SERIES 300
RESEARCH, DEVELOPMENT, ACQUISITION, TEST, AND EVALUATION FACILITIES

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300 RESEARCH, DEVELOPMENT, ACQUISITION, TEST AND EVALUATION FACILITIES

300-1 INTRODUCTION

Research, development, acquisition, test and evaluation facilities include the buildings and other scientific structures and facilities used directly in theoretical and/or applied research, development, acquisition, test and evaluation operations. Category code groups pertaining to these facilities are:

300-1.1 **Category Code 310 through 321.** Research, development, acquisition, test and evaluation buildings

300-1.2 **Category Codes 371 and 390.** Research, development, acquisition, test and evaluation structures

Associated facilities assigned function in support of research, development, acquisition, test and evaluation are assigned appropriate codes such as Category Code series 200 for normal maintenance, repair and overhaul purposes; Category Code series 400 for warehouse, as opposed to storage functions; Category Code series 600 for administrative facilities; Category Code series 800 for utilities, and Category Code series 900 for real estate.

300-2 CATEGORY CODE DESIGNATION.

After a determination is made of the gross floor/building area, a specific category can be assigned to the total space, based on the primary use for the facility. As a general guideline, offices and support areas which are directly related to a particular type of research activity carry the same category code as the laboratory areas themselves.

300-3 DEFINITION OF TERMS

The following definitions of terms are used in the research criteria:

300-3.1 **Gross Floor/Building Area**. The total areas of all floors, measured between the exterior faces of outside walls. It includes full areas of basements, on-grade and above grade floors, service and equipment rooms, boiler plants and heater rooms, mezzanines, penthouses, enclosed passages and raised covered platforms. Excluded is all enclosed space with an average ceiling height of less than seven feet.

300-3.2 **Net Floor Area**. This is total gross floor area, less space taken up by outside walls, stair towers, elevator shafts, interior partitions, toilets, basements unsuited for specific use, permanent hallways, elevator

machinery and machinery or equipment used for heating and/or ventilating the building, and NMCI/telcomm room servers and ducts. The net floor area does include special equipment bays peculiar to a particular laboratory function.

300-3.3 **Prime Unit Generator**. A special object (e.g., tow tank, wind tunnel, environmental chamber, multi-axis rate table) which tends to have the room built around it, rather than fitting into an existing room. Prime unit generators usually require "high bay" areas and often have overhead cranes or other heavy handling equipment associated with them.

300-3.4 **NTG Factor** (net to gross conversion factor) That factor which is used to convert a net floor area to a gross floor/building area (net floor area x NTG factor = gross floor/building area).

300-4 OVERALL METHODOLOGY

The basic problem in planning any research facility is the same: how to meet an existing need while at the same time providing for flexibility and growth. Research ranges from microscopic investigations to factory type testing set-ups. The methods described below provide a good prediction of the type and quantity of space that should be built to satisfy a specific program need, while at the same time allowing for flexibility to accommodate future RDAT&E program.

300-4.1 In approaching any research facility planning project, it is advisable to break down the facility requirements into basic functional components. These components consist of:

- Research Offices
- Research Support
- Bench Type Labs
- Specialized Research Facilities

300-4.2 Not all of these components will be present in all research facilities. To arrive at total requirements for a facility, each of the components which are present should be looked at separately, using the appropriate method described in succeeding paragraphs. Net floor areas should be developed first for each component, and gross floor/building areas calculated for each by multiplying the net areas by the appropriate NTG conversion factor. The total space requirement for the research facility is obtained by adding the gross floor/building areas for each of the components, as diagrammed below:

Total Area	=	Research Office	+	Research Support	+	Bench Type Labs	+	Specialized Research Facilities
(Gross)		(Net SF x NTG)		(Net SF x NTG)		(Net SF x NTG)		(Net SF x NTG)

300-4.3 There are three basic methods for developing and justifying net floor areas for research facilities. These consist of:

300-4.3.1 **Architectural Method** - This method consists of the development of scaled floor plans which depict a layout of equipment items within a required “envelope” of space. Such layouts should show the equipment as it should be placed within the space, which may not necessarily correspond to the manner in which such space is actually arranged in existing facilities. Such layouts should strive to be as efficient as possible.

300-4.3.2 **Industrial Method** - This method consists of identifying in a tabular format the net floor area required for each item of required equipment. When this method is used, the table should include three columns of information: (a) name of equipment item; (b) actual floor area occupied by the item, i.e., the size of its “footprint”; (c) size of the required working area within which the item sits, which permits all normal operations associated with the equipment as well as required services access to all sides. The sum of all the areas shown in item (c) will be the total net floor area for the space as a whole, and is equivalent to the “envelope” which would be shown graphically if the architectural method were used.

Note: the Introduction of category code 131 provides requirements for various types of workstations and for equipment mounted in racks. Table 131 provides requirements for typical equipment found in offices and labs.

300-4.3.3 **Use of Criteria** - For many types of facilities, approved rules of thumb (criteria) may be used to generate net floor areas. These are identified in terms of space per person, space per module, etc., and have been incorporated wherever possible into the P-80 guidance. Use of criteria generally requires less time and effort than either of the other methods.

300-4.3.4 In developing requirements for research facilities, any of the above methods may be used or a combination of these methods to develop the net floor areas for each functional component of the research facility.

300-5 OVERALL METHODOLOGY: RECOMMENDED PROCEDURES BY FUNCTIONAL COMPONENT

300-5.1 **Research Office**. Net floor areas for office spaces should be calculated by utilizing the criteria and guidance contained in Category Code 610 10. Gross floor/building areas should be developed using the NTG factors shown under this code. In utilizing the criteria, care must be taken to identify by administrative component, which personnel require office type space.

300-5.2 **Research Support**. The term “research support” is used to include lunch/locker spaces, libraries, auditoriums, etc., which may be required in direct support of an RDAT&E function. Studies have shown that space requirements for these types of space are similar, whether in support of a laboratory or other Navy uses. Therefore, the appropriate criteria may be used to calculate the requirements. If these criteria are to be used, refer to the appropriate category codes for guidance.

Examples of such codes are:

Installation Restaurant	Category Code 740 26
Academic Instruction Building	Category Code 171 10
Applied Instruction Building	Category Code 171 20
Auditorium	Category Code 171 25

Storage requirements are included in bench type labs or these requirements can be identified with Category Codes outside of the 300 series (Category Code 610 77 Admin storage or 171 77 Training Material Storage, etc.).

Net to gross conversion factors to be used for research support spaces are the same as for research offices.

300-5.3 **Bench Type Labs**. The bench lab component of research facilities tends (if present) to be organized into repetitive modules. Because of the nature of research, one scientist may share a laboratory module with another scientist, or in some instances, one scientist may have a need for two or more dedicated labs. Note: photographic darkrooms and control rooms are treated as bench labs, not as support space.

The basic laboratory module that is most adaptable to various types of research and which also works well within modern structural systems is 11.5 x 24 feet in size. This design allocates 276 square feet for net floor area per laboratory module.

The net to gross conversion factor to be used for bench type laboratories contains a built-in allowance for storage space, and laboratory support shop space. These are as follows:

For buildings supported by a central heating/cooling plant	1.35
For buildings containing their own HVAC equipment	1.65

300-5.4 **Specialized Research Facilities**. Specialized research facilities can be subdivided into three types: (1) Large set-ups of bench lab type activities which are too big to fit into a single bench lab module; (2) Systems Simulation including data processing laboratories, and (3) One-of-a-kind facilities such as tow tanks, environmental chambers, and wind tunnels.

300-5.5 **Large Set-Ups.** Large Set-Ups of relatively small and ordinary laboratory items arranged into a combination too large to fit into a single laboratory module, space allocation should be in multiples of a single 276 square foot bench lab module. These multiples usually range from 1 to 4 modules, only rarely exceeding 4 modules is size.

Net to gross conversion factors for large set-ups are the same as for bench labs spaces, and contain built-in allowances for storage and shop space. NTG factors to be used for large set-up spaces are as follows:

For buildings supported by a central heating/cooling plant	1.35
For buildings containing their own HVAC equipment	1.65

300-5.6 **Systems Simulation Facilities.** Allow 28 square feet of net floor area for each data processing unit such as communication hubs, data transmitters/receivers, display sets, or cryptographic modules or console. Do not count supplemental air handlers or programmers' desks—allowance for these is already included in the 28 square foot module.

Specialized equipment associated with the data processing equipment is treated as one-of-a-kind equipment (see below).

The Introduction of Category Code series 131 provides requirements for various types of workstations and for equipment mounted in racks. Table 131 provides requirements for typical equipment found in offices and labs.

NTG factors to be used for system simulation facilities are as follows:

For buildings supported by a central heating/cooling plant	1.35
For buildings containing their own HVAC equipment	1.65

300-5.7 **One-of-a-Kind Facilities.** One-of-a-kind facilities are built to house large and unique equipment such as wind tunnels, flow channels, shaker tables, environmental chambers, autoclaves, etc. A method for allocating space for one-of-a-kind facilities involves identifying the “Prime Unit Generator”. The prime unit generator is the item or assemblage of equipment which is the primary justification for the facility. Because of the specialized nature of these items, (which can be as small as a 6’ diameter pressure vessel, or as large as a 20 x 30 x 50 foot space shuttle avionics test fixture) it is necessary to have some special rules for defining prime unit generators. These rules include the following:

- Internal wind tunnels (where the entire tunnel is contained in a large room): Include compressors and/or suckers or reservoir vessels inside the building along with the tunnel tube itself.

- External wind tunnels (where most of the tube is outside and only a working chamber is housed inside the building): Do not include any mechanism which is outside the building. Do include the entire working chamber, even if one wall of the chamber constitutes or is in contact with the outside wall of the building.

- Tow tanks/flow channels/turning basins: Include in the prime unit generator all fundamentally necessary equipment which is inside the building and essential to the operation of the tank, channel, etc. Examples are pumps with flow channels, and wave making mechanisms with turning basins.

- Irradiation equipment including X-ray: Include as a part of the prime unit generator power generation equipment, (as with wind tunnels), flow channels, etc. For track mounted units, include the entire track as part of the prime unit generator. For remote controlled units operating in a shielded room, treat the room only as a prime unit generator, and the controls as bench lab if part of a larger building. If the controls are a freestanding building, the controls are considered a control console as described in the following paragraph.

- Control consoles: If freestanding in an otherwise open area, add 4 feet or clearance to working side and use the bench lab NTG. If in a separate room devoted exclusively to the control function, treat the entire room as a bench laboratory.

- Internal aisles and walk space in specialized research facility areas, and within bench labs accounted for in the NTG factor.

- General case. For RDAT&E equipment and installations not specifically discussed above, treat the primary functional unit, and any unique “custom tailored” ancillaries as the prime unit generator. Other support items of an off-the-shelf nature are not counted as part of the prime unit generator but allowed for in the NTG factor.

After the footprint (floor plan area) of the prime unit generator is identified, a 6-foot working clearance is provided on all sides. For irregular shaped items some smoothing of the outline should be allowed to simplify calculation.

Note that the 6-foot working clearance is a theoretical space allocation tool, not intended to reflect realistic working requirements. In cases where the equipment is close to a building wall, the 6-foot clearance may extend outside the building wall, but is still counted in determining the required net floor area.

The total area of the prime unit generator and its 6-foot working clearance is called the “Working Net” for that item.

The net to gross conversion factor applied to the working net of one-of-a-kind facilities depends upon the type of heating service provided to the building:

For buildings supported by a central heating/cooling plant	1.5
For buildings containing their own HVAC equipment	2.2

As an alternative to the above procedure, a scaled floor plan (Architectural Method) may be developed and provided as justification for the space requirement.

300-6 SUMMARY OF RECOMMENDED PROCEDURES

For convenience, a brief summary is provided:

- **Offices** - Use criteria for Category Code 610 10.

- **Research Support** - Use criteria for the appropriate category codes to obtain net floor area. Use NTG factor for the Category Code 610 10 administrative space.

- **Bench Labs** - Use 276 square foot per lab. Treat darkrooms and control rooms as bench lab space. The NTG factor includes allowance for storage and direct shops support and varies with the type of building heating system.

- **Specialized Research Facilities** –

a. <u>Large Set-Ups</u>: Use multiple of bench lab module. same NTG factors as for bench labs.

b. <u>Systems Simulation</u>: Use 28 square foot module for each piece of data processing equipment. Add area for any specialized equipment (which is treated as one-of-a-kind equipment). The NTG factor equals 1.35 or 1.65 depending on the type of building heating system.

c. <u>One-of-a-kind facilities</u>: Identify prime unit generator. Add 6 foot working space to obtain working net. The NTG factor equals 1.5 or 2.2 depending on the type of building heating system.

310 SCIENCE LABORATORIES

310-1 **DEFINITION.** Buildings used directly in theoretical or applied research, development and testing operations related to basic research such as chemistry, materials, medical, biological, sonic, physics, geophysics, etc.

310 11 ASTRONOMY & ASTROPHYSICS LABORATORY (SF)

FAC: 3101
BFR Required: Y

31011-1 **DEFINITION.** A facility required to support the investigation of radio astronomy equipment, satellite research, and development for navigational and communication programs. The facility is also utilized in conducting research and development in the fields of atmospheric physics, astrophysics in radio, radar and meteor astronomy, upper air physics, rocket astronomy, solar spectroscopy, and cosmic radiation, etc.

310 13 CHEMISTRY AND TOXICOLOGY LABORATORY (SF)

FAC: 3101
BFR Required: Y

31013-1 **DEFINITION.** The facility required to support the conducting of research, development, test and evaluation in the areas of physical, organic, inorganic, nuclear, and biological chemistry, directed towards problems concerning fuels, lubricants, corrosion, protective coatings, electrochemistry, submarine atmosphere purification, protection against biological and chemical warfare agents, polymers, molecular structure, and related programs. This facility is further utilized to support the application of chemicals to explosives, propellants, pyrotechnics, etc., and the effects of the chemistry of the ocean as it affects acoustic absorption, sound speed, thermocline and water mass identification.

310 15 MATERIALS LABORATORY (SF)

FAC: 3101
BFR Required: Y

31015-1 **DEFINITION.** This facility is used for research, development, test and evaluation of static, pneumatic non-destructive as well as destructive testing of components and assemblies for Navy weapons, vehicles, engines, ships and aircraft. Includes testing such as Zyglo, ultra violet light, sonic, X-ray, magna-flux and other techniques for accomplishing non-destructive testing of metals, plastics, etc.

31015-2 **USAGE.** This facility also supports research in the areas of physical, mechanical, chemical and structural metallurgy directed towards marine corrosion, high temperature flow and fracture mechanics, irradiation effects on metals, fracture-safe design, and in developing materials for use in transducers, underwater structures, sensing devices, weapons ships and aircraft. Also supports the synthesizing, modifying, fabricating and studying of metallic and nonmetallic materials such as plastics, rubber, adhesives, ceramics, resins, but excluding explosives and propellants, with emphasis on resistance to unusual conditions such as high and low temperatures, stresses, aerodynamic heating, etc.

310 17 OPTICS LABORATORY (SF)

FAC: 3101
BFR Required: Y

31017-1 **DEFINITION.** This facility is used in conducting research, development, test and evaluation programs in quantum optics, optical propagation, laser physics, optical materials and optical warfare. The facility is also used in efforts directed at discovering and understanding the basic physical principles and mechanisms involved in optical devices and phenomena.

310 19 PHYSICS LABORATORY (SF)

FAC: 3101
BFR Required: Y

31019-1 **DEFINITION.** This facility is used in research, development, test and evaluation studies in the applied science of matter and energy. It includes research in such areas as acoustics, mechanics, light, thermodynamics, electromagnetism, atomic and nuclear physics, cryogenics, solid state physics, particle physics and plasma physics, etc.

310 21 RADIATION EFFECTS LABORATORY (SF)

FAC: 3101
BFR Required: Y

31021-1 **DEFINITION.** This facility is used in conducting research, development, test and evaluation on radiation characteristics of various devices and their effect on performance of various systems in the air and in the ocean environment. The facility is also used in the study of effects of radiation on people and marine life (e.g., acoustic pollution, hearing damage, and radioactivity) and the accomplishment of studies to determine reliable methods for detecting radiation sources.

310 23 COMBINED RESEARCH LABORATORY (SF)

FAC: 3101
BFR Required: Y

31023-1 **DEFINITION.** This facility is used for research, development, test and evaluation of naval systems which utilized several of the sciences in a combined system applied directly to a Fleet problem or area of RDAT&E. It is also used to support research, development, test and evaluation of naval systems which do not logically fit the other categories of RDAT&E.

310 25 BIOLOGICAL LABORATORY (SF)

FAC: 3101
BFR Required: Y

31025-1 **DEFINITION.** This facility is used in research, development, test and evaluation in terrestrial and marine biology as related to structure

capabilities, functioning habitat, health, growth environmental indicators, ecological relationships of living organisms and association of biological phenomenon to man's existence and operations in the land, ocean and space environment. The facility also can include research in microbiology and environmental biology and the life process or characteristic phenomena of any group.

310 27 ENVIRONMENTAL LABORATORY (SF)

FAC: 3101
BFR Required: Y

31027-1 **DEFINITION.** This facility is used to support the research, development, test and evaluation of instrumentation and computer systems for measurement and analysis of the evaluation of environmental effects on various equipment, weapons systems, facilities, etc. The principle thrust of research and development in this area is in the fields of mechanical shock, vibration, pressure, and in the natural environments of temperature, humidity, corrosion, etc. Also includes working mock-ups of environmental studies relating man to the test environment.

310 29 ANIMAL APPLICATIONS LABORATORY (SF)

FAC: 3101
BFR Required: Y

31029-1 **DEFINITION.** This facility is used to support the research, development, test and evaluation on non-human animals in pure research and ocean support applications. This would include the use of whales and dolphins as trained deep sea divers, seals for shallow water tool recovery and dogs as sentries. It can also include research and development in application and knowledge of animal capabilities in sensing, homing and identification to improve the operation of man-made ocean devices. It provides veterinary medical support for marine mammal projects including applied research on diagnosis, treatment, surgery, husbandry and nutrition.

310 31 MEDICAL LABORATORY (SF)

FAC: 3102
BFR Required: Y

31031-1 **DEFINITION.** This facility is used in conducting research toward methodology for diagnosis, treatment, or prevention of disease or damage to the body or mind.

310 33 COMPUTATION AND ANALYSIS LABORATORY (SF)

FAC: 3101
BFR Required: Y

31033-1 **DEFINITION.** This facility supports research, development, test and evaluation in the areas of information processing and data handling, especially when concerned with identification of conditions responsible for given data configurations. Mathematical data analysis utilizing both digital and analog computers to research, develop, test and evaluate new naval systems from simulated and real time data.

310 37 OCEAN SCIENCES LABORATORY (SF)

FAC: 3101
BFR Required: Y

31037-1 **DEFINITION.** This facility is used to accomplish research, development, test and evaluation in marine biosystems, environmental protection and management, development of analytical systems for evaluation of the ocean environment, studies of wave dynamics, current flow, thermoclines, chemical variances, bottom sampling, as well as development of new techniques and equipment to increase man's knowledge and utilization of the total ocean environment.

310 39 LEVEL III BIOSAFETY LABORATORY (SF)

FAC: 3103
BFR Required: Y

31039-1 **DEFINITION.** This type of laboratory applies to clinical, diagnostic, and teaching, research, or production facilities for work involving indigenous or exotic agents that have the potential to transmit infection through the respiratory system, which may cause serious and potentially lethal infection. Biosafety Level III applies to Risk Group 3 agents that are associated with serious or lethal human disease for which preventive or therapeutic interventions may be available. Risk Group 3 agents are defined by the guidelines of “Biosafety in Microbiological and Biomedical Laboratories,” US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health.

31039-2 **USAGE.** Laboratory facilities must be separated from other areas that are subject to unrestricted traffic flow within a building. If a laboratory is separated into different laboratories (zones), a sink must be provided for hand washing in each zone. Access to the laboratory will be restricted to entry by a series of two self-closing doors. A clothing change room (anteroom) may be

included in the passageway between the two self-closing doors. An area for decontaminating all laboratory wastes should be planned in the facility, preferably within the laboratory (e.g., autoclave, chemical disinfection, incineration, or other validated decontamination method). The facility must also include an area for decontaminating large pieces of equipment to facilitate removal of the equipment from the laboratory.

310 40 LEVEL IV BIOSAFETY LABORATORY (SF)

FAC: 3104
BFR Required: Y

31040-1 **DEFINITION.** This type of laboratory is associated with work on dangerous and exotic agents that pose a high individual risk of life-threatening disease, aerosol transmission, or related agent with unknown risk of transmission. Biosafety Level IV applies to Risk Group 4 agents that are likely to cause serious or lethal human disease for which preventive or therapeutic interventions are not usually available. Risk Group 4 agents are defined by the guidelines of “Biosafety in Microbiological and Biomedical Laboratories,” US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, and National Institutes of Health.

31040-2 **USAGE.** A Laboratory facility consists of either a separate building or a clearly demarcated and isolated zone within a building. Rooms in the facility must be arranged to ensure exit by sequential passage through the chemical shower, inner (dirty) change room, personal shower, and outer (clean) changing area. A chemical shower must be provided to decontaminate the surface of the positive pressure suit before the worker leaves the laboratory. Sinks inside the suit laboratory should be placed near procedure areas and contain traps and be connected to the wastewater decontamination system. An eyewash station must be readily available in the laboratory area for use during maintenance and repair activities.

311 AIRCRAFT

311-1 Buildings used directly in the research, development and testing of air frames and related assemblies and spares, and other aircraft equipment.

311 05 RDAT&E MAINTENANCE HANGAR – O/H SPACE (HIGH BAY) (SQ. M. / SF)

FAC: 2111
BFR Required: Y

311 06 RDAT&E MAINTENANCE HANGAR – 01 SPACE (CREW AND EQUIPMENT) (SQ. M. / SF)

FAC: 2112
BFR Required: Y

311 07 RDAT&E MAINTENANCE HANGAR – 02 SPACE (ADMINISTRATIVE) (SQ. M. / SF)

FAC: 1444
BFR Required: Y

31105/06/07-1 **DEFINITION.** This criteria is currently in development and will be posted upon completion.

311 10 AIRCRAFT FLIGHT AND NAVIGATIONAL EQUIPMENT LABORATORY (SF)

FAC: 3111
BFR Required: Y

31110-1 **DEFINITION.** This facility is utilized in conducting research, development, test and evaluation of aerodynamic design of aircraft and weapons systems and navigational systems. Equipment is evaluated to assure optimum flight performance, stability, and control characteristics and on airborne equipment. The facility is also used in conducting RDAT&E in aerodynamic science in support of advanced aircraft and weapon concepts. The facility can also be an operating test facility for air navigation systems, equipment and component acceptance testing, design and performance analysis, and diagnostic and analytic evaluation to ensure proper system equipment and component function.

311 20 AIRCRAFT GROUND SUPPORT EQUIPMENT LABORATORY (SF)

FAC: 3111
BFR Required: Y

31120-1 **DEFINITION.** This facility is used to research, development, test and evaluation of aircraft ground support equipment, systems and techniques for the takeoff, recovery, maintenance, and test of aircraft. The facility is used to test and evaluate ground support equipment for aircraft armament and weapons, aircraft handling, servicing and inspection equipment and aircraft avionics equipment. This does not include missile and missile system ground handling equipment.

311 25 AIRCRAFT SYSTEMS INTEGRATION LABORATORY (SF)

FAC: 3111
BFR Required: Y

31125-1 **DEFINITION.** This facility is used for research, development, test and evaluation of various groupings and collections of interacting aircraft systems such as the effects of airframe, structure, flight control, electrical, environmental control, fuel, hydraulic, mechanical, pneumatic, propulsion, gun, life support and related ground support systems on ECM, air to air missile launch, etc. This does not include work on aircraft engine design characteristics.

312 MISSILE AND SPACE

312-1 Buildings used directly in the research, development and testing of missiles, missile system, related ground handling, and launching equipment, and other aerospace equipment.

312 10 GUIDED MISSILE LABORATORY (SF)

FAC: 3121
BFR Required: Y

31210-1 **DEFINITION.** This facility is used in support of research, development, test and evaluation of advance simulation, instrumentation, environmental test techniques and improved serviceability and reliability characteristics of guided missile weapon systems. It includes assembly, disassembly, test modification and analysis of test firing results of guided missiles.

31210-2 **USAGE.** This facility also may support research, development, test and evaluation of missile navigation systems and related equipment. It includes design and testing of guidance and control systems for guided missiles and launch and arming systems for ballistic missiles, component testing, error diagnosis, and performance analysis as applied to missiles and missile systems.

312 20 MISSILE SUPPORT EQUIPMENT LABORATORY (SF)

FAC: 3121
BFR Required: Y

31220-1 **DEFINITION.** This facility is used for research, development, test and evaluation of equipment and techniques for the launching, recovery,

maintenance, transport and testing of missiles and guided missile support equipment.

312 25 SPACECRAFT/SATELLITE LABORATORY (SF)

FAC: 3121
BFR Required: Y

31225-1 **DEFINITION.** This facility supports research, development, test and evaluation of spacecraft, satellites or components of each not otherwise classified as a missile weapon system. This facility would include related ground support/launching equipment.

312 30 MISSILE SYSTEMS INTEGRATION LABORATORY (SF)

FAC: 3121
BFR Required: Y

31230-1 **DEFINITION.** This facility is used for research, development, test and evaluation of related and interconnected systems that are necessary for launching, and in direct support of guided missile systems.

313 SHIP AND MARINE EQUIPMENT

313 10 SHIP AND MARINE LABORATORY (SF)

FAC: 3131
BFR Required: Y

31310-1 **DEFINITION.** This facility is used in conducting research, development, test and evaluation on ships, by use of models in high and low speed tow tanks, maneuvering and seakeeping basins, water tunnels, circulating water channels, fluid phenomenon basins, etc. The facility is also used in conducting fundamental and applied research related to the efficiency of ship structures, other marine vessels, including tracked amphibious vehicles, and the development of methods to assist the effect of static and dynamic loads imposed by submergence depth, wave and submarine structures.

31310-2 **USAGE.** The facility is also an operating test facility for ship and marine vessel navigation systems, equipment and component acceptance testing, design and performance analysis and diagnostic and analytic evaluation to ensure proper system equipment and component function.

313 20 SHIPS AND MARINE EQUIPMENT LABORATORY (SF)

FAC: 3131
BFR Required: Y

31320-1 **DEFINITION.** This facility is used to conduct research, development, test and evaluation of ships and marine support requirement. This includes repair and maintenance equipment as well as equipment for direct support and operation of ships and marine vessels such as periscopes, towed arrays, etc. It is further utilized to support the study of methods for designing shipboard and other marine equipment for resistance to service loads, attacks, and combat reliability.

313 25 SHIPS AND MARINE SYSTEMS INTEGRATION LABORATORY (SF)

FAC: 3131
BFR Required: Y

31325-1 **DEFINITION.** This facility is used for research, development, test and evaluation of related and interconnected ships and marine systems such as the ship platform integrated with the weapons systems, communication systems, command and control systems, surveillance systems, navigation systems, etc. The facility would include mock-up facilities for establishing adaptability, compatibility and space requirements for both man and machine.

314 TANK AND AUTOMOTIVE

314 10 GROUND TRANSPORTATION EQUIPMENT LABORATORY (SF)

FAC: 3141
BFR Required: Y

31410-1 **DEFINITION.** This facility is used in conducting research, development, test and evaluation in the field of automotive design as applied to tanks, APC's, and related military automotive equipment. This facility is also used in conducting RDAT&E on ground equipment in direct support of tank and automotive equipment such as power units, mobile maintenance, test equipment, heavy handling, lifting equipment, etc.

315 WEAPONS AND WEAPON SYSTEMS

315-1 RDAT&E facilities for guided missiles and related items are included under Category Code series 312.

315 10 AIRCRAFT WEAPON SYSTEMS LABORATORY (SF)

FAC: 3151
BFR Required: Y

31510-1 **DEFINITION.** This facility supports the research, development, test and evaluation of aircraft weapon systems including projectiles, mines and bombs, and defensive countermeasures devices/weapons.

315 15 SHIP WEAPON SYSTEM LABORATORY (SF)

FAC: 3151
BFR Required: Y

31515-1 **DEFINITION.** This facility is used for research, development, test and evaluation of weapons and weapon systems deployed from a surface ship. This would include guns, fire control, etc. This does not include aircraft or missile systems.

315 20 UNDERWATER WEAPON SYSTEM LABORATORY (SF)

FAC: 3151
BFR Required: Y

31520-1 **DEFINITION.** This facility is used for research, development, test and evaluation of undersea weaponry such as mines and torpedoes. This would include submarine mounted guns but not submarine launched missiles. Key platform components include sonar, combat control, underwater submarine warfare (USW) weapons targets, unmanned underwater vehicles (UUVs), and fleet training systems.

An underwater weapon system laboratory typically includes the following areas:

- Research offices
- Electronic assembly
- Prototype and electronic repair
- Commercial-off-the-shelf (COTS) laboratory
- Technical library
- Conference room
- Reproduction
- Lounge
- Storage

The typical net-to-gross factor for such a facility is 1.45.

315 25 GROUND WEAPON SYSTEMS LABORATORY (SF)

FAC: 3151
BFR Required: Y

31525-1 **DEFINITION.** This facility is used for research, development, test and evaluation of weaponry in use on or deployed from a ground base platform and would include small arms, automatic weapons, mortars, artillery, flame throwers, etc.

315 30 WEAPON SYSTEMS INTEGRATION LABORATORY (SF)

FAC: 3151
BFR Required: Y

31530-1 **DEFINITION.** This facility is used to accomplish research, development, test and evaluation associated with the integration of weapon systems with the weapons platform and with other interfaces between other weapons systems, guidance systems, surveillance systems, etc.

316 AMMUNITION, EXPLOSIVES AND TOXICS

316 10 AMMUNITION, EXPLOSIVES AND TOXICS LABORATORY (SF)

FAC: 3161
BFR Required: Y

31610-1 **DEFINITION.** This facility is used to support the research, development, test and evaluation of ammunition, rockets, bombs, mines, grenades, torpedoes, depth charges, demolition materials, pyrotechnics, AT0 units, related chemicals, and their components and materials. This Category Code does not include facilities for guided missiles, guided bombs, or commercial type petroleum products.

317 ELECTRONIC, COMMUNICATION AND ELECTRICAL EQUIPMENT

317-1 Buildings used directly in the research, development and testing or radio and radar equipment, signal equipment, radiation aids, electrical equipment and its controls, transmitting and receiving equipment, avionics equipment, sonar, and guided bombs.

317 10 COMMUNICATIONS SYSTEMS LABORATORY (SF)

FAC: 3171
BFR Required: Y

31710-1 **DEFINITION.** This facility is used in conducting research, development, test and evaluation in the areas of radio communication, instrumentation, satellite communication, electromagnetic propagation, radio antennas, underwater sound systems, optical systems (infrared), etc.

317 15 DETECTION SYSTEMS LABORATORY (SF)

FAC: 3171
BFR Required: Y

31715-1 **DEFINITION.** This facility is used in conducting research, development, test and evaluation in basic physical phenomena of importance to radar, sonar, and related sensors, also the development of systems analysis and evaluation of the sensors used in satellites, ships, submarines, and aircraft, etc. It includes surveillance for detection, localization, identification and classification of surface, aerospace and sub-surface objects.

317 20 ELECTRICAL AND ELECTRONICS SYSTEMS LABORATORY (SF)

FAC: 3171
BFR Required: Y

31720-1 **DEFINITION.** This facility is used in conducting research, development, test and evaluation in the areas of electrical power and its control, magnetic fields and ship's control systems. Research in this area involves development of motors and generators, frequency converters, voltage and current control devices, and shipboard power distribution systems. In the magnetic fields, studies are conducted in the reduction of stray fields produced by naval equipment, methods of determining ship's magnetic signature and new concepts in degaussing systems.

31720-2 **USAGE.** This facility is also used in the fields of electronics and electromagnetic phenomena in support of components, subsystems, and systems in detection, communication, navigation, countermeasures, acoustics, electromagnetics, identification, and classification as they apply to naval ordnance, submarine weapons systems, surface ships and aircrafts.

317 25 ELECTRICAL, ELECTRONICS AND COMMUNICATION SYSTEMS INTEGRATION LABORATORY (SF)

FAC: 3171
BFR Required: Y

31725-1 **DEFINITION.** This facility is used to accomplish research, development, test and evaluation associated with the integration of related systems and subsystems of electrical, electronics and communications systems with the platform (air, sea, ground, etc.) upon which they will operate and to verify interface consideration with other systems operating on the respective platform.

318 PROPULSION

318 10 PROPULSION SYSTEMS LABORATORY (SF)

FAC: 3181
BFR Required: Y

31810-1 **DEFINITION.** This facility is used to support research, development, test and evaluation of propulsion systems in order to determine operational capabilities and in studying the acoustics and electromagnetic noise effects on performance and efficiency of drive units.

318 15 PROPULSION FUEL LABORATORY (SF)

FAC: 3181
BFR Required: Y

31815-1 **DEFINITION.** This facility is used to support research, development, test, and evaluation of propulsion fuels in order to maximize a propulsion system's operational characteristics. This facility would also support investigation into new fuels and propulsive energy systems including controlled nuclear energy.

319 MISCELLANEOUS ITEMS AND EQUIPMENT

319 10 MISCELLANEOUS EQUIPMENT AND ITEMS LABORATORY (SF)

FAC: 3191
BFR Required: Y

31910-1 **DEFINITION.** This facility supports research, development, test, and evaluation of miscellaneous military equipment such as landing mats, valves (e.g. safety, pressure reducing, fuel regulating), and hyperbaric facilities not appropriate in another category code.

319 15 RDAT&E STORAGE LABORATORY (SF)

FAC: 3191
BFR Required: Y

31915-1 **DEFINITION.** This building is a storage facility for research, development, test, and evaluation equipment and materials directly related to RDAT&E programs.

319 20 CIVIL ENGINEERING LABORATORY (SF)

FAC: 3191
BFR Required: Y

31920-1 **DEFINITION.** This facility is used to support research, development, test and evaluation in the area of civil engineering. This would include military type bridging, hand tools, construction equipment, construction techniques, on land, in and under the ocean.

319 25 HUMAN FACTORS LABORATORY (SF)

FAC: 3191
BFR Required: Y

31925-1 **DEFINITION.** This facility is used to determine the effects of wartime atmosphere and material on military personnel and non-combatants. This facility would also deal with man-man interfacing (morale, command control, and the like) and man-machine interfacing (console design, payload design, work area requirements, etc.)

319 30 SURVIVAL EQUIPMENT AND CLOTHING LABORATORY (SF)

FAC: 3191
BFR Required: Y

31930-1 **DEFINITION.** This facility supports research, development, test and evaluation of pilot's and sailor's need for special equipment, clothing and techniques for survival in various hostile environments.

319 35 METROLOGY AND CALIBRATION LABORATORY (SF)

FAC: 3191
BFR Required: Y

31935-1 **DEFINITION.** This facility will be used in direct support of research, development, test and evaluation programs where precise weights and measures are required in calibrating RDAT&E equipment. This facility would include the metrology and calibration equipment and space for calibrating applicable equipment.

319 40 RANGE OPERATIONS AND INSTRUMENTATION LABORATORY (SF)

FAC: 3191

BFR Required: Y

31940-1 **DEFINITION.** This facility is used in support of research, development, test and evaluation of range operations to include command center, communications, surveillance, instrumentation, data collection/reduction/display, etc.

320 UNDERWATER EQUIPMENT

320 10 UNDERWATER EQUIPMENT LABORATORY (SF)

FAC: 3201
BFR Required: Y

32010-1 This facility is used in conducting research development, test and evaluation of underwater acoustics, ship vibrations and various types of underwater devices to increase man's capabilities in the ocean.

32010-2 The facility is also used to support RDT&E in hydro-acoustics, structural acoustics, mechanical vibration and signal processing, and conducting acoustic and vibration trials and instrumentation devices for sound and vibration attenuation, the RDT&E of deep ocean tools, equipment and work systems as well as support equipment for divers, submersibles and marine systems of all types.

32010-3 This building supports the RDT&E of undersea navigational systems and related equipment. This would include component design, error diagnosis, and performance analysis for location sensing, direction control, and depth control for undersea vessels. It would include devices for manned and unmanned vehicles as well as divers' navigational equipment.

320 20 UNDERWATER SYSTEMS INTEGRATION LABORATORY (SF)

FAC: 3201
BFR Required: Y

32020-1 This facility will be used for research, development, test and evaluation of various interacting underwater systems, equipment, tools, techniques and operators working together in an underwater environment. The integration of several systems to accomplish a greater total effort will be accomplished in this facility.

321 TECHNICAL SERVICES

321 10 TECHNICAL SERVICES LABORATORY (SF)

FAC: 3211
BFR Required: Y

32110-1 Buildings used directly in RD&T manufacturing or reverse engineering of one-of-a-kind models and parts for systems or subsystems from wood, plastic, fiberglass and other materials by molding, casting, extruding and machining.

371 RANGE FACILITIES

371-1 Structures used directly in research, development and testing of small arms, artillery, weapons systems, avionics, protection equipment, shelters, etc.

371 10 SCIENCE SYSTEMS RANGE FACILITY (EA)

FAC: 3712
BFR Required: N

37110-1 Facilities used in the conduct of tests and evaluations of items identified under Category Code series 310.

371 11 AIRCRAFT SYSTEMS RANGE FACILITY (EA)

FAC: 3712
BFR Required: N

37111-1 Facilities used in the conduct of tests and evaluations of items identified under Category Code series 311.

371 12 MISSILE AND SPACE SYSTEMS RANGE FACILITY (EA)

FAC: 3712
BFR Required: N

37112-1 Facilities used in the conduct of tests and evaluations of items identified under Category Code series 312.

371 13 SHIPS AND MARINE SYSTEMS RANGE FACILITY (EA)

FAC: 3712
BFR Required: N

37113-1 Facilities used in the conduct of tests and evaluations of items identified under Category Code series 313.

371 14 TANK AND AUTOMOTIVE SYSTEMS RANGE FACILITY (EA)

FAC: 3712
BFR Required: N

37114-1 Facilities used in the conduct of tests and evaluations of items identified under Category Code series 314.

371 15 WEAPONS AND WEAPON SYSTEMS RANGE FACILITY (EA)

FAC: 3712
BFR Required: N

37115-1 Facilities used in the conduct of tests and evaluations of items identified under Category Code series 315.

371 16 AMMUNITION, EXPLOSIVES AND TOXICS RANGE FACILITY (EA)

FAC: 3712
BFR Required: N

37116-1 Facilities used in the conduct of tests and evaluations of items identified under Category Code series 316.

371 17 ELECTRONIC, COMMUNICATION AND ELECTRICAL SYSTEMS RANGE FACILITY (EA)

FAC: 3712
BFR Required: N

37117-1 Facilities used in the conduct of tests and evaluations of items identified under Category Code series 317.

371 18 PROPULSION SYSTEMS RANGE FACILITY (EA)

FAC: 3712
BFR Required: N

37118-1 Facilities used in the conduct of tests and evaluations of items identified under Category Code series 318.

371 19 MISCELLANEOUS ITEMS AND EQUIPMENT RANGE FACILITY (EA)

FAC: 3712
BFR Required: N

37119-1 Facilities used in the conduct of tests and evaluations of items identified under Category Code series 319.

371 20 UNDERWATER SYSTEMS RANGE FACILITY (EA)

FAC: 3712
BFR Required: N

37120-1 Facilities used in the conduct of tests and evaluations of items identified under Category Code series 320.

390 RDT&E OTHER THAN BUILDINGS AND RANGE FACILITIES

390-1 Scientific structures and facilities other than buildings used directly in theoretical or applied research, development, and test operations related to such items as test tracks, wind tunnels, etc. Do not include structures and buildings used for normal maintenance, repair, and overhaul purposes.

390 10 SCIENCE SYSTEMS FACILITY (EA)

FAC: 3901
BFR Required: N

39010-1 Facilities used in the conduct of research, development, test and evaluation of items identified under Category Code series 310.

390 11 AIRCRAFT SYSTEMS FACILITY (EA)

FAC: 3901

BFR Required: N

39011-1 Facilities used in the conduct of research, development, test and evaluation of items identified under Category Code series 311.

390 12 MISSILE AND SPACE SYSTEMS FACILITY (EA)

FAC: 3901
BFR Required: N

39012-1 Facilities used in the conduct of research, development, test and evaluation of items identified under Category Code series 312.

390 13 SHIPS AND MARINE SYSTEMS FACILITY (EA)

FAC: 3901
BFR Required: N

39013-1 Facilities used in the conduct of research, development, test and evaluation of items identified under Category Code series 313.

390 14 TANK AND AUTOMOTIVE SYSTEMS FACILITY (EA)

FAC: 3901
BFR Required: N

39014-1 Facilities used in the conduct of research, development, test and evaluation of items identified under Category Code series 314.

390 15 WEAPONS AND WEAPONS SYSTEMS FACILITY (EA)

FAC: 3901
BFR Required: N

39015-1 Facilities used in the conduct of research, development, test and evaluation of items identified under Category Code series 315.

390 16 AMMUNITION, EXPLOSIVES AND TOXICS FACILITY (EA)

FAC: 3901
BFR Required: N

39016-1 Facilities used in the conduct of research, development, test and evaluation of items identified under Category Code series 316.

390 17 ELECTRONIC, COMMUNICATION AND ELECTRICAL SYSTEMS FACILITY (EA)

FAC: 3901
BFR Required: N

39017-1 Facilities used in the conduct of research, development, test and evaluation of items identified under Category Code series 317.

390 18 PROPULSION SYSTEMS FACILITY (EA)

FAC: 3901
BFR Required: N

39018-1 Facilities used in the conduct of research, development, test and evaluation of items identified under the Category Code series 318.

390 19 MISCELLANEOUS ITEMS AND EQUIPMENT FACILITY (EA)

FAC: 3901
BFR Required: N

39019-1 Facilities used in the conduct of research, development, test and evaluation of items identified under the Category Code series 319.

390 20 UNDERWATER SYSTEMS FACILITY (EA)

FAC: 3901
BFR Required: N

39020-1 Facilities used in the conduct of research, development, test and evaluation of items identified under the Category Code series 320.