVE FILTER - A TRANSDUCER for separating WAVES on the basis of their frequency.

WAVE PIERCING TUMBLEHOME (WPTH) - A hull design (*e.g.*, for the DDX) intended to meet low RADAR CROSS SECTION (RCS) SIGNATURE while maintaining seakeeping, damage stability, maneuvering, propulsion, and resistance capabilities. [Navy's DD(X) Web site is:
<http://peoships.crane.navy.mil/ddx/>]

WAVEFORM - A manifestation or representation or a visualization of a WAVE, pulse, or transition. EXAMPLE: The geometrical shape obtained by displaying a characteristic of the wave as a function of some variable, usually time, plotted over one primitive period (*e.g.*, one cycle).

WAVEFORM DIVERSITY - A radar ECCM technique wherein the transmitted waveform characteristics are changed periodically or randomly to make it difficult for an ECM operator to receive, determine the lethality of, and/or effectively jam the radar.

WAVELENGTH DECORRELATION - A high-resolution imaging technique for measuring target shape and estimating surface-scattering properties.

WAVELET - (1) Families of basic mathematical functions in terms of which other arbitrary functions can be represented with far greater accuracy and efficiency than the Fast Fourier Transform. (2) An oscillating waveform that persists for only one or a few cycles. A given wavelet has both a location (position) and a scale (duration).

NOTE: Wavelets were initially developed for performing multi-resolution analysis on digital imagery. There appear to be many additional applications, including audio and video compression and covert communications. Wavelets are most useful for representing signals and images with discontinuities.

WEAK PASSWORD - A password that can be guessed easily by an intruder, especially one who knows something about the target's background. Also called **INEFFECTIVE PASSWORD**. NOTE: The following guidelines are provided by one agency of the Department of Energy:

"Here are some simple guidelines for a strong password:

- It should contain at least eight characters.
- It should contain a mix of four different types of characters . upper case letters, lower case letters, numbers, and special characters such as !@#\$\$%^&*;, ". If there is only one letter or special character, it should not be either the first or last character in the password.
- It should not be a name, a slang word, nor any word in the dictionary. It should not include any part of your name or your e-mail address.
- You should be able to type it quickly, so that someone looking over your shoulder cannot readily see what you have typed.
- It should be changed at least every 90 days to keep undetected intruders from continuing to use it."

WEAPON BACKTRACKING - Determining the location of a firing platform by analyzing weapon observables and trajectory.

WEAPONS SYSTEMS TECHNOLOGIES (WST) - Technologies whose technical performance parameters are at or above the minimum level necessary to ensure continuing superior performance of U.S. military systems. [See more details at: <http://www.dtic.mil/mctl>]. See also **DEVELOPING CRITICAL TECHNOLOGIES (DCT)**, **MILITARILY CRITICAL TECHNOLOGIES LIST (MCTL)**. The WST comprises the following (*circa* 1999):

<u>WEAPONS SYSTEMS TECHNOLOGIES (WST)</u>
Aeronautics Systems
Armaments & Energetic Materials
Chemical and Biological Systems
Electronics
Ground Systems
Guidance, Navigation, and Vehicle Control
Information Systems
Information Warfare (IW)
Manufacturing and Fabrications
Materials
Marine Systems

Nuclear Systems
Power Systems
Sensors and Lasers
Signature Control
Space Systems
Weapons Effects and Countermeasures
Source: DTIC

WEARABLE COMPUTER - A garment (cotton t-shirt) composed of continuously woven optical fiber to detect bullet or shrapnel wounds under battlefield conditions. Additional fibers in the shirt are attached to a personal medical monitor attached to the soldier's belt to monitor vital signs. The shirt actually functions like a computer, with sensors attached to the soldier's body. When the continuous optical fiber is broken, a remotely located medical unit can accurately assess the soldier's condition before dispatching medical units to the battlefield.

WEB BROWSER - A software application used to locate and display Web pages. Most modern web browsers can display graphics as well as text, and some can present multimedia information, including sound and video. Also called BROWSER.

WEB SPIDER - See SPIDER.

WEBTAS (or WebTAS) - Acronym for *Web-enabled Temporal Analysis System*, a sophisticated software package that facilitates the manipulation and analysis of huge data sets, both historical and in REAL TIME. WebTAS detects patterns of interest and can notify analysts that an event of interest may be occurring. Historical research tools provide a research capability facilitating the discovery of patterns of interest. Web-based, real-time portals provide up-to-date views of situations to other users of the relevant INTRANET.

NOTES: **(1)** WebTAS is used to analyze the many unfolding events in a crisis situation and compares them against known or historical conditions. *Ad hoc* queries allow analysts who are not database experts to construct complex historical questions relating to the databases. External database connectivity allows users to tap into existing intelligence databases and fuse the results into common visual displays and web pages. **(2)** In Law enforcement, WebTAS can be used to organize and analyze the myriad of events, such as phone calls, credit card transactions, emails, interview statements, etc, which might be entailed in a complex case. The results of such an analysis could be used to present circumstantial evidence in a court of law. **(3)** Fraud Analysts can use WebTAS to comb through large data sets ferreting out interesting patterns of potential fraud. Once a pattern has been detected it can be applied against the entire database to identify possible previously undiscovered crimes. WebTAS can be used to bring together several disparate databases and combine the results in an investigation or analysis effort. Other applications of WebTAS include:

- Counter Narcotics
- Counter Terrorism
- C³I Analysis
- C⁴I Analysis
- Criminal Investigation
- Law Enforcement
- Money Laundering
- Medical Trend Analysis
- INFORMATION WARFARE (IW)
- Performance & Measurement Analysis
- Intelligence Analysis
- DECEPTION & DENIAL
- Market Analysis
- CLICKSTREAM ANALYSIS.

WELTANSCHAUUNG - A SPACE AND ELECTRONIC WARFARE (SEW) concept under SONATA that prescribes a "world view" or "global perspective" for SEW. See also COPERNICUS ARCHITECTURE, CROESUS STRATEGIES.

WHITE ALICE - White (for snow) ALaskan Integrated Communications and Electronics. A 900 MHz tropospheric communications system (circa 1956 - 1979) consisting of 49 communication sites throughout Alaska. They were characterized by their 50-foot "drive-in-movie-screen" antenna reflectors. White ALICE was subsequently replaced by satellite systems.

WHITE HAT HACKER - See HACKER.

WHITE NOISE - RANDOM NOISE or IMPULSE NOISE that has a flat frequency spectrum at the frequency range of interest. (LISTEN to **white noise**. LISTEN to **white noise with modulation**.)

WHITE-PHOSPHOROUS GRENADE - A grenade which spews phosphorous over an area from 35 to 50 meters; it is used for signaling, screening, and incendiary purposes, or to inflict casualties. See also INCENDIARY GRENADE.

WIDE AREA NETWORK (WAN) - A data or computer NETWORK which covers a large geographical area. Contrast with LOCAL AREA NETWORK (LAN).

WIDEBAND OPERATIONS - A fuze counter-countermeasure consisting of fuze operation over a wide band of frequencies from VHF up, thus increasing the difficulty in jamming the fuzes. See also FUZE JAMMING.

WIDEBAND RADAR - A radar that utilizes a wide bandwidth for very short pulse and/or multiple frequency operation.

WIDEBAND SHORT-PULSE - A radar ECCM technique where a very narrow transmitted pulse and a wide bandwidth receiver are used.

WIDE OPEN RECEIVER - A receiver that provides a wide BAND PASS by means of broadly tuned circuits.

WILD SIDE - The public, or uncontrolled, side of a FIREWALL.

WILD WEASEL - **(1)** An aircraft specially modified to identify, locate, and physically suppress or destroy ground based enemy air defense systems that employ sensors radiating electromagnetic energy. **(2)** An aircraft designed to engage in SUPPRESSION OF ENEMY AIR DEFENSE (SEAD). It precedes or accompanies a strike group into a target area protected by surface-to-air missile sites and uses a combination of threat identification and targeting systems to automatically detect, identify, locate and destroy missile sites with anti-radiation missiles, stand-off guided weapons and iron bombs. Synonymous with IRON HAND.

WIND-CORRECTED MUNITIONS DISPENSER (WCMD) - A bomb tail-kit used to improve accuracy of dropped munitions such as cluster munitions, COMBINED EFFECTS MUNITIONS (CEM), anti-material mines and SENSOR-FUZED WEAPONS (SFW). WCMD enhances accuracy by correcting for launch transients, ballistic errors, and winds aloft.

WINDOW - See CHAFF.

WINDOWING - See Y2K WINDOWING.

WIRELESS POWER TRANSMISSION (WPT) - The beaming of microwave energy to a vehicle, which then converts it to DC power that can drive a motor, thus eliminating the need for a battery on board. WPT is presently (1999) being used on prototype UNMANNED AIR VEHICLE (UAV) devices called MINIATURE (MICRO) AIR VEHICLES (MAVs).

WOBBLIN' GOBLIN - A nickname for the F-117 stealth aircraft.

WOLFPACK - A Defense Advanced Research Projects Agency (DARPA) program (2001) to enable tactical battlespace RF spectrum dominance in the 20 MHz to 15+ GHz range.

WOODEN BOMB - A concept which pictures a weapon as being completely reliable and having an infinite shelf life while at the same time requiring no special handling, storage or surveillance. See also WOODEN ROUND.

WOODEN ROUND - An ordnance round (shell, missile, etc.) requiring no maintenance or preparation time prior to loading for firing. See also WOODEN BOMB.

WORLD WIDE WEB (WWW) - A HYPERTEXT-based, distributed information system created by researchers at the CERN European Laboratory for Particle Physics in Switzerland.

WORM - See MALICIOUS SOFTWARE.

WORMHOLE - See BACK DOOR.

WRITE ONCE READ MANY (WORM) - An optical disk used for archiving computer data.

X

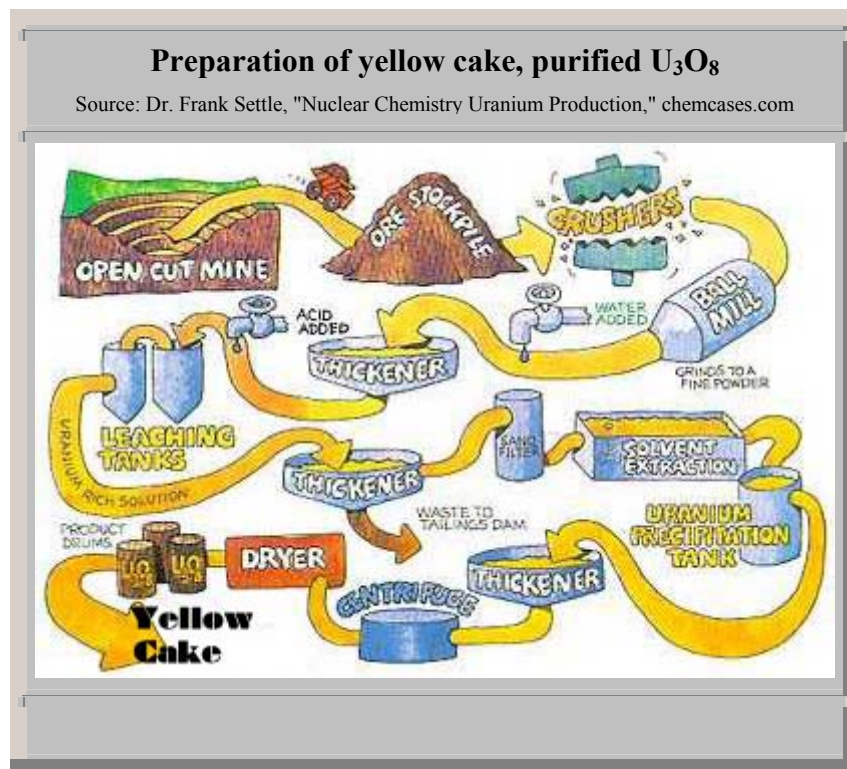
X-RAY LASER - A DIRECTED ENERGY WEAPON consisting of a nuclear bomb surrounded by metal rods, presumably a space-based device. When activated, the bomb causes the rods to emit x-rays radiation, which can be directed at a target. The powerful x-ray beam produces a powerful shock wave in the target, destroying it.

Y

Y2K WINDOWING - A computer program patch that allows one to continue to use 2-digit years for both the 20th and 21st century in data input so that the system converts the number to a properly prefixed year. This is accomplished through the use of a "pivot", where years prior to a pivot point are assumed to be of the 21st century, and dates after the pivot are from the 20th century. (NOTE: Y2K windowing is not a Y2K solution, it merely moves the Y2K problem to another year, depending on the value of the pivot. In addition, windowing will likely not work on PCs used in mainframe environments.)

YEHUDI - An optical jamming technique whereby a number of lights are placed on an aircraft to provide the aircraft with a luminance close to that of its background. The lights are pointed in the general direction of the threat observer, making the aircraft difficult to be seen. [1984 USAF briefing handout] (See also ISOLUMINESCENCE.)

YELLOW CAKE - Uranium ore purified into a uranium oxide concentrate (U_3O_8). Yellow cake may be sintered (formed into a fused mass by heating without melting) and made into fuel pellets. Yellow cake may be further refined to produce enriched uranium.



YTTRIUM ALUMINUM GARNET (YAG) - A crystal used in lasers.

YTTRIUM IRON GARNET (YIG) - A crystal used in modern receivers. When used in a frequency oscillator, the YIG crystal's frequency can be changed by varying a surrounding magnetic field.

Z

"Z" ELECTRO-OPTICAL PAYLOAD (ZEOP) - A light-weight, all-weather, day and night image intelligence sensor for close- and short-range UNMANNED AIR VEHICLES. The ZEOP weighs less than 50 lbs. and used a simple modular design incorporating second-generation IR technology. It is housed in a stabilized gimbaled turret, and contains an integral autotracker.

ZAPPER - See LASER ZAPPER

ZENER DIODE - A class of silicon DIODES which permit a highly stable reference voltage to be maintained across the diode despite a relatively wide range of current through the diode.

ZERO-INTERACTION AUTHENTICATION (ZIA) - A security system for mobile electronics that automatically encrypts stored data when a device's owner leave it unattended, and automatically unlocks when the owner returns. The identification process is conducted automatically by an authentication token worn by the device's owner. The token, which can be installed in a wristwatch, is in continuous contact with the device via a wireless link.

ZIG-ZAG COURSE - A series of relatively short varying course segments superimposed over a desired base course. (See also SINUOUS COURSE CLOCK.) (NOTE: Zig-zag courses are used to make it difficult for a tracking submarine to compute a torpedo fire-control solution, since the ship will seem to be making a series of random unexpected course changes. Tactical publications exist which contain a number of zig-zag courses to achieve various percentages of base speeds (*e.g.*, one zig-zag course at a speed of 15 knots may result in advancing along the desired base course at an effective speed of, say, 80%, or 12 knots). The trade-off, therefore, is between zig-zag effectiveness, and base speed.

ZONAL ELECTRIC DISTRIBUTION - A ship architecture technique that reduces the amount of electrical cabling needed on ships and minimizes electric cable penetration of watertight bulkheads.

ZONE OF SILENCE - A local region in which the signals of a given radio transmitter cannot be received satisfactorily.