**6. ENGINEERING SYSTEMS REQUIREMENTS**

**D50 ELECTRICAL**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
SYSTEMS REQUIREMENTS  
ELECTRICAL TEMPLATE 06/23  
  
Instructions for using this template: There are template files for each UNIFORMAT Level 2 Group Elements. This template is for Group Element D50-ELECTRICAL. Text such as this is hidden text that will not print when the hidden text box in "Print/Options" is un-checked.  
  
Edit this template for the requirements of the project and wherever brackets [ ] appear. Use UFC 3-501-01 when determining electrical system requirements.   
  
It is acceptable to place all required information in the main element (such as D5010) and delete the sub-elements provided in this template.  
  
The SYSTEMS REQUIREMENTS are intended to define items that are required throughout the facility or on a system wide basis that is common to several rooms. Room-specific requirements are defined in the ROOM REQUIREMENTS section. Coordinate with the lead programmer for ROOM REQUIREMENTS. Delete all building elements that are not required for the project. If additional elements or sub-elements are required for the project that do not appear in the template, refer to the NIST UNIFORMAT II publication for additional building element numbers and descriptions. The Uniformat II Work Breakdown Structure can be found at** [**www.wbdg.org/ndbm/**](http://www.wbdg.org/ndbm/) **. Coordinate with the PERFORMANCE TECHNICAL SPECIFICATION SECTION D50 (Section D50) to ensure that performance requirements are provided for all of the Building Elements listed here and that paragraph numbering matches.  
  
There may be rare occasions when prescriptive specifications may either be edited and included in Part 5 of the RFP or required in Section D50 to be edited by the Contractor's Designer of Record. In both cases, the Engineering Systems Requirements (ESR) must include references to these documents.  
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NOTE: Consider each electrical system component relative to UFGS Section 01 33 29, *Sustainability Requirements and Reporting*and UFC 1-200-02 ,*High Performance and Sustainable Building Requirements*and minimize energy costs.  
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**SYSTEM DESCRIPTION**  
**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Address scope and ensure the system description clearly describes the existing systems and designated connection points as applicable, and any other information needed for the Contractor to understand the existing system and how the new project will connect to it.  
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This project includes the construction of buildings and structures as listed below. Refer to site plans for building locations.

[ ]

[Demolish the existing [ ] system [and provide new [ ].]

Provide an interior electrical system consisting of [Service Entrance Wiring and Equipment,] [Distribution and Lighting Panelboards,] [Dry Type Transformers,] [Conduits,] [Feeder and Branch Circuits,] [Motor Control Equipment,] [Lighting and Branch Wiring,] [Communications, Security and Alarm Systems,] [Emergency Generator], [Emergency Lighting and Power,] [Grounding,] [Lightning Protection,] [Photovoltaic Energy System,] [400-Hertz Converters], [270VDC Power Supply], [28VDC Power Supply], [UPS,] [ ] including accessories and devices as necessary and required for a complete and usable system. This section covers installations out to the building 5 foot (1.5 meter) line.

Provide each building shall have a [single] [ ] utility service with [radial] [loop] power distribution.

Select electrical characteristics of the power system to provide a safe, efficient and economical distribution of power based upon the size and types of electrical loads to be served. Use distribution and utilization voltages of the highest level that is practical for the load to be served.

Provide a minimum of [25][ ] percent spare circuit and load capacity at all levels of the power distribution system including any stand-by power systems.

Provide an interior distribution system consisting of insulated conductors in conduit.

**GENERAL SYSTEM REQUIREMENTS**  
Provide an Electrical System complete in place, tested and approved, as specified throughout this RFP, as needed for a complete, usable and proper installation. Install all equipment per the criteria of PTS Section D50 and the manufacturer's recommendations. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

This section of the RFP includes all electrical work on or within the building out to the five (5) foot line. Electrical site work outside the five (5) foot line is covered in section G40.

SUSTAINABILITY  
Provide electrical systems and components that support project sustainability and energy goals.

ANTITERRORISM  
Provide bracing of electrical equipment which is suspended and weighs more than 31 pounds.

SEISMIC BRACING  
Bracing of electrical equipment to resist seismic events [is] [is not] required based on site seismic design criteria and building importance factor.

ELECTRICAL TESTING  
Test new electrical equipment in accordance with NETA acceptance testing specifications. Test existing electrical equipment remaining in service in accordance with NETA maintenance testing specifications.

COMMISSIONING  
Commission all systems in accordance with RFP Part 3, Chapter 2; *Part 2*Section 01 91 00.15 *Building Commissioning*, Section 01 33 29, *Sustainability Requirements and Reporting* and UFC 1-200-02, *High Performance and Sustainable Building Requirements*.

[special instructions]

[GOVERNMENT FURNISHED [Government Installed] EQUIPMENT

Rough-in and provide connections for Government furnished equipment such that the equipment will operate as intended. Provide any and all required miscellaneous items such as disconnect switches, receptacles, plugs, cord, cable, conduit and fittings, or boxes. Before beginning installation of rough-in for Government furnished equipment the Contractor ;must confirm with the Government the required power characteristics of each item to be supplied by the Government. The following systems and equipment will be furnished, [installed], [and tested] by the Government:

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NOTE: Requirements for Government Furnished Equipment (GFE) are provided in ESR E10, Equipment.  
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**D5010 ELECTRICAL SERVICE AND DISTRIBUTION**

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NOTE: Typically, the scope of design build projects covered by this specification will limit the voltage in a facility to 480 volts maximum. All medium voltage work will generally be exterior to the facility and will be covered in ESR G40.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**D501001 MAIN TRANSFORMERS**

Main transformer(s) are defined in Section G40, *Site Electrical Utilities*.

**D501002 SERVICE ENTRANCE EQUIPMENT**

Provide underground service into the facility.

[Provide a service entrance rated [switchgear] [switchboard] [main distribution panel] as service equipment. [Provide each [switchgear] [switchboard] with digital metering.] Provide Transient Voltage Surge Suppression (TVSS) at the service equipment.]

[Provide energy usage monitoring by using digital metering with current transformers on the incoming service equipment. Monitor the total power usage at the service entrance. Monitored output must report to and be compatible with the Direct Digital Controls (DDC) system.]

**D501003 INTERIOR DISTRIBUTION TRANSFORMERS**

[Provide dry type transformers to step down voltages for general purpose outlets and other low voltage equipment.]

**D501004 PANELBOARDS**

[Provide distribution and branch circuit panelboards to serve loads as required.] Panelboards must be of sufficient ampacity to serve the designed loads plus a minimum of 10 percent additional ampacity to provide for future growth. [Provide panels supplying sensitive electronic loads (i.e. server/LAN rooms, computer labs, telecom rooms) with Transient Voltage Surge Suppression.] [Provide separate dedicated panelboards to serve each separate user area. [All of the space identified to be associated with a particular squadron must be considered a separate user area.]] [Except as specifically noted otherwise, feed loads located in the 01 space from panelboards located in the 01 space; feed loads located in the 02 space from panelboards located in the 02 space; feed loads located in the OH space from panelboards located in the OH space; feed loads located in the shops areas from panelboards dedicated to feed the shop only.] ]. [Panelboards located in the OH space must be rated NEMA 250 Type [4X for hangars subject to be used for airplane washdown] [1].

**D501005 ENCLOSED CIRCUIT BREAKERS**

[Provide enclosed circuit breakers for [ ] as required.]

**D501006 MOTOR CONTROL CENTERS**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Thoroughly coordinate this section with the mechanical design requirements. Delete all paragraphs that do not apply.  
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Provide [motor control centers] [individual motor starters with disconnect switches] [combination motor starters] [variable speed drives] [variable frequency drives] [reduced voltage controllers] [manual motor starters] for motor controls as required by mechanical equipment. Provide all circuits and connections for motor [ ]. The Contractor must determine whether or not to combine required devices in motor control center(s).

**D501090 OTHER SERVICE AND DISTRIBUTION**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Determine if surge protective devices (SPD) are required for switchgear, switchboards, or panelboards.  
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[Provide transient voltage surge protective devices (SPD) at the following locations [service entrance] [ ]].

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NOTE: Busway is generally reserved for power systems that require constant rearrangement such as machine shops and are typically not used. Delete when not required.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

Provide an interior distribution system consisting of insulated conductors in conduit so as to supply the required power to all lighting, convenience outlets, equipment connections and or special systems associated with the project. Provide connections for all equipment, plumbing systems, air conditioning and ventilation systems, fire alarm system, cable TV (CATV) systems, and security systems, provided by other trades.

[The use of Busway is at the discretion of the Designer of Record.]

**D5020 LIGHTING AND BRANCH WIRING**

Provide electrical connections for all systems requiring electrical service.

Provide lighting and general purpose receptacles throughout all spaces as required.

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Edit to identify project specific special outlets required. Include amp and voltage requirements as appropriate.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

Provide dedicated circuits and connections for the following special outlets: [ ].

[In addition to the standard requirements of receptacles and data outlets for conference/ward rooms, provide a floor mounted receptacle/data outlet assembly under the conference/ward room table in each conference/ward room.] [With respect to systems furniture provide [ ].] [With respect to each NMCI [telecommunication] room provide [ ].]

**D502001 BRANCH WIRING**

Provide branch wiring consisting of [insulated conductors in conduit]. Homeruns may have no more than three phase conductors. [The sharing of neutral conductors between phases is not allowed on non-linear loads (i.e. computers, electronic ballasts,)]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Insert requirement for specific branch circuit types and quantities for specific areas in this section.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**D502002 LIGHTING EQUIPMENT**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Editor fill out room data sheets with lighting requirements for each area.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide a complete lighting system consisting of exit and emergency lighting and area lighting consisting of [LED][fluorescent] [high intensity discharge] lighting including switches and automatic controls including [occupancy sensors,] [vacancy sensors,][daylighting controls,] [automatic lighting shutoff systems] and [dimming systems].] Lighting systems must comply with the most recent publication of ASHRAE/IESNA 90.1 and federal energy management requirements] [Generally, life safety illumination must be accomplished with area fluorescent fixtures supplied from a source backed-up by an onsite generator, except that electrical, mechanical, telecommunication, and server/LAN rooms must be illuminated with internal battery backed-up fixtures, supplied from a source backed-up by an onsite generator.]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Insert requirements for specific lighting types, controls, or levels for specific areas in this space, for example- requirement for fixtures mounted to illuminate the bottom of specific types of aircraft.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**D5030 COMMUNICATIONS AND SECURITY**

The Room Requirements Section identifies locations for communications and security systems and equipment, unless noted otherwise in the following sub-elements.

**D503001 TELECOMMUNICATIONS SYSTEMS**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Edit the following to meet the base and or activity requirements. Include Category 6 cable requirement here. This coordinates with the latest guidance indicated in UFC 3-580-01 and will override the conflict in UFC 3-580-10 that required Category 5E cable.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

Provide a complete building entrance facility, backbone distribution system, and horizontal distribution system including, but not necessarily limited to, all [wiring,] [pathway systems,] [grounding,] [backboards,] [connector blocks,] [protectors for all copper service entrance pairs,] [patch panels,] [fiber optic distribution panels,] [terminators for all fiber optic cables,] [outlet boxes,] [telephone jacks,] [data jacks] [cover plates] and [ ].

Provide Category 6 Unshielded Twisted Pair (UTP) copper cable for horizontal voice and data cables.

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Secret Internet Protocol Router Network (SIPRNET) and other protocols are used to transmit unencrypted classified information. SIPRNET outlets can only be provided in controlled access areas (CAA) as defined by IA PUB-5239-22, Information Assurance Protected Distribution System (PDS) Guidebook, which is issued "For Official Use Only".  
  
Guidance for designing a Protected Distribution System (PDS) is described in UFC 3-580-10, Appendix E. The PDS is used to protect the media transporting the unencrypted classified information, and is required for any media transporting unencrypted classified information that leaves the perimeter of the CAA. Determine if a PDS is required for the project and indicate SIPRNET outlet requirements either in the Room Requirements section of the RFP or in the paragraph below, but not in both locations.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Secret Internet Protocol Router Network (SIPRNET) is a project requirement. Provide a Protected Distribution System (PDS) as required. Provide outlets in accordance with [the Room Requirements.][in the following rooms:

[\_\_\_\_]

[\_\_\_\_].]

**D503002 PUBLIC ADDRESS SYSTEMS**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: The Public Address System and the Intercommunications system may generally be combined into one system and utilize the telephone system and desktop phones for all communications. Coordinate and verify with user if this is a suitable system for mission accomplishment. Coordinate locations with user for microphone and aux input jacks within the hangar. If multiple occupants (squadrons), provide additional microphone locations accordingly.   
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

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NOTE: For single occupant (squadron) hangars, utilize the following:  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide speakers in all interior areas, spaces, and rooms as required for system intelligibility given average ambient sound levels in the given area, space, or room. Provide recessed ceiling mounted speakers in all areas, spaces, and rooms with finished ceilings. Provide surface mounted paging horns in all areas, spaces, and rooms (minus the hangar) in which finished ceilings are not provided.]

[Speakers within the hangar space must be flat panel technology based and powered via amplifier(s) installed within a dedicated amplifier rack. Provide quantity and spacing of units per manufacturer recommendations for complete coverage.]

[Provide exterior rated loudspeakers to provide sound to the surrounding parking apron.]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: For multiple occupant (squadron) hangars, utilize the following:  
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[Provide separate paging speaker systems in each separate user area hangar space.]

[Speakers within the hangar space must be flat panel technology based and powered via amplifier(s) installed within a dedicated amplifier rack. Provide quantity and spacing of units per manufacturer recommendations for complete coverage.]

[Provide exterior rated loudspeakers to provide sound to the surrounding parking apron.]

[Provide a Public Address system with speakers in all [common spaces] [exterior speakers for outside activity spaces] [ ].

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NOTE: Include bracketed option when project involves hangar or large, open work spaces.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[In [hangar] [ ] spaces, provide handset type microphone dedicated to speakers in the [hangar] [ ] space only. ]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Include the following option when project requires a mass notification system and combining the two systems is feasible.  
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[Interface the Public Address System with the Mass Notification System.]

**D503003 INTERCOMMUNICATIONS SYSTEMS**

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NOTE: The Public Address System and the Intercommunications system may generally be combined into one and utilize the telephone system and desktop phones for all communications. Coordinate and verify with user if this is a suitable system for mission accomplishment. When project involves hangar space and maintenance shops, include separate Maintenance Control Intercom system. Pay particular attention to the size of the room where the stations will be installed, ensuring adequate sound from the station's speakers. If this is not sufficient for larger spaces, consider multiple stations or interface into room's speakers. Provide volume controls in locations where this is done.   
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide an Intercommunication System to allow two-way communications between all hangar [office spaces], [locker rooms], [storage areas], [Department Heads], [Commanding Officer], [Executive Officer], [Officers Ready Rooms], [Maintenance Control Rooms], [Administration Offices and Maintenance Administration Offices], [ ].]

[Provide a separate stand-alone intercommunications system with individual two-way connections between the Maintenance Control Office and each shop space. This system must be completely independent from the telephone system.]

**D503004 TELEVISION SYSTEMS**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: CATV for training is typically required in facilities where classrooms and training takes place. Coordinate requirements with the using activity. Delete this paragraph when not required. CCTV Systems are generally provided with empty raceways only. If complete system is required, this section and PTS D50 will require extensive modifications.  
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[Provide a CCTV system for training purposes including, but not necessarily limited to, cable supporting structures, including equipment racks, empty conduits with pull strings, junction boxes, outlet boxes, outlet connectors, and cover plates.]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Coordinate locations with the using activity and edit accordingly.  
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[Provide [ ] CCTV outlets.]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Community Antenna Television Systems (CATV) are generally referred to as Cable TV. The service provider may not, however, be a traditional cable company. Therefore, it will need to be determined whether the provider will have special requirements such as a pathway to the roof for a satellite dish, fiber optic interconnections, etc. Determine if there will be a CATV system that is not owned and maintained by the Government.   
   
If the system will not be owned by the government, specify the requirements for empty raceways and outlet boxes to enable system installation by the commercial CATV supplier.  
   
If the system will be owned by the government, specify a complete system. Include backbone consisting of backboards/cabinets, wire, conduit, outlets and jacks in all offices. Include jacks in other locations as required by the user.  
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[Provide a CATV system consisting of empty raceways and outlet boxes to enable system installation by the commercial CATV supplier.]

[Provide a complete CATV system to be owned and maintained by the Government including all interior equipment required to provide high quality TV signals to all outlets with a return path for interactive television and cable modem access. System must include, but is not necessarily limited to, [headend amplifier,] amplifiers, splitters, combiners, line taps, cables, outlets, tilt compensators and all other parts, components, and equipment necessary to provide a complete and usable system. ]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Coordinate locations with the using activity and edit accordingly.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide CATV outlets in [ ].] [Provide calculations within submittals with anticipated dB levels at all TV locations.]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Specify CATV testing method to ensure that the RFP is complete.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

Conduct CATV testing at each of the following points in the system:

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Use option for testing at each outlet instead of random sampling and at the furthest outlet when project includes only a small number of outlets.  
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Furthest outlet from [each communications closet] [service entrance point of connection]  
A random sampling of 25 percent of the [outlets [from each communication closet] [housing units] as designated by the Contracting Officer.  
[At each outlet.]  
[Distribution amplifier inputs and outputs.]

**D503005 SECURITY SYSTEMS**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: NAVFAC's goal, is to fully integrate the design, procurement, installation and testing of ESS into Navy MCON design and construction contracts. Include ESS supporting infrastructure in the base construction contract and include the procurement, installation, and testing as an option.  
  
For Marine Corps projects, provide infrastructure support only. Coordination with Commandant Marine Corps (CMC) is required. Marine Corps considers Mass Notification Systems (MNS) to be a component of the ESS; MNS are included in D40, *Fire Protection.***

**If an ESS is required, coordinate requirements with Project Manager, Base/Regional Security Personnel, and the Accrediting Official. Baseline ESS requirements must be coordinated and defined by the RFP writer and not left to the design builder.**

**ESS is typically provided for the protection of designated assets. Use the following for guidance as applicable:**

**• SCIF: use bracketed option referring to Intelligence Community Standard (ICS) Number 705-1**

**• Secret, Top secret, or controlled access areas (CAA): use bracketed option for SECNAV M-5510.36 Department of Navy *Information Security Program***

**• Arms, ammunition, and explosives (arms rooms, Armories, and magazines): use bracketed option for OPNAV Instruction 5530.13C *Department of the Navy Physical Security Instruction for Conventional Arms, Ammunition, and Explosives***

**• SAPF: use bracketed option for JAFAN 6/9 Manual *Physical Security Standards for Special Access Program Facilities***

**If drawings are provided as part of the RFP, indicate the perimeters of the areas to be protected. If there is more than one area or type of area to be protected, separately identify each area. In addition, indicate in the Room Requirements section of RFP the rooms/areas/locations that require:**

**• Protection by IDS**

**• Access control**

**• Duress alarm**

**• CCTV coverage**

**NOTE: Do not identify "SCIF" in RFP or construction drawings. With accrediting official's approval, areas may be identified as "secure area".**

**The following is provided for guidance only and must be edited as applicable for each project.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

An Electronic Security System (ESS) is the integrated electronic system that encompasses one or more of the following subsystems; access control system (ACS), intrusion detection system (IDS), and closed circuit television (CCTV) systems for assessment of alarm conditions.

Provide the ESS for this project in accordance with the requirements of UFC 4-021-02, *Electronic Security Systems*, consisting of [an ACS] [and] [an IDS] [and] [a CCTV system for alarm assessment].

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: If the ESS equipment will be provided by others, specify the requirements for empty raceways and outlet boxes to enable system installation by the ESS supplier.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide an ESS consisting of empty raceways with pull strings, outlet boxes, cover plates, and associated power outlets to enable system installation by the ESS supplier.]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: If the system is provided under this contract, specify a complete system that includes equipment and supporting infrastructure as required.  
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[Provide an electronic security system (ESS) including equipment and supporting infrastructure complete, tested, and operational. ESS must be compatible with the Installation's central monitoring system and monitored [within the protected zone/area] [and] [at the Installation central monitoring station].

[Provide an ACS utilizing [credential devices] [coded devices] [and] [biometric devices] to monitor and control personnel movement through and within [protected areas][ the facility.] The ACS must log and archive all transactions and alert authorities of unauthorized entry attempts. [ACS must be interfaced with the CCTV system to archive unauthorized entry attempts and assist security personnel in the assessment of unauthorized entry attempts].]

[Provide an IDS to detect intruders or unauthorized personnel in protected areas/zones. Provide point sensors on all windows, doors, and man passable openings. Provide volumetric sensors within protected areas/zones to detect movement within protected areas/zones. System must annunciate [, print,] and archive alarm conditions [within the facility] [and] [at central monitoring station].]

[Provide an [interior] [and] [exterior] CCTV system consisting of devices to provide visual assessment and digital archiving of alarm conditions. Features must include interface to ESS for control of camera call up to video monitors [, pan-tilt-zoom camera control,] and digital video archiving based on alarm event triggers. Video archiving capacity must be a minimum of [30] [ ] days. [Integration must provide means to associate archived alarm events with recorded video at the [ ] location(s).] ]

**D503006 INDUSTRIAL CONTROL SYSTEMS (ICS)**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Edit the following to meet the base and activity requirements.  
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[Provide an Industrial Control System (ICS) distribution system, and horizontal distribution system including, but not necessarily limited to, equipment racks, all [wiring,] [pathway systems,] [grounding,] [backboards,] [connector blocks,] [protectors for all copper service entrance pairs,] [patch panels,] [fiber optic distribution panels,] [terminators for all fiber optic cables,] [outlet boxes,] [data jacks] [cover plates] and [ ].

[The ICS Equipment Rack must be 84-inches (2100mm) [ ]high[, double compartment with two doors, separately keyed with vertical locking mechanism].]

Provide [Category 6 Unshielded Twisted Pair (UTP) copper cable] [[ ] strand single mode fiber optic cable] for horizontal ICS distribution system data cables.

Provide horizontal distribution system from the Telecommunications Room to the following facility control systems[, through the patch panel in the Mechanical Room]:

[HVAC Direct Digital Controls (DDC)]

[Lighting Control System]

[\_\_\_\_]

**D503090 OTHER COMMUNICATIONS AND ALARM SYSTEMS**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Mass Notification Systems are included in D40, *Fire Protection*. RFP writer is encouraged to contact the base Safety Officer to determine whether any base standards have been adopted (i.e. giant voice, combination fire alarm systems, combination notification devices, lighted signs at exits, etc.).  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**D5090 OTHER ELECTRICAL SERVICES**

**D509001 GENERAL CONSTRUCTION ITEMS (ELECTRICAL)**

Provide General Construction Items (Electrical) including, but not necessarily limited to, all connections, fittings, boxes and associated equipment needed by this and other sections of this RFP as required for a complete and usable system.

Provide firestopping for conduits, cable trays and busways that penetrate fire-rated walls, fire-rated partitions, or fire-rated floors in accordance with Section C10, Interior Construction.

**D509002 EMERGENCY LIGHTING AND POWER**

[Provide power and wiring for emergency lights and exit lights throughout the facility.]

[In finished space, use battery supported emergency ballasts in conjunction with normal lighting fixtures for emergency lighting.]

[In non finished spaces, use stand alone emergency lighting units for emergency lighting.]

[Provide emergency lighting units with self testing and diagnostic control features.]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Edit the following as applicable when more than one emergency circuit is required. Identify circuits requiring emergency power (e.g., FACP, ESS). Include voltage and amp requirements.  
  
Differentiate between loads requiring Emergency Power, Legally Required Standby Power, Optional Standby Power and Critical Power as each of these power types are treated differently in codes and standards.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide dedicated emergency power for the following loads:

[ ], [ ], [ ], [ ], [ ]]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Emergency generators should be limited to small packaged units based on scope of design build facilities addressed by this RFP. Large systems and paralleling schemes do not fall under the scope of the typical Design Build scenario. Determine when and if generator power is required and edit accordingly. Do not size the generator but rather provide loads and voltages of dedicated equipment or circuits. Delete when not applicable.  
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[Provide an emergency generator for power for the following loads and equipment: [ ], [ ], [ ]. The generator must provide [ ] [minutes] [hours] [days] of emergency power.]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: For projects in California requiring emergency diesel generators add the following.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Diesel fuel engines greater than 50 break horsepower (bhp) must comply with the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition (CI) Engines (17CCR 93115) adopted by the California Air Resource Board (CARB). For additional information go to <http:www.sdapcd.org> .]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Uninterruptible Power Supply (UPS) generally is not provided under construction but when required by the Activity should be provided for critical loads only and be limited to small (15-50 kVA) stand alone units based on scope of design build facilities addressed by this RFP. Large systems, paralleling schemes, and redundant systems typically do not fall under the scope of the Design Build scenario. Small, individual, under desk type units are typically provided by the Government as collateral equipment and are not part of construction dollars. Determine when and if UPS power is required and edit accordingly. When complex systems are required, this section requires extensive modifications. Coordinate this section with the emergency generator section when both are required. Delete when not applicable.  
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[Provide Uninterruptible Power Supply (UPS) power for the following critical loads and equipment:

[ ], [ ], [ ]. The UPS system must provide [ ] minutes of emergency power to allow [startup and connection of the emergency generator] [an orderly shutdown of the critical loads].]

**D509003 GROUNDING SYSTEMS**

Provide a complete grounding system for the facility electrical and telecommunications systems.

As a minimum, provide a 2" tall X 1/4" thick copper ground bus, installed on insulated stand-offs, around the perimeter of the communication entrance facility and each telecommunication room in the facility.]

[As a minimum, provide a 2" tall X 1/4" thick copper ground bus, installed on insulated stand-offs, at locations in the shops at locations as required by the users.]

[Provide an aircraft static grounding system in the OH spaces. [Coordinate the location of the grounding points with the aircraft to be served by the hangar.]]

**D509004 LIGHTNING PROTECTION**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: RFP writer must make preliminary determination if a lightning protection system is required in accordance with UFC 3-575-01, *Lightning and Static Electricity Protection*. A "UL Lightning Protection Inspection Certificate certified to NFPA 780" is now required in lieu of a “UL Master Label” when a system is provided.   
   
Include the bracketed option(s) when additional buildings or systems will require work in order to qualify for the Certificate. Delete when not required.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Design and install a complete lightning protection system in accordance with UFC 3-575-01, *Lightning and Static Electricity Protection System*, with a UL Lightning Protection Inspection Certificate certified to NFPA 780, including, but not necessarily limited to, strike termination devices, conductors, ground terminals, interconnecting conductors, surge protective devices, and other connectors and fittings required for a complete and usable system.]

[Work includes necessary modifications to the existing lightning protection system on [ ] such that the entire system meets the UL Lightning Protection Inspection Certificate certified to NFPA 780.] [Work includes installation of a complete lightning protection system on [ ] such that the entire system meets the UL Lightning Protection Inspection Certificate certified to NFPA 780.]

[Lightning Protection Systems must not void the roof warranty.]

**D509005 ELECTRIC HEATING**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Electric heating systems are generally sized and rated by the mechanical designers. Coordinate with mechanical and specifically point out any proposed large electric heating loads.  
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[Provide power wiring and connections as required for all electric heating systems and equipment.]

**D509006 ENERGY MANAGEMENT CONTROL SYSTEM**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Energy management typically is covered in detail in the mechanical sections. Coordinate with mechanical and ensure that all power requirements are accounted for.  
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[Provide power wiring and connections as required for all systems and equipment including [ ]. Coordinate connection requirements with service entrance energy monitoring equipment.]

**D509007 PHOTOVOLTAIC ENERGY SYSTEM**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Consider roof mounted crystalline panel Photovoltaic Energy Systems for all buildings with clearance from shading, appropriate roof orientation, and roof area availability. Roof availability must consider other roof mounted systems which could include Solar Domestic Hot Water System (SDHWS), HVAC equipment, personnel access paths, and standoffs from the roof edge. Roof availability may be less than 80 percent. Consider electrical room space for inverters, and other equipment.  
  
Verify building and roof structural capacity to support crystalline panels for existing buildings. Coordinate crystalline panel support with structural engineering for new construction. Coordinate with roofing requirements covered in Section B30 and UFC 3-110-03 Roofing.  
  
 Verify that a life cycle cost analysis (LCCA) has been performed per UFC 1-200-02, by planning or otherwise perform a LCCA before design start. Perform an analysis for your project using "PVWatts" at** [**http://rredc.nrel.gov/solar/codes algs/PVWATTS/version2/**](http://rredc.nrel.gov/solar/codes%20algs/PVWATTS/version2/) **. Locally verify and apply for incentives, where applicable. Incentives may be found at** [**www.dsireusa.org**](http://www.dsireusa.org/) **. Purchased electrical utility rates may be found at** [**https://navyenergy.navfac.navy.mil/duers/index.html**](https://navyenergy.navfac.navy.mil/duers/index.html) **. EAR 16 Activity Detail Report contains the blended purchase price.   
  
Coordinate special requirements for metering with Activity and add appropriate information on existing and planned systems.  
  
Size Photovoltaic System, verify size specified will physically fit available space.  
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide a roof mounted, grid connected, photovoltaic energy system including crystalline photovoltaic panels, inverters, combiner boxes, and support systems. System inverters must have an output of [480Y/277v] [208Y/120v] [240/120v] [ ] and a minimum aggregate capacity of [ ]kw.

Provide KWH meters that are compatible to [the existing base AMI system].

**D509090 OTHER SPECIAL SYSTEMS AND DEVICES**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: 400-Hertz power requirements must be determined by the RFP writer based on user requirements. Aircraft power requirements have changed drastically recently (kVA and power quality requirements have generally increased) and values and requirements indicated in UFC 4-121-10N and UFC 3-555-01N may not be accurate. New aircraft may contain an individual power monitor that disconnects the aircraft from ground power when voltages exceed very specific requirements and the trend is to provide individual stand-alone units per each aircraft in lieu of the original distribution system as called for in the UFCs. Several new aircraft (E2C Hawkeye 2000 for instance) now also require two separate power sources due to the power monitor requirements. RFP writer must include specific equipment requirements including number of units, kVA, requirements, etc.  
   
Provide solid state frequency converters (UFGS Section 26 35 43) for most projects.   
\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

[Provide solid state frequency converter(s).]

[Provide 400 hertz power wiring and connections for the following loads and equipment:

[ ], [ ], [ ]. [400 Hz units located in the OH space shall be NEMA 250 Type 4X rated for [direct spray in hangars subject to be used for airplane washdown] [ ].] [400 Hz power shall be supplied from stand alone units at each location.]]

[Provide 270 VDC power wiring and connections for the following loads and equipment:

[ ], [ ], [ ]. [270 VDC units located in the OH space shall be NEMA 250 Type 4X rated for [direct spray in hangars subject to be used for airplane washdown] [ ].] [270 VDC power shall be supplied from stand alone units at each location.]]

[Provide 28 VDC power wiring and connections for the following loads and equipment:

[ ], [ ], [ ]. [28 VDC units located in the OH space shall be NEMA 250 Type 4X rated for [direct spray in hangars subject to be used for airplane washdown] [ ].] [28 VDC power shall be supplied from stand alone units at each location.]]

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*   
NOTE: Provide descriptions below for any other special systems required in the project.  
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[Provide power wiring and connections for the following special systems:

[ ], [ ].]

--End of Section--