

ARMED SERVICES PATENT ADVISORY BOARD
"ASPAB"
PATENT SECURITY CATEGORY REVIEW LIST

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PATENT SECURITY CATEGORY REVIEW LIST

This is the first edition of an ASPAB composite category review list of the categories of inventions that should be made available in accordance with 35 USC 181. It resulted from a review and revision of the composite list previously used by the Patent Office. The list was compiled by the ASPAB Sub-Committee for Revision of the Category List comprised of representatives from the Army (AMC), the Air Force, and the Navy with the cooperation of CE, AEC, NASA, and NSA. The assistance of Mr. Charles Pistorino, CE; Mr. Anthony Campana, AEC; Mr. Howard Maines, NASA; and Mr. John Utermohle, NSA was of significant value in this compilation.

Approved by Chairman, ASPAB

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ASPAB
COMPOSITE CATEGORY LIST

The following abbreviations are used in the category list to indicate the particular agencies of the National Military Establishment and other Government agencies interested in the items listed:

Department of the Army

- Army Materiel Command(AMC)
- Corp of Engineers(CE)

Department of the Navy(NAVY)

Department of the Air Force(AF)

Atomic Energy Commission(AEC)
For AEC, substitute DOE – Department of Energy 1994

National Aeronautics & Space Administration(NASA)

National Security Agency(NSA)

Group I - Explosives and Inflammables

- Item 1. Charges, shaped (hollow) (AMC) (NAVY)
- Item 2. Explosives (AMC) (NAVY) (AF)
- Item 3. Explosives, methods of manufacture (AMC) (NAVY) (AF)
- Item 4. Explosives, raw materials and intermediate materials useful in the production of (AMC) (NAVY)
- Item 5. Means and methods of encapsulating an explosive or propellant. (NAVY)
- Item 6. Mixtures, primers and igniters (AMC) (NAVY)

- Item 7. Mixtures, tracer (AMC) (AF) Mixtures, infra-red tracer only (NAVY)
- Item 8. Mixtures, incendiary and methods of manufacture (AMC) (AF)
- Item 9. Explosives and propellants, methods of loading charges (AMC) (NAVY) (AF)
- Item 10. Propellant compositions (solid, liquid or gas) for artillery, gun, mortar and other tube fired projectiles (AMC) (NAVY)
- Item 11. Methods or means for controlling and/or extinguishing ammunition fires in combat vehicles (AMC) (AF)
- Item 12. Cartridge cases; caseless, combustible, silent (AMC) (AF)
- Item 13. Controlled fragmentation for explosive devices and methods of manufacture (AMC) (NAVY) (AF)
- Item 14. Hyper-velocity particle projection above 10,000 ft./sec. (NAVY) (AF)
- Item 15. Methods for igniting gun chambers for optimum burning rates (AMC)

Group II - Missiles, Munitions and Explosive Devices

- Item 1. Missiles, guided (including warheads) and means for controlling same and detonating same (including radar and other means of fuzing) (AMC) (NAVY) (AF)
- Item 2. Bullets, (incendiary, explosive, combustible, caseless) (AMC) (AF)
 - 2A. Bullets, high density fragmentation (AMC)
- Item 3. Flechettes (AMC)
- Item 4. Sabots (projectiles) (AMC) (AF)
- Item 5. Rockets (AMC) (NAVY) (AF)
 - 5a. Screening smoke/markings (AMC) (8/29/76)
- Item 6. Missiles, projectiles, explosive devices and bombs.
 - 6a. Missiles, projectiles, explosive devices and bombs (biological) (AMC)
 - 6b. Projectiles (chemical warfare) (AMC) (NAVY)
 - 6c. Chemical Riot Control Munitions (AMC)
 - 6d. Bombs (chemical] warfare) (AMC) (NAVY) (AF)
 - 6e. Projectile/mortar cartridge (Screening smoke) (AMC) 8/29/78
- Item 7. Bombs (chemical warfare) (AMC) (NAVY) (AF)
- Item 8. Mines (Anti-personnel) (AMC)
- Item 9. Projectiles, and explosive propelled explosive devices where such projectiles and devices are for mine field and obstacle clearance during combat operations, including amphibious assault (AMC)
- Item 10. Underwater explosive devices. (AMC) (NAVY) (AF) charges and mines (NAVY only)

Torpedoes where the propulsion thereof is usually self-contained and which propels the torpedo on the surface or at a desired depth. This involves torpedoes controlled or guided from a shore or other station by suitable steering means which controls the course, direction, speed, etc thereof. Also devices for keeping the torpedo at a pre-determined depth and varying depths. The component parts of any system pertaining to a torpedo such as guidance, steering equipment, depth control, and propulsion is also included. (NAVY Only)

Item 11. Projectiles, explosive, including warheads for anti-personnel; anti-armor; anti-material; chemical (lethal and non-lethal); and multipurpose warheads (AMC) (NAVY) (AF)

Item 12. Bombs, explosive (AMC) (NAVY) (AF)

Item 13. Grenades, explosive (AMC)

13a. Grenades, screening smoke/markings (AMC) 8/29/78

Item 14. Grenade launchers (AMC)

Item 15. Kinetic energy penetrators and projectiles for defeat of armor and hard target material (AMC)

Item 16. Explosive, propellant, incendiary devices for clearing aircraft landing sites (AMC)

Item 17. Anti-missile warfare devices (AMC) (NAVY) (AF)

Item 18. Rocket assisted artillery projectiles (AMC) (NAVY)

Item 19. Smoke pots (AMC) 8/29/78

Group III - Explosive Actuating Methods and Means; Fuzes, Igniters, Mine Sweeping and Torpedoes

Item 1. Fuzes, proximity (AMC) (NAVY) (AF)

Item 2. Firing devices, variable delay type (AMC) (AF) (NAVY) NAVY not interested in mere incremental steps forward in the art, such as mechanical time fuzes. Underwater missiles fuzes of the variable delay type NAVY Only.

Item 3. Fuzes, contact, and non-contact, actuated, delay and non-delay (AMC)

Item 4. Land mine clearing methods, jet and/or impulse type (AMC)

Item 5. Underwater mine sweeping (NAVY)

Item 6. Anti-torpedo devices (NAVY)

Item 7 Igniters or fuzing devices for explosives, missiles, or rockets (AMC) (NAVY)

Item 8. Guidance means and/or tactical performance characteristics of explosive devices or destructive device (NAVY)

Item 9. Barometric switches, altitude sensing devices, safeing and arming devices (AMC)

Group IV - Weapons, Counter-measures and Fire Control

Item 1. Guns, automatic and semi-automatic (including electro-magnetic) (AMC) (AF)

1A. Guns of a unique type such as those employing liquid propellants or rocket propellants, and/or having unique ammunition feeding means. NAVY - Only.

Item 2. Gun erosion, disclosures pertaining thereto such as chemical additives for reduction of erosion (NAVY) (AF) (AMC)

Item 3. Flame throwing devices (AMC)

Item 4. Directed Energy or energy projection devices and systems in which electrical particles, wave radiations, or laser beams are claimed to cause deleterious effects on human beings or machines (AMC) (NAVY) (AF)

Item 5. Chemical warfare. Chemical warfare agents, weapons and methods of manufacture (AMC) (NAVY) (AF)

Item 6. Chemical Warfare Defensive Methods and Equipment (AMC) (NAVY) (AF)

6a. Smoke/aerosol generators - large area screening (AMC) 8/29/78

6b. Smoke/aerosol generators - armored vehicle protection (AMC) 8/29/78

6c. Aircraft smoke/aerosol spray tanks (AMC) 8/29/78

Item 7. Biological warfare. Biological Warfare Agents and Methods of Manufacture (AMC) (NAVY) (AF)

7A. Biological agent detectors (AMC) (NAVY)

Item 8. Anti-biological warfare (AMC) Defense against only (NAVY) (AF)

Item 9. Weapon mounts, missile launchers and loaders (AMC) (AF) (Missile launchers - NAVY)

Item 10. Fire control (AMC) (NAVY) (AF)

a. Night sighting - sighting apparatus (passive or active including use of laser techniques)

b. Target detection apparatus using radar, photoelectric or laser techniques

c. Computers and software for tactical fire control purposes

Item 11. Airborne turrets (AF)

Item 12. Weapons designed to eliminate or minimize recoil or its effects, e.g. recoilless rifles and rocket launchers (AMC) (AF) (NAVY not interested in small arms recoil reduction).

Item 13. Targets, command control, transmitters and receivers, target augmentation, reflectivity measurements, miss distance measuring systems, long-range tracking radar and telemetry used with targets (NAVY).

Item 14. Nuclear Defense Warfare (NAVY) (AF) (AMC)

Item 15. Radiological Warfare (AMC)

Item 16. Anti-submarine warfare (NAVY)

Item 17. Decoys and Electronic Warfare (AMC)

Group V - Explosive Device Detection Methods and Means

Item 1. Detectors, mine, tank mounted (AMC)

Item 2. Detectors , trip wire (AMC)

Item 3. Detectors, Underwater mines, locators and classifiers including mine watching devices and the identification of bottom mines (AMC) (N)

Item 4. Detectors, metallic and non-metallic mine, combination (AMC)

Item 5. Detectors, mine anti-countermeasure (AMC)

Item 6. Detectors, hypersensitive, for detecting small quantities of metal (AMC)

Item 7. Detectors for chemical warfare mines (AMC)

Item 8. Detectors for detection of explosive mines through identification for reaction to component chemicals contained therein (AMC)

Group VI - Object Locating Methods and Means

Item 1. Object locators, detectors and identifiers using radar, sonar, TV, or other forms of energy to do IFF and/or to do surveillance and tracking of a target.

a. Object locators and detectors using radar, TV, and sonar (NAVY) (AMC)

b. MASER or LASER range finding equipment (AMC) (AF) (NAVY)

c. Radar devices for locating and ranging on low flying targets. (AMC) (NAVY)

d. Airborne sonar (AF) (NAVY)

Item 2. Infra-red, ultra-violet and low level visible light projection or reception apparatus ("image intensifiers") and processes for manufacturing thereof (NAVY) (AF) (AMC) (not CE unless any of the above are usable for terrain information acquisition, including aerial mapping).

Item 3. Sonar systems, major components thereof, and transducers, that may be used to locate a military object (NAVY)

Item 4. Sonobuoys employed for military purposes (NAVY)

Item 5. Methods or means for object locating and self locating (direction and distance) other than those listed above (AMC) 6/79 (AF -- ground and airborne) (NAVY) - including circuitry, methods and equipment used for detection, location and identification of underwater objects, and for signal processing and display by correlation, digital means or related techniques) Exclude those devices which merely indicate the presence of an object, such as traffic detectors and counters.

Tubes -CEBA, Mullipactor- Novel Magnetic Materials/Circuit Configurations (AMC)

Item5A. Intrusion detection equipment of all art types for both interior e.g: building, and exterior, e.g., open area or fenced ares, i.e., burglar alarms, depot and warehouse protection devices. (CE) (AMC) (AF) infra-red, ultra-violet, electronic seismic, or acoustic intrusion detection and parameter defense devices - ONLY.

Item 6. Bomb sights (AF) (NAVY)

Item 7. Devices for measuring the intensity and frequency of underwater sounds (NAVY)

Item 8. Low-level nuclear radiation detection equipment for detection from concealed sources (AMC)

Item 9. Nuclear yield measuring devices (AMC)

Item 10. Chemiluminescent materials or agents (AMC) (NAVY) (AF)

Electroluminescent materials or agents (AMC)

Item 11. Detection by chemical detection means (AMC)

Item 12. Gunsights, airborne (AF)

Item 13. Target tracking systems, airborne (AF) (NAVY) (AMC)

Item 14. High accuracy, angle, distance and position measurement devices for mapping and geodesy and methods which employ any of the following principles: electronic, optical, laser, maser, electro-optical, gyroscopic, magnetic and gravimetric. (CE) (AMC)

Item 15a Antennas for use in a military environment such as military communications, aircraft, and radar. (AMC) (NAVY) (AF) (NAVY) especially ships and floating buoys.

b. Microwave antenna elements using electron beam/p-n junction amplifier driven for phased array antenna systems. (NAVY)

c. Millimeter and nearmillimeter wave antennas and/or emission devices used in target detection, location and tracking (AMC)

Item 16. Missile impact locating systems (NAVY) (AF)

Item 17. Submarine detection devices and/or methods and major components thereof (NAVY)

Item 18. Displays of visual presentations of received signals (such as radarscope displays) that represent information obtained from equipment such as sonobuoys, magnetic airborne detectors, (MAD), fire control pertaining to anti-submarine warfare, mine hunting devices and surveillance and tracking devices. (NAVY) (AF) (AMC) 6/79

Group VII - Mapping, Charting and Geodesy

Item 1. Plotting equipment, field artillery (AMC)

Item 2. Geodesy for navigation of long-range guided missiles (CE) (AMC) (AF)

Item 3. Survey methods for mapping using helicopters (AMC) (CE)

Item 4. Satellite mapping and geodesy (CE) (AF)

Item 5. Extraterrestrial mapping (CE) (AF)

Item 6. Automatic map compilation equipment & methods (CE)

Item 7. Computer generated map image hardware and software (AMC) 8/29/78

Group VIII - Navigation Equipment

- Item 1. Heading reference Gyrocompressor, navigational, for ground vehicles (AMC)
- Item 2. Compasses, gyro, miniature (AMC)
- Item 3. Compasses, lensatic (AMC)
- Item 4. Azimuth determining methods and devices (AMC) (CE) (NAVY)
- Item 5. Position indicators, ground, portable (AMC) (CE) (AF)
- Item 6. Automatic celestial navigation systems (NAVY) (AF)
- Item 7. Ship speed indicating devices (NAVY)
- Item 8. Periscopes (not interested in optics, per se) (NAVY)
- Item 9. Compasses, navigational, airborne (AF) (NAVY) (AMC)
- Item 10. Navigation instruments, airborne (AF) (NAVY)
- Item 11. Flight instruments (AF) (Sensing systems, airborne - NAVY)
- Item 12. Aircraft Terrain clearance, obstacle, and collision avoidance systems (NAVY) (AF) (AMC)
- Item 13. Gyroscopes and bearings therefor including ring laser and fiber optic gyroscopes (NAVY) (AF) (AMC)
- Item 14. Accelerometers used with aircraft, missiles, rockets and for other military uses especially if indicated to be highly accurate or sensitive and also especially if performance information is set forth in the specification. Bearings for accelerometers are also of interest. (NAVY) (AMC) (AF)
- Item 15. Ship Inertial Navigation Systems (NAVY)
- Item 16. Inertial and Doppler navigation systems, for aircraft and missiles (NAVY) (AF) (AMC)8/29/78
- Item 17. Sea water depth measuring equipment for depths beyond 350 feet (NAVY)
- Item 18. Gravimetric navigation devices (measuring the magnetic field of the earth and identifying unusual gravity conditions to determine location) (NAVY)
- Item 19. Frequency control devices and techniques having accuracies in excess of one part in 10¹², or stabilities in excess of one part in 10¹³ (AF)

Microcomputer Compensated crystal oscillator (AMC)
- Item 20. Navigation by satellite systems to provide precise position determining signals to earth surface points including ships and submarines and major components of such systems such as receivers. (NAVY)(AMC)8/29/78
- Item 21. Ground systems using satellite signals for navigation (NAVY)(AMC) 8/29/78
- Item 22. Hyperbolic and distance navigation and surveying systems (AF) (CE)
- Item 23. Aircraft automatic landing systems using IFF (NAVY) (AF)(AMC)

Item 24. Microwave landing equipment (AMC)8/29/78

Item 25. Navigational equipment for ground vehicle (AMC)

Item 26. Heading reference, navigational, airborne (AMC)

Item 27. Altitude and heading reference, navigational, airborne (AMC)

Item 28. Terrain correlation methods (AMC)

Item 29. Satellite navigation equipment (man-portable, vehicular and airborne (AMC)

Group IX - Concealment, Communications, Countermeasures and Counter-Countermeasures

Item 1. Ice or fog suppression, methods or means for (as caused by exhaust from internal combustion engines) (AMC) (AF)

Item 2. Camouflage paints and coatings except passive visual methods (AMC) (AF - as to aircraft only)

Item 3. Laser or multi-frequency radar screening materials/coatings (AMC) (NAVY). Sonar screening- NAVY only.

Item 4. Smoke/aerosol screening materials and dissemination techniques (AMC) (AF) 8/29/78

4a. Multi-spectral screening materials (ultraviolet thru microwave) (AMC) 8/29/78

Item 5. Smoke dissipation (AMC)

5A.-Cloud dissipation (CE - for aerial mapping and reconnaissance purposes)

Item 6. Signaling and communication, secret, means and methods for, including IFF. (NAVY) (AMC) (AF)

Item 6A. NSA-cryptology-communications security, specifically:

(1) Cryptography as applied to

Manual,

Typewriter,

Teletypewriter,

Any and all data systems,

Computers,

Voice, both privacy and secrecy, analog or digitalized,

Facsimile, including means for masking facsimile systems,

and

Television, including means for masking television systems,

as applied to any and all communication systems intended to deprive all but the addressee of the intelligence contained.

(2) Secret inks and

Secret microphotography

(3) All means which are intended by the nature of the system to deprive all but the addressee of knowledge of the existence of the signal, or to deprive any but the addressee the ability to intercept, record, or process such signals. These include but do not exhaust:

Very short signals,

Signals using unusual media for transmission including underwater,

Frequency changes controlled by privacy and secrecy means,

Any and all signals controlled by privacy or secrecy means, and

Any and all exotic modulation means.

Any and all systems using the physical or optical properties of fiber optics or related optics principles to provide communications security from interception or signal injection and/or line supervision of optical fiber links (AMC)

(4) Any and all means which make practicable from an engineering standpoint, desirable cryptographic principles or communication security principles previously known, but not realized due to lack of invention in enabling means.

(5) Any and all attachments to complete communications systems or sub-systems thereof, which permit the user as an option to apply privacy or security means to the system, hence, the systems or sub-systems themselves.

(6) Privacy or security means, defined as any sequence, system, or detail which must be known to intended addressee in order to (1.) receive, (2.) process, (3.) record, (4.) transform, (5.) recognize, (6.) decode, (7.) decipher, etc., any means of communication. Any one or any combination of (1.)-(7.) may be involved.

(7) Signals systems whose primary purpose may be high signal-to-noise ratio, freedom from natural interference, resistance to intentional jamming, etc., but which have the de facto result of preventing interception, recording, or processing.

(8) All systems for generating "pseudo random digits", all means for applying "pseudo random digits" to digital messages, data, remote computer input links, digitalized voice or signal parameters, singly or in combination.

(9) Noise and/or low deductibility communications systems, including "spread spectrum" systems.

(10) Means for suppressing or exploiting electronic or mechanical emanations (radiation).
A-O techniques/devices

Item 7. Countermeasures and counter-countermeasures used with missiles systems, rockets, radar systems, sonar systems, tracking, infra-red, ultra-violet, and any other military use. (AMC) (NAVY) (AF)

Jamming devices and other military countermeasures including electronic countermeasure equipment. (AMC) (NAVY) (AF)

Item 8. Radar, infra-red, ultra-violet means used for the purpose of c+c-c, including target background discrimination techniques. (AMC) (NAVY)

Item 9. Recorders of high frequencies (10 megacycles and above) (EHF) and extremely low frequencies (ELF) (a fraction of a CPS to 10 CPS) and very low frequencies (VLF) (10 CPS through 100 CPS). (NAVY) (AF)

Item 10. Radio Frequency Interference, means of detecting, measuring propagating, or suppressing. (AMC)

Item 11. Detection of Clandestine cache systems, electronic or mechanical (AMC)

Item 12. Anti-torpedo devices (NAVY)

Item 13. Periscopes relating to radar and communication intercept capability. (NAVY)

Item 14. Communications systems and major components thereof for use between submarines, between airplanes, between submarines and airplanes, diver communications, satellite communications, laser communications, and modulators therefor. (NAVY)(AMC)8/29/78

Item 15. Warning system intended to detect and establish the angular direction of incident energy received from laser target designators and rangefinders (AMC)8/78

Item 16. Countermeasures used with combat vehicles to produce replica vehicles signatures (magnetic, acoustic, IR, etc) which are projected in front of vehicle to prematurely initiate mine fuzes of encounter land mines. (AMC) 8/78

Item 17. Communications electronic warfare, to include radio communications jamming and deception, direction finding, and location of communication transmitters, and intercept and analysis signals. (AMC)

Item 18. Fiber optic cables and communication systems including equipment for optical telephones. This includes transmission of voice, data and video signals and associated multiplexing, splicing and repair devices. (AMC)

Item 19. Millimeter and submillimeter wave radios. (AMC)

Item 20. Thermal infrared signature suppression/alteration (AMC)

Item 21. Acoustic signature suppression/alteration (AMC)

Item 22. Decoys and other simulations of equipment, personnel and activities. (AMC)

Item 23. Communications systems and/or components intended to provide communications for physical security systems and incorporating countermeasures to tapping and/or signal injection. (AMC)

Group X - Propulsion Systems, Propellants, and Fuels

Item 1. Ramjet (direct ram or in engine form) for sustained propulsion of guided missiles, drones and pilotless aircraft (AMC) (NAVY) (AF)

Item 2. Propulsion units for assisted take-off of aircraft and guided missiles (AMC) (NAVY) (AF)

Item 3. Propulsion units for propulsion of explosives, rockets, missiles, and other ordnance (AMC) (AF)

Item 4. Propellants and propellant compositions for rockets and missiles (including mono-, bi-, and tri-propellants) (AMC) (AF) (NAVY)

Item 5. Additives for improving the performance of conventional rocket fuels (AMC) (AF) (NAVY)

Item 6. Special fuels for rockets, aircraft and the like, having high temperature stability (or high energy, density or high heat-absorbing capacity in fuels). These may include such materials as: hydrocarbon substituted hydrazines, non-hydrocarbon lubricant mixtures and blends, acetylenes and derivatives thereof for power purposes, fuel mixtures of hydrocarbon and inorganic components (e.g. metallic slurries) and high energy non-hydrocarbon fuels (AMC) (NAVY) (AF – compositions only)

Item 6A. Propellants (fuels and Oxidizers), producing any of the following characteristics:

- a. Specific impulse greater than 350 pounds per second of thrust per pound of propellant at an operating pressure of a thousand pounds per square inch at sea level (NASA) (AF)
- b. Low temperature coefficient of burning rate (NASA) (AF)
- c. Extremely high density (NASA) (AF)

- d. Very low pressure exponents (NASA) (AF)
 - e. Temperature resistant (NASA) (AF)
 - f. Low storage temperatures (NASA) (AF)
- Item 6B. For gyroscopes and thrust bearings (AF)
- Item 7. Additives for lubricants (AF)
- Item 7A. Additives for thickened hydrocarbon fuels and contaminants for hydrocarbon fuels (AF)
- Item 8. Propulsion means for submarines, surface craft (including nuclear power plants and hydrofoils, and high energy per volume batteries) (NAVY) (AEC if propulsion means is Nuclear.)
- Item 9. Turbo-propellers and jets other than simple open cycles (AF)
- Item 10. Pulse jets and/or intermittent ram jets (NAVY) (AF)
- Item 11. Combined rocket and ram jets (NAVY) (AF)
- Item 12. Rocket engines, liquid and solid fuel type (AMC) (NAVY) (NASA) (AF)
- Item 12a. Ideas pertaining to rocket component construction and new structural and insulation materials. (NASA) (AF) (NAVY)
- Item 12b. Methods of steering rocket motors, vehicles and vehicle stages (NASA) (AF) (NAVY)
- Item 12c. Methods of controlling the thrust level of a rocket motor (NASA) (AF) (NAVY)
- Item 12d. Methods of terminating rocket thrust with subsequent re-start capabilities (NASA) (AF) (NAVY)
- Item 12e. Improved nozzle configuration (exclude those for jet engines) (NASA) (NAVY) (AF)
- Item 12f. Ignition systems for rockets (NASA) (AF) (NAVY) (AMC)
- Item 13. Gas turbines, special cycles and unusual design (AF)(AMC) 8/78
- Item 14. Silencing methods or equipment including means to quiet aircraft, or ship and submarine propulsion and auxiliary machinery such as propellers that are quiet and that provide exceptionally efficient propulsion. This also includes methods or devices that provide low noise levels, high performance, reduced weight and space, and the elimination of propellers. (NAVY)
- Item 15. Underwater propulsion units for swimmers (NAVY)
- Item 16. Hydrogen peroxides, use of in propulsion systems (AMC) (NAVY) (AF)
- Item 17. Seals. High pressure type seals that may be used under extraordinary conditions such as deep submergence and in ship shafting environments. (NAVY)
- Item 18. Means for safe storage and handling of liquid propellants for rockets and guided missiles. (AMC) (AF)
- Item 19. Borohydrides, use of in propulsion systems (AF) (NAVY)

Item 20. Methods for supporting and/or reinforcing propellant grains under high accelerations to prevent crumbling of the propellant grains (AMC)

Item 21. Improvements in gas turbines, components: compressors, turbines, combustion chambers, afterburners, control systems, accessories, etc. (AF)

Item 22. Water propulsion units for amphibious vehicles (AMC)

Item 23. Drag Reduction Devices and Methods (NAVY) (AF)

Devices and means for diminishing the resistance between a vehicle or vessel and fluent material when moving therethrough by the application of a means or material to the vehicle or vessel to affect the flow characteristics of the fluent material relative to the vehicle or vessel. The use of heat, or other forms of energy, as well as coverings or polymer coatings and means for mixing and ejecting a material are examples of such materials, methods or means. (NAVY-only) Vessels that may be operated wholly beneath the surface of the water or submergible vessels and vessels designed to travel on the bottom of the sea.

Item 24. Nuclear, ionic, free radical, plasma, MHD and related propulsion methods and devices (AF) (NAVY) (NASA) (AEC) if Nuclear

Item 25. Auxiliary power supply systems of all types suitable for space crafts (NASA)

Item 26. Methods for attainment of particle velocities above 60,000 ft/sec (AF)

Item 27. Pollution control with relation to airborne gas turbine engines (AF)

Item 28. Noise suppression related to gas turbine engines (AF)(AMC) 8/78

Item 29. Gas turbine engine components, bearings, seals and accessories (AMC) 8/78

Item 30. V/STOL transmission systems, couplings and lubrication (AMC) 8/78

Item 31. Fuel stabilizing additives (AMC) (AF)

Item 32. Fire safe fuel concepts (AMC) (AF) (NAVY)

Group XI - Power Supply

Item 1. Batteries, secondary, for low or high temperature operation; Cells for extended low temperature storage (AMC) (AF) High energy per volume batteries (for submarines, torpedoes and warheads) (NAVY)

Item 1A. Batteries, thermally activated (AMC) (NAVY) (AF)

Item 2. Gas powered electrical and hydraulic auxiliary power suppliers for missiles (NAVY)

Item 3. Fuel Cells: Electro-chemical devices in which part of the energy derived from the chemical reaction maintained by the continuous supply of chemical reactants, is converted to electrical energy (AF) (NAVY) (AMC)- only if military applications are mentioned.

Item 3a. Electro-chemical devices: other unusual and efficient energy conversion devices such as thermoelectric, thermionic generators (including installation procedures), biochemical sensors, and biological electrical power generation devices (AMC)-military applications only (NAVY) (AF) (AEC) only if Radioactive Material is used

Item 4. Thermionic convertor: a device which will convert heat energy directly (statically) to electric energy by means of emission of electrons from a hot cathode and collection of these electrons on a cold anode within a

vacuum or gas-filled tube. (AF) (NAVY) (NASA)(AMC) 8/78 (AEC – only if Radioactive Material is used)

Item 5. A device which will convert heat energy directly (statically) into electrical energy by means of two dissimilar metals or semi-conductors formed into a closed circuit and maintained at different temperatures (AF)(AMC)8/78(NAVY) (AEC – only if Radioactive Material is used)

Item 6. Biochemical fuel cells and biochemical electric generators (NAVY) (AF)

Item 7. MHD generators (NAVY) (NASA) (AF).(AMC) 8/78

Item 8. Solar photovoltaic generators (AMC)- if > 20% efficient (NASA) (AF)

Item 9. Energy conversion systems with conversion efficiencies in excess of 70-80% (AF) (NAVY)(AMC) 8/78

Item 10. Novel energy sources and storage devices for fuzes (AMC) (AF) (NAVY)

Item 11. Pulsed energy source for high powered lasers (AMC) (AF) (NAVY)

Group XII - Computers

Item 1. Computers and software where a military use is set forth such as ballistic data calculations and use, aircraft flight control. (AMC) (NAVY) (AF) NAVY only - computers for anti-submarine warfare.

Item 2. Computers, software and computing systems, memory devices and peripheral equipment thereof where military operational use and tactical application is specified. (NAVY) (AMC)

Item 3. Computer Aided design (AMC)

Item 4. Microprocessors and systems of microprocessors which have real-time processing capability and networking and distributed data bases where a military use is specified. (AMC)

Item 5. Computer systems which simulate complex military systems (AMC)

Item 6. Computer systems with artificial intelligence capability where military use is specified. (AMC).
Group XIII - Meteorology

Item 1. Sampling, meteorological (remote sensing) (AMC)

1a. Sampling, smoke/aerosol (remote sensing/real time) (AMC) 8/78

Item 2. Means for studying cloud behavior and intermediate atmospheric layers (AMC) (AF)

Item 3. Methods for controlling climate to effect changes in means of temperature, atmospheric water vapor content, sea water temperatures, precipitation, etc. Exclude cloud seeding, heaters, wind machines, smudge pots, etc., for local or small scale effects. (AF) (AMC)

Group XIV - Vehicles

Item 1. Land or amphibious combat vehicle components or accessories employing new principles (AMC)

1a. Vehicle smoke/aersol protection systems (AMC) 8/78

Item 2. Inflatable boats and rafts (AF)

Item 3. Aircraft and component parts designed for Mach number below 0.92 (AMC) Above Mach 0.92 (AF)
Air Force not interested in these things: Landing gear, propellers, helicopters, mufflers, thrust reversers,
reciprocating engines, and ejection seats for aircraft. (AMC) only
Air Force also not interested in corrosion inhibitors.

Item 4. Aircraft handling gear such as aircraft barriers and aircraft arresting gear (AF) (NAVY - only aircraft
arresting gear of the shipboard and shore-based type having engaging capabilities of 150 knots or more.

Item 5. Aircraft, automatic flight control and stabilization devices (AF) (NAVY) - including automatic pilots)

Item 6. Aircraft structural details (AF)

Item 7. Aircraft, airfoil profiles and plan views (AF)

Item 8. Fuel tank, aircraft, self-sealing (AF) (AMC)

Item 9. Hydrofoil craft and control systems thereof including electrical circuits or mechanical means for
maintaining height and altitude of submerged foil systems and height systems. (NAVY)

Item 10. Space vehicles, satellites and related equipment to include methods for lunar and planet exploration
(NASA) (NAVY)-only Satellites used for navigation to provide precise position determining signals to earth
surface points including ships and submarines and major components thereof such as receivers.

Item 11. Deployable decelerators (stowable parachutes, rotors, balloons), to provide drag for nuclear weapons
(AF)

Item 12. Ground effect machines (GEM's) (AMC)

Item 13. Unusual configurations of waterborne vehicles (for reducing wave or frictional drag, etc.) (NAVY)

Item 14. Vertical takeoff and landing aircraft including helicopters tilt rotors, tilt propellers, lift fans, and lift
jets (AMC) 8/78

Item 15. Vehicular diagnostic systems (AMC)

Item 16. Vehicular Personnel Heaters (AMC)

Group XV - Military Photography

Item 1. Photographic equipment, aerial (AF) AF not interested in commercial photographs or photography for
amateurs. (AMC) (CE - for mapping and reconnaissance only) (NAVY - aerial photographic equipment
compatible with space vehicles, optics of unusual design and materials for performance at extreme distances,
devices and techniques for obtaining photographs passively under extremely adverse conditions of weather and
light, but not interested in general photographic equipment for conventional use under normal weather and light
conditions: any equipment or techniques pertaining to submarine periscope photography)

Item 2. Photography (color) (AF) (AMC) (CE-for mapping and reconnaissance only)

Item 3. Photographic prints, rapid production of (AMC) (AF) (CE)

Item 4. High-speed photography techniques (AF) (AMC) (CE)

Item 5. Unattended devices and techniques for photographic surveillance (AMC)

Group XVI - Materials

Item 1. Alloys, including powder metallurgy and rapidly solidified (RST) products having unusual properties, and which appear to be adapted to military use, and production techniques for such alloys (AF) (NAVY) Pyrolytic graphite for use, particularly in missile propulsion systems and ship propellers (exclude such non-military uses as furnace electrodes and liners)

Item 2. Coatings. (NAVY) (AMC) (AF)

a. Coatings or coverings that are used to prevent gun erosion, coatings or covering of propellants or explosives, or for other military purposes such as coatings used for infra-red or radar and sonar screening and absorbers to protect targets from detection. Coatings for radiation hardening of optical materials.

b. Coatings and compositions of color schemes of materials that may be used as camouflage for military purposes.

c. Ceramic coatings as well as their composition and methods of making or fabricating that may be deployed for military purposes such as ablative uses on rockets or missiles and with infra-red, sonar, radar or the like.

Item 3. Ceramic coatings or solid ceramic bodies for service above 2500 degrees F. - Ceramic coatings or solid ceramic bodies for service above 3500 degrees F. Methods and techniques of fabrication, and compositions for use in missile propulsion systems at 4500 degrees F. and above: exclude non-military uses. (AF)(AMC) 8/78

Item 4. Material for self-sealing aircraft fuel tanks (AMC) (AF)

Item 5. Insulation for use at temperatures above 4500 degrees F. (NAVY) (AF) - for propulsion systems: exclude non-military uses) (AEC) - where applicable to Nuclear Subs (AF) - composition, formulation, processing, curing, fabrication and physical characteristics of insulating material suitable for use in the temperature range stated above.)

Item 5a. Cryogenic insulation for use below 100 degrees F. (AF)

Item 6. Lightweight radiation shielding material (including graded Z materials) (AMC)

Item 7. Special adhesives or bonding agents for extreme service including water exposure, high temperature (above 600 degrees F.) and low temperatures (below 35 degrees F.) (NAVY) (AF)

Item 8. Compositions or compounds of materials used in breathing equipment for underwater divers. (NAVY)

Item 9. Plastics that may be used in high temperature environments such as for heat shields and ablative purposes in rockets. (AF) (NAVY)

Item 10. Plastics and methods for encapsulating propellants or explosives. (NAVY) (AF) (AMC)

Item 11. Fire resistant paints (AF)

Item 12. Plastics possessing rubber-like characteristics that may be used as coatings. Coatings or coverings that are used to prevent gun erosion, the covering of propellants or explosives, or for other military purposes such as coatings used for infra-red or radar and sonar screening and absorbers to protect targets from detection. (AMC) (NAVY) (AF)

Item 13. Special fire extinguishing materials for extinguishing incendiary fires and fires of volatile liquids (AF)

Item 14. Materials for protection from extreme heat or cold (AF)

Item 15. Military equipment preserving materials. Packaging, cushioning for air drop purposes and containers specifically for military equipment. (AF) (AMC)

Item 16. Materials that are used to fabricate a ship, vehicle, rocket, missile, or other military device where the military use is set forth. Also, any material that may be used by the Navy for military purposes and that has extraordinary performance characteristics beyond the state of the art, such as ceramics and ferrites. (NAVY) (AF - only rockets & missiles)

Item 17. Welding materials and processes for equipment which may be deployed militarily. (NAVY)

Item 18. Oxidation - resistant refractory alloys (alloys of molybdenum, tungsten, tantalum and columbium. (AMC)

Item 19. Fragmentation ammunition materials. (AMC)

Item 20. Any material used to make penetrators or composite penetrators where the ballistics performance characteristics are changed to any degree. This includes such materials as steel, tungsten, tungsten carbide and uranium. (AMC) 8/78

Item 21. Steel and titanium sponge or titanium alloys. (NAVY) (AF)

Item 22. Self-healing coatings for reactive materials or alloys, e.g. self-sealing fuel tanks (AMC)

Item 23. Materials such as polymer coatings, gaseous ejections, polymers (solid or liquid), heat, steam, and coverings to the surface, for reducing drag on a vehicle passing through fluent media. (NAVY)

Item 24. Armor. Any material used to make armor or composite armor where the performance characteristics (ballistic characteristics) are indicated to any degree. This includes such metals as aluminum, magnesium, steel, titanium, and plastic laminates, ceramic laminates, etc. (AMC) (NAVY) (AF) AMC - only-Spacific array of materials for armor. 8/78 includes proposed classification guide.

Item 25. Chemiluminescent agents (AMC) (NAVY) (AF)

Item 26. High performance composites for structural applications (AMC)

Item 27. Coatings, films, etc. for protection against chemical and biological contamination; methods & materials for decontamination. (AMC)

Item 28. Synthesizers, Submicron devices, supermatricies, superlattice structure/devices, Novel magnetic materials/circuit configurations, VHSIC/Microelectronics: RAD HARD FAULT TOLERANT, FAIL SAFE. (AMC)

Item 29. Composite material for missile structures.

Group XVII - Radiology

Item 1. Detection, measurement and decontamination of, and protection against radiological emanations (AMC) (AF) not interested in decontamination) Chemical composition and performance characteristics of photochemical materials – change color in response to light – for protection against the luminous energy of nuclear bursts: shielding and shielding materials for personnel protection.

NOTE: With respect to Item 1, AF states that if all patent applications pertinent to this item are being reviewed by AEC for recommendation with respect to placement under 35 USC 181 and removal therefrom, it will be unnecessary for that agency to review such

cases for either purpose. AMC, however, desires to review all such cases for both purposes. AMC desires that no secrecy orders issued under this item be rescinded, on recommendation by AEC or others, without obtaining AMC's concurrence.

Item 2. Nuclear weapons, components and systems. Simulators, training devices therefor and instrumentation for nuclear weapons (AF)

Item 3. Protective equipment and measures against ionizing and microwave radiation (AF)

Item 4. Radiological agents (AMC)

Group XVIII - Amplifiers, Recorders, Sensors, and Electronic Tubes

Item 1. Fluid Amplifiers for military use (AMC) (NAVY) (AF)

Item 2. Parametric amplifiers having an improvement in characteristics such as a gain band width product improvement in the 200 to 300 megacycle range, a gain band width product of 100 or above, or a simplification of the stability and frequency controls. (NAVY)

Item 3. Lasers and masers and components parts thereof. (NAVY) (AMC) (AF) No interest, however, in holographic devices where the laser is conventional. Holographic devices, however, may be worthy of NAVY review if they fall into any one of the categories of Navy interest listed elsewhere on this Category List.

The following is of special interest for security review.

- a. [Obsolete comment] the terminology "Gas Dynamic Laser" - "GDL" or "Combustion Powered Laser" in itself presently is classified.
- b. laser devices providing in excess of 1 KW average or CW power output.
- c. laser devices or techniques in the 3-5 micron region and generating in excess of 10 watts Power.
- d. the detection of laser radiation in the 8-14 micron region with D* (D star) of 109 or greater.
- e. laser applications to weapons, reconnaissance or under water communications. AEC also.

Item 4. Recorders of high frequencies (10 megacycles and above) (EHF) and extremely low frequencies (ELF) (a fraction of a CPS to 10 CPS) and very low frequencies (VLF) (10 CPS through 100 CPS). (AMC) (NAVY) (AF)

Item 5. Sensors having a military application (including those where a laser may be used) that may be used to provide sensitive perception or detection such as by temperature or other forms of energy. (AMC) (NAVY) (AF)

Item 6. Semi-conductors and other solid state materials that may be used for infra-red and other military purposes. (AMC) (NAVY) (AF)

Item 7. Electron tubes especially of the microwave or miniature type that are adapted for use in a military manner such as in proximity fuses or the like. (AMC) (NAVY) (AF)

Item 8. Amplifiers such as those using electron-beam/semiconductor-diode hybrid concepts. Especially where the amplifier delivers high radio frequency power outputs (over 100 watts continuous wave (C.W.) at frequencies of 200 million cycles per second) over very broad band widths. Unique phase control techniques are of special interest. (AMC) (NAVY) (AF)

Item 9. Devices to prevent injury to biological tissues or body systems caused by exposure to coherent electromagnetic radiation. (AF)

Item 10. Fiber optic sensors having military and/or physical security applications that may be used to provide sensitive perception or detection such as by ultrasonic or other forms of energy, or which provide geometrical flexibility in their detection pattern.

Group XIX - Miscellaneous

Item 1. Training devices that maybe used for classified military equipment (AF) (NAVY) (AMC)

Item 2. Decision making training devices for war games and the like (AF)

Item 3. Solid state materials for IR, thermoelectric and thermionic uses (NAVY) (AEC)

Item 3A. Solid state devices and circuitry with capabilities in excess of 70 Gc. (AF)

Item 4. Superconductors (AF) (NASA)

Item 5. High speed centrifuges, gas bearings, high temperature packings, and centrifugal separators (AEC)

Item 6. Underwater breathing apparatus (NAVY)

Item 7. Methods for control of spray properties of liquids by the addition of polymers (AMC)

Item 8. Methods for protecting and maintaining aerosol particles by encapsulation or by addition of surface-action chemicals (AMC) (AF)

Item 9. Methods of keeping powder of less than 10 micron size, free flowing (AMC) (AF)

Item 10. Psychological Warfare - Noise devices (AMC) (AF)

Item 11. Valves that are quick acting and/or that act silently that are specified for specific military purposes. (NAVY)

Item 12. Systems

a. Bombing systems and major components thereof. (NAVY) (AF)

1.) Electronic Warfare/intelligence (EW/I systems)

b. Communication systems for use between submarines, between airplanes, between submarines and airplanes, diver communications, and satellite communications. (NAVY) Also, laser communication systems and modulators therefor. (NAVY) (AMC) (AF only aerospace communications)

c. Missile systems, missile guidance or command systems, major components thereof, and anti-missile systems. (NAVY) (AMC) (AF)

d. Rocket systems and major components thereof. (NAVY) (AMC) (AF)

e. Tracking systems for locating and tracking a target, and major components thereof including the processing circuitry of data therefrom. (NAVY) (AMC) (AF)

f. Sonar systems and major components thereof including transducers used with sonar systems. (NAVY)

- g. Weapon systems using any component or components that would bring about a unique result or results. (NAVY) (AF)
- h. Drag reduction systems that bring about a reduction of the friction between the vehicle and the air or water through which it is traveling. This includes vehicles such as ships, torpedoes, and submarines. (NAVY) Aircraft application - (NAVY) (AF)
- i. Nuclear weapon systems and major components including warheads, fusing systems, arming, safeing systems, detonators and firing systems. (NAVY) (AMC) (AF)
- j. Torpedo systems including anti-torpedo systems, and major components thereof including guidance, etc. (NAVY)
- k. Waterborne mine detection systems & minesweeping systems or equipment. (NAVY)

Group XX -- Contracts

Item 1. Patent applications where the subject matter thereof was developed under a contract or contracts with the Department of the Army (AMC), and the Departments of the AF and Navy or where an application is only indicated as being developed under a Department of Defense contract with no indication of specific agency within DOD.

Group XXI – Unique Materials, Devices, or Performance Data & Characteristics

Item 1. Any new material, device, article, or method that may be used for military purposes and/or that may be used to provide new results for military purposes in an old system even though not set forth and represented to be of interest elsewhere by this Category List that has extraordinary characteristics beyond the general state-of-the-art. (AMC) (AF) (NAVY)

Those of special interest would be those patent applications that provide performance data and characteristics such as effective range, speed, accuracy, altitude, lethality, tactical usage, principles of operation during pre-flight or impact, fabrication, techniques, size, ruggedness, packaging, sensitivity, frequency, band width, deep submergence capability, percent of absorption figures, effectiveness of counter measures, and vulnerability to countermeasures. (AMC) (AF) (NAVY)

GROUP XXII - Protective measures (as added 29 August 1984)

Item 1. Panelling technology that would allow for nuclear hardening to include overpressure, thermal protection, electromagnetic interference and electromagnetic pulse protection, radiation shielding and ballistics. (ARMY)

Item 2. Gasketing technology utilized in nuclear hardening applications and for chemical agent protection. (ARMY)

Item 3. Fabric technology as it relates to chemical agent protective properties. (ARMY)

Item 4. Nuclear hardening shields; with special concern for over-pressure capability, thermal protection, electromagnetic interference and electromagnetic pulse protection, radiation shielding and ballistics. (ARMY)

Item 5. Chemical agent protective shelters; including tentage and rigid walled shelters. (ARMY)

Item 6. Devices and technology for eye protection against lasers, particularly agile lasers. (ARMY)

Item 7. Materials and their treatment which afford personnel protection against directed energy weapons. (ARMY)

Item 8. Materials and measures which protect the individual against chemical/biological weapons. (ARMY)

Item 9. Methods of inactivation of chemical and biological agents. (ARMY)

Item 10. Methods of detection and measurement of chemical and biological agents, particularly rapid and sensitive methods. (ARMY)

Item 11. Dual purpose materials functioning as camouflage and chemical/biological protective agents. (ARMY)

Item 12. Countersurveillance material and design patterns; thermal, visual, infrared and radar suppressive. (ARMY)

Item 13. Ballistic protection; specialized ballistic threats. (ARMY)

NASA

GROUP XXIII STRUCTURES (NASA only)

A. Space activities (for use outside the earth's atmosphere (NASA))

Item 1. Space vehicle configuration (including manned orbital laboratories, reusable vehicles, space stations and satellites)

Item 2. Space vehicle docking and coupling devices

Item 3. Launch vehicle configurations

Item 4. Stage separation devices

Item 5. Erectable space structures

Item 6. High-strength, fatigue resistant, flight weight structural configurations

Item 7. Structural designs to withstand intense heat

Item 8. Remote control devices for acquiring samples of materials in outer space

Item 9. Heat conductance devices (e.g. heat pipes)

Group B . Aeronautical activities

Item 1. Aircraft configurations (including subsonic, supersonic, VTOL, STOL, helicopter and tilt rotor craft configurations; variations of sweep, twist aspect ratio, movable wings & tails, etc.)

Item 2. Wing design

Item 3. Wing-tip vortex eliminators

Item 4. Lift augmentation devices (e.g. flaps, slots, blowing slots, etc.)

Item 5. Lift fans

Item 6. Rotor craft (including helicopters and tiltrotors)

- a. rotors (e.g. hingeless type)
- b. rotor control system
- c. multiple blade systems (e.g. variable geometry type)
- d. blade tip shapes
- e. airfoil shapes of blades, bodies, rotors, etc.

Item 7. High strength, fatigue resistant, flight weight structural configurations, particularly structures made of composite materials

Item 8. Any invention directed to fuel economy, efficiency, air and noise pollution, or safety

GROUP XXIV MATERIALS FOR USE IN AERONAUTIC AND/OR SPACE VEHICLE (NASA only)

A. Fracture, fatigue and heat resistant materials, particularly including:

Item 1. Composite materials with/without fibers (e.g. carbon, etc.)

- a. Resin matrix composites (e.g. epoxy, polyamide and other polymer composites)
- b. Metal matrix composites (e.g. aluminum, titanium, superalloy and refractory metal composites.
- c. Ceramic matrix composites

Item 2. Protective coatings for composites

B. High temperature insulation materials
(including heat shield materials)

C. Cryogenic insulation materials

D. Heat ablation materials

E. Heat conductance materials

F. Superconductive materials

G. Spacecraft paints (e.g. thermal control paints or coatings)

H. Lubricants for use in space (e.g. solid lubricants such as metal cerami combinations)

I. Fire resistant, low smoke , nontoxic materials (including foams, paints, fabrics)

J. High temperature materials for gas turbine engines including:

Item 1. Superalloys (nincluding nickel base, cobalt base and iron base types)

Item 2. Eutectic composites (fiber formed insitu)

Item 3. Ceramics [including silicon carbide, silicon nitride and sialon (silicon, aluminum, oxygen and nitrogen)]

XXV POWER PLANTS (NASA only)

A. Rocket engines (non air breathing)

Item 1. Liquid propellant engine systems, components and fuels therefor

Item 2. Solid propellant engine systems, components and fuels therefor

Item 3. Ion propellant engine systems, components and fuels therefor

Item 4. Plasma propellant engine systems, components and fuels therefor

Item 5. Components used in connection with rocket engines, including:

a. Rocket nozzle thermal and erosion control materials and techniques

b. Rocket nozzle thrust alignment devices and techniques

B. Auxiliary power plants for space vehicles and launching vehicles

Item 1. Chemical materials and devices (e.g. batteries)

Item 2. Solar cells and collectors

Item 3. Thermal electric materials and devices (e.g. radio isotope generators)

Item 4. Thermionic fuel cells

Item 5. Nuclear devices

C. Jet engines for aircraft

Item 1. Noise reduction apparatus

Item 2. Pollution reduction apparatus

Item 3. Fuel conservation technology

Item 4. Alternate fuels

Item 5. Fans and compressors (axial & centrifugal)

Item 6. Turbines (cooling & aerodynamics)

Item 7. Combustors and augmentation systems such as burners

Item 8. Drive system mechanical components (e.g. seals, bearings, lubricants, transmissions, gears, shafts, etc.)

D. General aviation engines (including sterling, rotary and diesel cycles)

Item 1. Pollution reduction apparatus

Item 2. Apparatus for increasing efficiency

Item 3. Hydrogen enrichment techniques

XXVI LAUNCH FACILITIES (NASA only)

A. Launch pads

B. Checkout and handling equipment

C. Launch instrumentation

D. Propellant storage & transfer equipment

E. Hazardous emissions and contamination monitoring

F. Communications and control

G. Autonomous Systems

H. Materials science

XXVII SPACE VEHICLE GUIDANCE AND CONTROL (NASA only)

A. Radio command systems

B. Inertial guidance systems

C. Inertial platform reference devices

D. Precision gyros (particularly electrically suspended types) (accelerometer)

E. Celestial - inertial systems

F. Horizon sensors and sun sensors

G. Gravity gradient sensors

H. Star trackers

I. Radio altimeters

J. Doppler velocity measuring systems

K. Attitude control systems

L. Attitude and stability control mechanisms (e.g. vibration dampers, control jets, reaction wheels, processing gyroscopes, magnetic field torques)

M. Guidance and control computers

N. Telemetry and recording equipment

O. Tracking systems and devices

P. Guidance and control communication systems (including vehicle to ground, ground to vehicle and vehicle to vehicle)k

Q. Terminal guidance and landing systems

XXVII SPACECRAFT ENVIRONMENTAL CONTROL (NASA only)

A. Systems and components protecting the spacecraft per se from space environment

B. Life support systems and components (e.g. biomedical sensors and systems, air breathing systems and waste conversion systems)

XXVIII SATELLITE APPLICATIONS (NASA only)

A. Communication systems and components (including laser communications and components)

B. Navigation systems and components

C. Meteorological systems and components

D. Geodesy applications

E. Geophysical measurement systems and components

F. Topological systems and components

G. Air traffic control systems

H. Search and rescue

XXIX INSTRUMENTATION & TECHNIQUES USEFUL IN AERONAUTICAL AND SPACE RESEARCH & ACTIVITIES (NASA only)

A. Sensors and sensing systems used for earth, lunar, and interplanetary observation including magnetometers, radiometers and radiometric scanners, interferometers, photoelectric devices, solid state scanning arrays and other similar systems and devices capable of remote sensing from space

B. Optical and electronic photo image processing apparatus including digital, laser and holographic techniques for producing photos from received telemetry and for reprocessing of photos to enhance certain features

C. Instrumentation and techniques for support of life in space (e.g. space suits, air breathing systems, biomedical sensors and systems, waste conversion systems)

D. Instrumentation and techniques for performing scientific experiments in sounding rockets; orbiting satellites and space vehicles

E. Doppler systems for measuring fluid parameters (flow around airfoils)

- F. Instrumentation and techniques, including computer software for manufacturing in space
- G. Flight simulators, moving base and fixed base types (including visual presentation devices for simulating acceleration, etc.)
- H. Partial or zero gravity simulators
- I. Instrumentation and techniques for performing experiments from aircraft (e.g. aircraft mounted telescopes)
- J. Lightning detection systems in relation to launch of space vehicles
- K. Video compression systems for satellite-to-earth communications
- L. Robotics, including processes and computer programs for robotics simulations and control
- M. Processes and computer software for scheduling events

XXX COMPUTER SOFTWARE RELATING TO ANY OF THE ABOVE CATEGORIES (NASA only)

REMARKS:

The above category list is not exclusive. We would like to examine any application which, in the judgment of the examiner, has significant use in aeronautical and space activities. We will from time to time amend this list to keep it as current as possible.