

**STATEMENT OF WORK
FOR CONSTRUCTION SOLICITATION**

DATE: 07/13/2016

PROJECT TITLE: CATEGORY 6 CABLE INSTALLATION, BLDG. 440

**PROJECT LOCATION: Naval Academy Preparatory School (NAPS) Naval Station Newport,
Newport, RI**

PART I - PROJECT SCOPE AND GENERAL INFORMATION:

- 1.1 GENERAL INTENTION: It is the declared and acknowledged intention and meaning to provide installation of category 6 (CAT 6) cabling in Building 440.
- 1.2 GENERAL DESCRIPTION: Provide all labor, materials, transportation, equipment, supplies and supervision as required for new, complete and usable, CAT 6 data lines of specifications indicated on the associated drawing, for the purpose of network connections for a wireless network. Perform the work described as shown on attached plan and specifications.
- 1.3 LOCATION: The work shall be located at Building 440 CP, Perry Hall an academic instruction building.
- 1.4 COMMENCEMENT, PROSECUTION AND COMPLETION OF WORK: The contractor shall commence work under the contract within 15 Calendar days after the date of contract award. The contractor shall complete the entire work, ready for use, within 150 calendar days. The time stated for completion shall include final clean-up of the premises. The contractor shall set up a meeting with the contracting officer or representative prior to the start of work. The Contractor shall schedule his work no less than 48 hours in advance with the Contracting Officer.
- 1.5 PARTIAL PAYMENT: Partial payment for work accomplished under this contract will not be made. Payment will only be made when work is 100 percent complete and accepted by the Government.
- 1.6 OSHA/EPA REGULATIONS: During performance of all work under this contract, the Contractor shall strictly adhere to regulations of the Environmental Protection Agency (EPA) and the Occupational Safety and Health Agency (OSHA), as well as all applicable State and Local requirements, Newport NAVSTA regulations, and the Army Corps of Engineers Safety and Health Requirements Manual EM-385.
- 1.7 DRAWINGS ACCOMPANYING SPECIFICATIONS:
 - a. Drawing Reference – NAPS WLAN Site Survey Report
 - b. Standard USNA Telecommunication Infrastructure Standards, Release 1.9, dated November 2009
- 1.8 EXAMINATION OF THE PREMISES: Bidders are expected to visit the site of work to make a survey of the conditions to be encountered which may affect the cost of the performance of the work. Failure to familiarize with the conditions shall not relieve the contractor from the responsibility for full completion of the work. The contractor is required to contact the FEAD Office at 401-841-7624 prior to commencement and upon completion of work. Work shall be

performed during normal hours Monday through Friday 0700-1530 excluding federal holidays. Work performed outside of normal hours requires the approval of the contracting officer's representative. Submit requests for approval a minimum of 5 working days in advance. Utility outages shall be performed during off hours unless directed otherwise.

PART II - TECHNICAL REQUIREMENTS:

2.1 DETAILED REQUIREMENTS:

Provide all labor, materials, transportation, equipment, supplies and supervision as required for a new, complete and usable, CAT 6 data lines of specifications indicated on the associated drawing, for the purpose of network connections for a wireless network.

Provide and install CAT 6 cable from Room 316, located on the third floor level of Building 440 to eighteen locations shown on the NAPS WLAN Site Survey Report. All Cat 6 wiring shall be plenum rated and fire stopped at any wall or floor penetration.

Provide a single data outlet with one data jack and faceplate at each location and all cable and connectivity hardware.

Cable runs to the identified locations from Room 316 shall be in the existing cable tray(s) located in the accessible corridor ceilings.

Install data outlets in the identified locations. All locations are marked with stickers on the wall or ceiling.

Provide an approved fire rated penetration from the corridor to classrooms and Room 316. Maintain the fire-resistance rating of the corridor walls.

Provide and install CAT 6 cable 24 port patch panel. Install patch panel in existing data rack located in Room 316.

Secure the existing data rack located in Room 316 to the floor and walls to prevent overturning.

Contractor shall acknowledge that Building 440 CP, Perry Hall an academic instruction building will remain open and operational during the duration of this project. Tools and materials shall not be left in the paths of exit/entry at any time, and the work area shall be cleaned at the end of each work day.

Submit all required materials to Officer in Charge prior to commencement of work for approval. Contractor shall adhere to the guidelines of attached soil management plan. Test to ensure proper operation.

Installation shall meet or exceed the requirements of the National Electrical Code.

PART III – SUPPLEMENTAL REQUIREMENTS:

3.1 REFERENCES:

1. All work shall comply with applicable Uniform Facility Criteria (UFC) and the International Building Code (IBC) as modified by UFC 1-200-01 General Building Requirements.
2. All work shall comply with the United States Naval Academy (USNA) Information Technology Services Division (ITSD) standards and their mission to develop, manage and integrate information technology systems. In accomplishing this mission, all work shall comply with the USNA Telecommunication Infrastructure Standards, Release 1.9, dated November 2009. All work shall meet the standards set in TIA/EIA-568 version C and shall conform to the requirements of The National Fire Protection Association 70 NEC revision 2014.
3. Provide design submittals and product information for review and approval for all materials to be used.
4. All work shall be completed in a neat and professional manner.
5. The contractor shall provide and maintain As-Built drawings. Include any addition, deletion or relocation of outlets.
6. All work shall be done with the knowledge that Building 440 ceiling texture contains asbestos. Do not disturb the ceiling texture or any other material that may contain asbestos. If an asbestos containing material (ACM) is found to be in conflict with the execution of this project stop work immediately. Notify the Government project manager of the conflict

3.2 SECURITY AND IDENTIFICATION BADGING:

All contractor employees and sub-contractors on the job site must be U.S. citizens. A list of individuals requiring access to the job site will be provided to NAVSTA Newport, RI prior to the start of the installation.

Obtain access to the installation by participating in the Navy Commercial Access Control System (NCACS) or by obtaining passes each day from the Base Pass and Identification Office. Costs for obtaining passes through the NCACS are the responsibility of the Contractor. One-day passes, issued through the Base Pass and Identification Office will be furnished without charge. Furnish a completed EMPLOYMENT ELIGIBILITY VERIFICATION (DHS FORM I-9) form for all personnel requesting badges. This form is available at <http://www.uscis.gov/portal/site/uscis> by searching or selecting Employment Verification (Form I-9). Contractor shall immediately report instances of lost or stolen badges to the Contracting Officer.

- a. NCACS Program: NCACS is a voluntary program in which Contractor personnel who enroll, and are approved, are subsequently granted access to the installation for a period up to one year, or the length of the SECTION 01 14 00 contract, whichever is less, and are not required to obtain a new pass from the Base Pass and Identification Office for each visit. The Government performs background screening and credentialing. Throughout the year the Contractor employee must continue to meet background screening standards. Periodic background screenings are conducted to verify continued NCACS participation and installation access privileges. Under the NCACS program, no commercial vehicle inspection is required, other than for Random Anti-Terrorism Measures (RAM) or in the case of an elevation of Force Protection Conditions (FPCON). Information on costs and requirements to participate and enroll in NCACS is available at <http://www.rapidgate.com/vendors/how-to-enroll> or by calling 1-877-727-4342. Contractors should be aware that the costs incurred to obtain NCACS credentials, or costs related to any means of access to a Navy Installation, are not reimbursable. Any time invested, or price(s) paid, for obtaining NCACS credentials will not be compensated in any way or approved as a direct cost of any contract with the Department of the Navy.

- b. One-Day Passes: Participation in the NCACS is not mandatory, and if the Contractor chooses to not participate, the Contractor's personnel will have to obtain daily passes, be subject to daily mandatory vehicle inspection, and will have limited access to the installation. The Government will not be responsible for any cost or lost time associated with obtaining daily passes or added vehicle inspections incurred by non-participants in the NCACS.

3.3 SHOP DRAWING AND SUBMITTAL:

- a. Prior to starting work, the contractor shall provide a minimum of 2 copies of all submittals for approval purposes for all materials to be used on this project (project specifications may require the provision of additional submittal copies). Partial submittals will not be acceptable and will be returned without review. Submittals shall be from the manufacturer and complete with manufacturer's name, catalog number, specifications, and any other information necessary to approve the materials. Material Safety Data Sheets (MSDS) shall be submitted along with product data for any potentially hazardous materials such as paints, adhesives, sealants, cleaners, gypsum board compound, flux materials, etc. Use low VOC materials wherever possible. No hazardous materials shall be brought on to government property without approved MSDS. The contractor shall maintain a copy of all MSDS at the job site at all times.
- b. Submit shop drawings and calculations for review and approval. Submittals shall include the following:
 - Shop Drawing of wiring runs
 - Product data for Cat 6 wiring
 - Product data for CAT 6 24 port patch panel.
- c. Accident Prevention Plan (APP) at least 10 days in advance of starting work, following Appendix A of EM-385-1-1. The plan shall incorporate all aspects of the project and additionally include the items mentioned below, as appropriate. Work may not begin until approval of the APP.
- d. Traffic control plan when any operation may interrupt or interfere with normal traffic in the area. Plan shall meet the requirements of EM-385-1-1.
- e. Safety plan
- f. Environmental Protection Plan
- g. Product information for all material to be used.
- h. Schedule
- i. Schedule of Values
- j. Warranties

3.4 SAFETY REQUIREMENTS:

- a. The contractor shall be required to follow all federal occupational safety and health regulations (OSHA), EM 385-1-1, as well as all applicable state and local requirement.

3.5 GENERAL REQUIREMENTS:

- a. Before beginning any excavation, contractor will follow National and Navy Dig Safe requirements. Navy Dig Safe POC, Fran Furtado (401) 841-1355.
- b. Extreme care shall be exercised to avoid damaging government or personal property, damaged or destroyed objects will be repaired or replaced, at the contracting officers' approval at no expense to the government.
- c. Any road closures will be coordinated through the Navy road closure process set forth by the NAVFAC Newport Facilities Engineering and Acquisition Division.
- d. In accordance with the EM-385-1-1, contractor will be responsible for submitting an Accident Prevention Plan (APP) to the contracting officer or representative before the start of work.
- e. The contractor shall be responsible for proper disposal of all items to be removed from government property, and clean up all dust and debris generated at the construction sites on a daily basis. For specific direction, contact Naval Station Newport's environmental division at (401) 841-7561. The contractor shall comply with NAVSTA waste recycling and green procurement policies.
- f. During the performance of this contract, contractor shall strictly adhere to environmental protection agency regulations (EPA), the federal occupational safety and health regulations (OSHA), EM 385-1-1, as well as all applicable state and local requirements.
- g. Contractor parking is available on site.
- h. Contractor to provide preferred space for lay down area for Government approval.
- i. Soil and sediment erosion controls are necessary unless excess soil is to be piled.
- j. For exterior work, or work which involves closing a building's entrance, the contractor shall install and maintain temporary chain link construction fencing set into moveable concrete blocks, meeting the requirements of EM-385-1-1, around the entire work area unless otherwise indicated. Fencing shall be installed to prevent unauthorized personnel from entering the work zone or any unsafe area. The fence shall be equipped with signage as required by EM-385-1-1. Provide gates where necessary for access by emergency personnel or to allow personnel to escape during an emergency. Temporary chain link fencing shall remain in place and maintained for the duration of the project.
- k. The contractor shall take necessary precautions to ensure any roof or other building opening exposed to the weather are monitored and protected. Take immediate actions necessary to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday. Ensure that the openings are completely sealed off to protect materials and equipment in the building from damage.
- l. When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions shall

include, but are not limited to, closing openings; removing or securing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or any nearby Government property. During severe weather the contractor will be required to take any additional actions as required by the contracting officer or representative. Any work required to protect against inclement weather or high winds shall be at the contractor's expense.

- m. Hazardous Substances. When any hazardous substances are procured, used, stored or disposed, a hazard communication program must be in effect and MSDSs shall be available at the worksite. Employees shall have received training in hazardous substances being used. When the eyes or body of any person may be exposed to corrosives, irritants or toxic chemicals, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within 10 seconds of the worksite.
- n. Traffic control shall be accomplished in accordance with DOT's MUTCD.
- o. Control of Hazardous Energy (Lockout/Tagout). Before an employee performs any servicing or maintenance on any equipment where the unexpected energizing or startup of the equipment could occur, procedures must be in place to ensure adequate control of this energy.
- p. Driving, working on (i.e., working with equipment/mowers) while on slopes, working from/in boats/skiffs, etc shall also be considered and dealt with accordingly.
- q. Fall Protection – full text as required by the EM385-1-1.

USNA TELECOMMUNICATION INFRASTRUCTURE STANDARDS

Release 1.13

April, 2013

Please use the following as a general guide from Information Technologies for the repair and renovation of all buildings at the Naval Academy. We will update this information and assign a new release number each time there is a revision. Some parts of this document are redundant with the EIA/TIA standards and specifications but are repeated because they have failed to be incorporated into released contracts. To work from this document, please contact IT to assure it is the current release.

Copies of specifications used on previous building renovations may be attached for information purposes. They are not to be copied verbatim, they shall be modified, customized and updated for each specific project or building.

GENERAL REQUIREMENTS:

Any building or space that is under construction, repair or renovation should comply with the data/phone/video infrastructure per Information Technologies USNA standard.

USNA ITSD does not have personnel or contractors available to install telecommunication systems in new or renovated buildings, all systems shall be installed as part of the renovation or construction. Installation contractors shall provide all materials, labor and equipment required to install, test and certify complete data, telephone and video systems.

Any telecommunications service available in USNA buildings before renovation shall be replaced or reinstalled during construction, i.e. a building with data network service should not lose this capability because of renovation or repair. All services in existing buildings shall be protected during renovations or reinstalled into the building.

All cables, outlets, equipment and other systems installed shall be terminated, labeled and tested by the installation contractor. Documentation of As-Built cable, outlet, equipment locations and other physical infrastructure shall be provided at completion of installation.

The Naval Academy's standard technology equipment for distribution systems includes a nCompass Structured Cabling System constructed with nCompass approved with Superior Essex/Ortronics products. Technology Installers seeking work at the U.S. Naval Academy that involves installing, replacing or extending Network Cable Products must be certified by the proper Superior Essex and Ortronics Certified Integrator/Installer Program. This certification and training must be current as identified in the Superior Essex and Ortronics Certified Integrator/Installer Extended Warranty Program. The system must be designed and built in accordance with referenced standards; meeting specified link/channel performance and topological (distance and connection) limits. The nCompass Warranty is Twenty-Five (25) Years from date of installation registration.

The Naval Academy's standard technology equipment for Fiber Optic cabling is Corning Cable Systems. Technology Installers seeking work at the Naval Academy that involves replacing or

extending Corning Fiber Optic Cable Products must be certified by the proper Corning Cable Systems Installation and Design training courses. This certification and training must be current as identified in the Corning Cable Systems LANscape Solutions Extended Warranty Program.

USNA must receive the Corning Cable Systems LANscape Solutions Extended Product Warranty (25yrs), all Corning Cable System installations must be designed by and reviewed by a certified installer. The installation company's personnel must have successfully completed the identified Corning Cable Systems Engineering Services Design Course within the two-year eligibility period, and a minimum of 80% of on-site supervision of the work must be performed by personnel who have successfully completed the identified Corning Cable Systems Engineering Services Installation Course requirements within the two-year eligibility period.

The installer must guarantee that each installation where the Corning Cable Systems LANscape® Solutions Extended Product Warranty is offered will be performed in accordance with these standard procedures. The installer agrees to keep copies of all submitted documentation, for the period of the extended warranty, and to make them available to USNA and Corning Cable Systems upon request.

The following materials must be submitted to USNA and Corning Cable Systems for the Extended Warranty:

1. Completed (in full) Warranty Registration Form
2. Installation design drawings, blueprints or diagrams showing Corning Cable Systems parts, installed in the specific project
3. Bill of materials showing part numbers of Covered Corning Cable Systems Products installed
4. End-to-end attenuation test results for complete installation in electronic format. OTDR test device results, or other test results as required by Corning Cable Systems Recommended Procedures, in electronic format from approved testing device or in printed format should be kept on file at the installer's place of business

Existing telephone and data networks traverse many buildings at USNA, it is the design engineer's responsibility to conduct a study of dependency of these networks. Information Technologies, upon request, will provide the engineer with the network topology of the area. Should network backbone cable re-routing be necessary, the engineer shall devise a plan that will describe the disconnection of the existing system and rerouting that will prevent any network service interruption for dependent building(s). IT will review the engineer's plan. When approved, the rerouting plan will become part of the building prints and be described in the specifications in sufficient detail as required to allow a competent third party to perform the work.

TELECOMMUNICATIONS INFRASTRUCTURE:

Design Engineers and installation contractors shall adhere to EIA/TIA standards for the design and installation of all telecommunications infrastructure, i.e.

EIA/TIA 568-B Commercial Building Telecommunications Cabling Standard

EIA/TIA 569-A Commercial Building Standard for Telecommunications Pathways and Spaces

EIA/TIA 606 Administration Standard for Telecommunications Infrastructure of Commercial Buildings

EIA/TIA 607 Commercial Building Grounding and Bonding Requirements for Telecommunications

Cable trays, conduits or other support structures are required for all cables and shall be described in the "Interior Distribution System" specification section.

Infrastructure designs and riser diagrams for telephone & data UTP and fiber optics should be detailed in separate prints and described in the specifications with adequate description to perform work. Design of the networks and infrastructure should not be left up to the installation contractor.

If any of the existing data/phone equipment is to be salvaged for reuse within the building, the details of actions, dependencies, identification and storage shall be described in detail in the specifications. All other required equipment, not identified for reuse, shall be supplied and installed by the installation contractor.

If requested, ITSD will mark the existing cables and equipment before demolition begins. The renovation contractor is responsible for the protection of the marked cables and equipment. ITSD shall be notified 2 weeks before demolition begins to allow for removal of existing network equipment.

Installation contractors shall provide extra pull strings when pulling cables in ducts or conduits. Should a contractor use an existing pull string in a conduit, the pull string should be replaced at the same time.

The **standard USNA telecommunication outlet** consists of **2 data jacks and 1 telephone jack**. Unless otherwise directed use the standard outlet configuration. The minimum density in general office spaces is one standard outlet per 100 square feet or 1 standard outlet on opposing walls, whichever is greater.

A 4" by 4" dual gang box shall be used for each standard outlet. A minimum of ¾" conduit shall feed the box from the closest hallway ceiling space.

Service loops are required on all installed cables. Provide 30 foot service loops on all backbone cables at service entrances, on distribution cables, provide 12 inches at outlet end and 36 inches at telecommunication room termination.

TELECOMMUNICATIONS ROOMS:

Telecommunication rooms that are smaller than EIA/TIA minimum (10' X 8' for rooms with LAN cabinets or racks) are never ITSD approved, a minimum of 3 feet is required, front and backside, of LAN equipment cabinets (see last sheet attached).

Telecommunications rooms shall be located as close as possible to the center of the area they serve to minimize horizontal cable lengths.

Telecommunication rooms shall be readily accessible, and free from danger of flooding. Provide doorways that are properly sized (36" by 80" minimum) as required to remove and replace the largest size of equipment installed in the room.

Telecommunication room floors and walls must be painted white. Under no circumstances should concrete or blocks walls or floors remain unfinished.

No piping, ducts, or equipment installed in, enter, or pass through communication equipment spaces. Piping, ducts, or equipment serving communication equipment spaces shall not be installed above the communications equipment.

Telecommunication rooms require environmental controls to offset thermal load generated by LAN & other equipment. Provide adequate ventilation, a minimum of 1 air change per hour, maintain humidity levels of 33% -55%, and temperature range of 64 – 75 degrees Fahrenheit. Mechanical rooms are not a suitable substitution for telecommunication rooms. Environmental controls must operated 24/7 and be independent of buildings environmental controls and HVAC systems.

Telecommunication rooms shall have ¾", Fire rated, AC Grade plywood backboards, A grade side out on a minimum of two walls for telephone termination and other equipment.

Telecommunication rooms shall have convenience electrical power receptacles 18" AFF, every 6 – 8 feet or at least one on each wall. These receptacles shall not be on the same circuit as the telecommunication room equipment circuits.

One dedicated, 20 Amp, electrical power circuits, each on it's own individual branch circuit are required in all designated LAN equipment cabinets in telecommunication rooms. Electrical power cables shall be fed through the top of the cabinets to allow movement of the cabinets.

Telecommunication rooms shall have an emergency electrical power shut off to terminate the power supplied to the LAN equipment cabinets.

Telecommunications rooms shall be provided with a Telecommunications Grounding Bus Bar (TGGB) that is connected to the building electrical grounding system. All LAN cabinets or racks as well as all service entrance cables and other active equipment shall be bonded to the TGGB.

Telecommunication rooms shall have a wall mounted telephone outlet near the door.

When telecommunication rooms are NOT vertically stacked per EIA/TIA standards, 2 trade size 3 horizontal steel conduits shall be installed connecting additional telecommunications rooms

Lighting shall be adequate (minimum of 50 footcandles) so that craftpersons can distinguish small lettering and work with small wires.

FIBER OPTICS:

The Naval Academy Data Network uses a fiber optic trunk cable system to provide data communications connectivity between all buildings on the main campus at USNA, Perry Center and the Naval Station. The primary fiber trunk consists of three loose tube fiber cables, a 144 strand, 50 micron core, multimode cable and a 216 strand, 8.3 micron core, single mode cable. The multimode trunk cables have all dielectric central support members, N.A of 2.0 and 1 dB/Km max attenuation at 1300 NM while the single mode cable has a steel central support member and 0.3 dB/Km max attenuation at 1550 NM. Additional fiber optic trunk cables, multimode and single mode, of several fiber counts and core sizes exist in specific areas of the campus. The NADN uses the single mode cables and the multimode cables for Ethernet 10 Gigabit and Gigabit backbone connections and distribution connections.

Fiber optic distribution and riser cables exist in many buildings on the campus. These cables are both 50 and 62.5 micron core multimode cables and 8.3 micron core single mode cables.

Any replacement cable spliced to an existing fiber optic cable shall meet the same physical characteristics and performance standards.

New multimode fiber optic riser cables that are terminated at both ends, not spliced to existing cables, shall be 62.5 micron core cables.

New fiber optic trunk cables servicing a building shall provide both multimode and single mode fibers. If new trunk cables are spliced to existing trunk cables, the core size shall match the existing.

All fiber cables shall be terminated in a rack-mounted connector housing in the LAN cabinets. The EIA/TIA standard SC fiber connector shall be used for all new fiber installations.

All fiber optic cable shall be installed in innerduct within conduits, trays or open ceiling spaces.

Design specifications shall describe requirements for all fiber optic cable, connecting hardware, splice trays, splice cabinet, termination panels, termination cabinet, testing and documentation.

UNSHIELDED TWISTED PAIR:

Enhanced Category 6 UTP cable (Cat-6 or better) shall be used for all data and telephone cable installations until future standards are released. Definition and requirements of CAT-6 cable performance shall be written into specifications.

Where data cables co-exist with power cables, the data cables must cross the electrical cables at 90-degree angles to minimize any effect of potential EMI sources. Data cables must never be tied/bundled to electrical cables or conduit.

The UTP cables installed for data connections shall have a blue outer sheath. The UTP cables for telephone connections shall have white or gray outer sheaths.

The data and telephone cables shall both be terminated using the T568B pin/pair assignments. The UTP cables shall terminate directly to Cat-6 eight position modular jacks in the outlets using Insulation Displacement Connections (IDC), place the jack in the outlet faceplate with the tab down.

The outlet jack bezel for the data outlets shall be Black in color and the phone outlets jacks shall be White.

All UTP data cables shall terminate on 110 IDC, high density, modular jack patch panels in the LAN cabinets in the telecommunications room. The patch panels shall be labeled to match the labels on the outlets.

All UTP telephone cables shall terminate on 110 IDC, wall mounted blocks on the plywood boards on the walls of the telecommunications room. The ends of the telephone cables shall be labeled to match the label on the outlets.

All UTP Out Side Plant (OSP) telephone trunk cables shall terminate on protector blocks at the service entrance to the building or the telecommunications room if permitted by code.

All UTP distribution cable installed for both data and telephone connections should terminate in a common telecommunications room.

All UTP cables terminated on patch panels or blocks shall be terminated in numerical sequential order from the lowest room number to the highest room number and within the rooms in alphabetical order from the lowest letter (first jack in first outlet to the left of the door) to the highest letter clockwise around the room. Leave spare patch panel ports at the end of the first floor sequence, start the second floor terminations on a new patch panel starting with the lowest second floor room number. Installation contractors shall plan, sort, identify and label all cables before termination to ensure they meet this requirement. Terminations out of order on the patch panels will not be accepted.

COMMERCIAL CATV COAXIAL:

If it is determined that connections to the commercial CATV system (currently Comcast) are required in a building the telecommunications installation contractor shall install the required distribution system within the building.

The commercial CATV system uses coaxial drop cables, RG-6 quad shield, and F-81 outlet connectors. The drop cables extend from the outlet back to a multi-port tap located in the telecommunications room.

The commercial CATV system uses different distribution and trunk cable sizes, contact the local Company for details. In the past, the local CATV Company has provided the cable to the installation contractor. The current Comcast Design Engineer for Anne Arundel County is Tom Morgan. Contact him at 443-871-3228.

GROUNDING AND BONDING

The facility shall be equipped with a Telecommunications Bonding Backbone (TBB). This backbone shall be used to ground all telecommunications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential to act as a current carrying conductor. The TBB shall be connected to the nearest approved building grounding electrode and the equipment grounding system. The system shall be designed in accordance with the recommendations contained in the ANSI/TIA/EIA-607 Telecommunications Bonding and Grounding Standard.

The main entrance facility/equipment room in each building shall be equipped with a telecommunications main grounding bus bar (TMGB). Each telecommunications room shall be provided with a telecommunications ground bus bar (TGB). The TMGB shall be connected to the building electrical entrance grounding facility. The intent of this system is to provide a grounding system that is equal in potential to the building electrical ground system. Therefore, ground loop current potential is minimized between telecommunications equipment and the electrical system to which it is attached.

All racks, metallic backboards, cable sheaths, metallic strength members, splice cases, cable trays, etc. entering or residing in the TR or ER shall be grounded to the respective TGB or TMGB using a minimum #6 AWG stranded copper bonding conductor and compression connectors.

All wires used for telecommunications grounding purposes shall be identified with a green insulation. Non-insulated wires shall be identified at each termination point with a wrap of green tape. All cables and bus bars shall be identified and labeled.

Installation and termination of the main bonding conductor to the building service entrance ground shall be performed by a licensed electrical contractor.

FIRESTOP

A firestop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, smoke, heat, vapor and pressurized water stream.

All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly firestopped.

Firestop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by a qualified Professional Engineer (PE), licensed (actual or reciprocal) in the state of Maryland. A drawing showing the proposed firestop system, stamped/embossed by the PE shall be provided to the USNA ITSD prior to installing the firestop systems.

All firestop systems shall be installed in accordance with the manufacturer's recommendations and shall be completely installed and available for inspection by USNA ITSD authorities prior to cable system acceptance.

TESTING AND ACCEPTANCE

General

All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-B. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.

All cables shall be tested in accordance with this document, the ANSI/TIA/EIA standards, the Ortronics Certification Program Information Manual and best industry practice. If any of these are in conflict, the Contractor shall bring any discrepancies to the attention of the project team for clarification and resolution.

Copper Channel Testing

All twisted-pair copper cable links shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below. Additional testing is required to verify Category performance.

Horizontal cabling shall be tested using a Level III test unit for category 6 performance compliance. The basic tests required are:

- Wire Map
- Length
- Attenuation
- NEXT (Near end crosstalk)
- Return Loss
- ELFEXT Loss
- Propagation Delay
- Delay skew
- PSNEXT (Power sum near-end crosstalk loss)
- PSELFEXT (Power sum equal level far-end crosstalk loss)

Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests. The test shall be recorded as pass/fail as indicated by the test unit in accordance with the manufacturers' recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.

Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA/EIA-568-B Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.

Fiber Testing

All fiber testing shall be performed on all fibers in the completed end to end system. There shall be no splices unless clearly defined in an RFP. Testing shall consist of an end to end power meter test performed per EIA/TIA-455-53A. The system loss measurements shall be provided at 850 and/or 1300 nanometers for multimode fibers and 1310 and/or 1550 nanometers for single mode fibers. These tests also include continuity checking of each fiber.

Backbone multimode fiber cabling shall be tested at both 850 nm and 1300 nm (or 1310 and 1550 nm for singlemode) in both directions.

Test set-up and performance shall be conducted in accordance with ANSI/EIA/TIA-526-14 Standard, Method B.

Where links are combined to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. **ONLY LINK TEST IS REQUIRED.** The contractor can optionally install patch cords to complete the circuit and then test the entire channel. The test method shall be the same used for the test described above. The values for calculating loss shall be those defined in the ANSI/TIA/EIA Standard.

Insertion Loss (Attenuation) testing shall be performed with an approved hand held tester from an industry recognized test equipment manufacturer.

Passive Insertion Loss link loss shall be tested Bidirectional (MTR to TR, TR to MTR) at all wavelengths.

SYSTEM DOCUMENTATION

Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the USNA ITSD for approval. Documentation shall include the items detailed in the sub-sections below.

Documentation shall be submitted within ten (10) working days of the completion of each testing phase (e.g. subsystem, cable type, area, floor, etc.). This is inclusive of all test result and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 30 working days of the completion of each testing phase. At the request of USNA ITSD, the telecommunications contractor shall provide copies of the original test results.

USNA ITSD may request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by USNA ITSD Network Engineer, including a 100% re-test. This re-test shall be at no additional cost to the Owner.

TEST RESULTS

Test documentation shall be provided on disk within three weeks after the completion of the project. The disk shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is required on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.

The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-B including applicable TSB's and amendments. The appropriate Level III tester shall be used to verify Category 6 cabling systems unless the manufacturer specifies a list of approved cable testers.

Printouts generated for each cable by the wire (or fiber) test instrument shall be submitted as part of the documentation package. The telecommunications contractor must furnish this information in electronic form (DVD or CD-ROM).

All test results shall be in the original tester format from applicable testers.

When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

AS-BUILT DRAWINGS

The drawings are to include cable routes and outlet locations. Outlet locations shall be identified by their sequential number as defined elsewhere in this document. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The Naval Academy may provide floor plans in paper and electronic (DWG, AutoCAD) formats on which as-built construction information can be added. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to USNA ITSD.

The Contractors shall annotate the base drawings and return a hard copy (same plot size as originals) and electronic (AutoCAD) form.

FINAL ACCEPTANCE & SYSTEM CERTIFICATION

Completion of the installation, in-progress and final inspections, receipt of the test and as-built documentation, and successful performance of the cabling system for a two week period will constitute acceptance of the system. Upon successful completion of the installation and subsequent inspection, the end user shall be provided with a numbered certificate, from Ortronics / Berk-Tek, and Corning registering the installation.

EIA/TIA-569 Equipment Room

Centralized space for telecommunications equipment

- Shall house only equipment directly related to the telecommunications system and its environmental support systems
- Sizing:
 - To meet known requirements of specific equipment
 - If equipment is unknown, plan for 0.07 m² (0.75 ft²) of equipment room space for every 10 m² (100 ft²) of work station space
 - Must be a minimum of 14 m² (150 ft²)
 - For special-use buildings, size must be based on number of work stations as follows:
 -
 -

Equipment Room Floor Space for Special-use Buildings

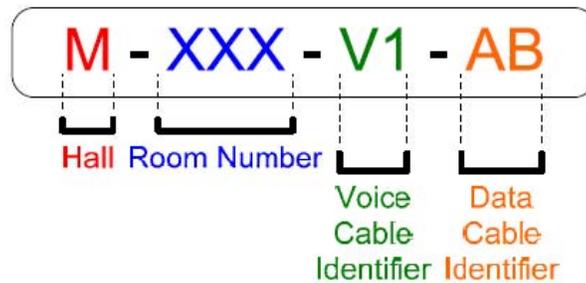
Work Stations	Area	
	(m ²)	(ft ²)
Up to 100	14	150
101 to 400	37	400
401 to 800	74	800
801 to 1200	111	1200

Approved Products

DESCRIPTION	PART#	MANUF.
1. TELECOM CABLES & INNERDUCT		
DataGain Cat6+ 4-Pr UTP White (CMP) 1000-ft Plenum	66-240-4B	Superior Essex
DataGain Cat6+ 4-Pr UTP Blue (CMP) 1000-ft Plenum	66-240-2B	Superior Essex
DataGain Cat6+ 4-Pr UTP White (CMR) 1000-ft	66-240-4A	Superior Essex
DataGain Cat6+ 4-Pr UTP Blue (CMR) 1000-ft	66-240-2A	Superior Essex
Plenum 75-Ohm Quad-Shield RG6 (1,000')	2227V	Commscope
Essex 100-Pr Cat3 UTP (CMP)	18-799-36	Superior Essex
Essex 200-Pr Cat3 UTP (CMP)	18-A99-86	Superior Essex
24 fiber Hybrid Cable, 12 MM/12 SM	024XSF-141XXA20	Corning
12 fiber Single Mode OS2 cable	012EUF-T4101D20	Corning
12 fiber Multimode OM1 62.5 riser rated cable	012KUF-T4130D20	Corning
1 1/4" Corrugated Plenum Innerduct		
2. WORKSTATION TERMINATION HARDWARE		
TracJack Clarity Cat6 RJ45 Black Module	OR-TJ600-00	Ortronics
TracJack Clarity Cat6 RJ45 White Module	OR-TJ600	Ortronics
TracJack Blank Modules (Kit of 10)	OR-42100002	Ortronics
TracJack 4-Port SG Plastic Faceplate	OR-40300546	Ortronics
TracJack 1-Port SG Plastic Faceplate	OR-40300549	Ortronics
Wall Phone Plate w/ RJ45 Jack		
3. TELECOM ROOM TERMINATION HARDWARE		
86"x21"x16.25" Mighty Mo6 Floor Rack (45RU's)	OR-MM6716	Ortronics
Clarity 48-Port Cat6 Patch Panel	OR-PHD66U48	Ortronics
2U Mgmt Panel w/ 5-Dist. Rings	OR-60400057	Ortronics
288-Pr Cat6 110-Block Kit w/ C4 Clips	OR-110ABC6300	Ortronics
300-Pr 110-Block Kit w/ C5 Clips	OR-30203519	Ortronics
110 Jumper Trough w/ Legs	OR-30200140	Ortronics
Rack-Mnt 12-Panel Fiber Enclosure	CCH-04U	Corning
Rack-Mnt 4-Panel Fiber Enclosure	CCH-02U	Corning
6-Duplex SC MM Coupler Panel	CCH-CP12-57	Corning
6-Duplex SC SM Coupler Panel	CCH-CP12-59	Corning
SC 62.5 MM Connector (Composite)	95-000-40	Corning
SC Single-Mode Connector (Ceramic)	95-200-41	Corning
12" Diameter PolyFiber Storage Ring		
Cable Sling	CAT425	Caddy
4. VIDEO SYSTEM		
F-Connector for Quad-Shield RG6	SNS6	T&B
TracJack F-Connector Module	OR-63700006	Ortronics



Communications Outlet Addressing Scheme



Labels occasionally may omit the Hall designation. If the outlet only contains a single voice or data port, only the hall, room number and voice or data cable identifier will be included in the label.

The **Voice Cable Identifier** is the letter V followed by a sequential number designating whether it is the 1st, 2nd, etc. phone port in the room.

The **Data Cable Identifier** is a sequential letter designating whether it is the 1st, 2nd, etc. data port in the room. If there are two or more ports in the outlet, they will be separated by commas (e.g., A,B). If there are more than 26 data ports in a room, then two letters are used to designate the data port.

Below are some examples of the addressing scheme:

Single data port in room 20 of Michelson Hall:	M-020-A
Outlet with one voice and data port in room 130 of Michelson:	M-130-V3-E
Outlet with two data ports in Chauvenet, room 323 (ports C and D)	C-323-C,D

Activity Hazard Analysis (AHA)

Activity/Work Task		Overall Risk Assessment Code (RAC) (Use highest code)					
AHA Signature Log #							
Project Location		Risk Assessment Code (RAC) Matrix					
Contract Number							
Date Prepared		Probability					
SSHO Signature		Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Superintendant Signature		Catastrophic	E	E	H	H	M
QC Manager Signature		Critical	E	H	H	M	L
Subcontractor Foreman Name:		Marginal	H	M	M	L	L
Signature:		Negligible	M	L	L	L	L
QA Reviewed by (Name/Title)		Step 1: Review each Hazard with identified safety "Controls". Determine RAC (see above).					
Notes: (Field Notes, Review Comments, etc)	Probability: Likelihood the activity will cause a Mishap (Near Miss, Incident, or Accident). Identify as Frequent, Likely, Occasional, Seldom or Unlikely Identify as Catastrophic, Critical, Marginal, or Negligible Step 2: Identify the RAC (probability vs. severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of the AHA					RAC CHART	
						E = Extremely High Risk	
						H = High Risk	
						M = Moderate Risk	
						L = Low Risk	
Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls			RAC		

Activity Hazard Analysis (AHA)

Job Steps (Work Sequences)	Specific Anticipated Hazards	Controls	RAC

Activity Hazard Analysis (AHA)

Equipment to be used	Training Requirements & Competent or Qualified Personnel Name(s)	Inspection Requirements

UFGS 013526 11/15 1.9 Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences; specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

UFGS 013526 1.9.1 Review the AHA list periodically (at least monthly) at supervisory safety meetings, update when procedures, scheduling or hazards change.

UFGS 013526 1.9.2 Each employee performing work...must review the AHA and sign a signature log for that AHA prior to starting work. The SSHO must maintain a signature log on site for every AHA