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**STATEMENT OF WORK  
FOR  
TECHNOLOGY REFRESH OF THE POWER ELEMENT COMPONENT (PEC), PHASE II  
OF THE NATIONAL TRAINING CENTER – INSTRUMENTATION SYSTEM (NTC-IS)**

**1.0 SCOPE**

This Statement of Work (SOW) defines the effort required for the technology refresh of generators and automatic transfer switches at Tiefert Mountain, Granite Mountain, National Aeronautics and Space Administration (NASA) facility, Field Support Site (FSS) facility, and at the seven Fiber Optic Network (FON) terminus shelters. This equipment is part of the Power Element Component (PEC) of the National Training Center – Instrumentation System (NTC-IS).

**2.0 EXISTING SYSTEM**

**2.1 Tiefert and Granite Mountains Generators and Automatic Transfer Switches (ATS)**

The Tiefert and Granite Mountains, 100 KW diesel generators and ATS; 400 Amp, 3 phase, 208 Volts were initially installed in 1996. These diesel generators and ATS are no longer supported by their respective vendors and have reached end of life. The diesel generators and ATS provide power to the Tiefert Mountain, Granite Mountain facilities.

**2.2 NASA Facility Generator and ATS**

The NASA facility, 20 KW diesel generator and ATS; 100 Amp, 1 phase, 240 Volts were initially installed in 1996. This diesel generator and ATS are no longer supported by their respective vendors and have reached end of life. The diesel generators and ATS provide power to the NASA facility.

**2.3 FSS Facility Generators and ATS**

The FSS facility, 220 KW diesel generators and ATS; 600 Amp, 3 phase, 480 Volts were initially installed in 2009. On 18 March 2015, the Mojave Desert Air Quality Management District (AQMD) denied a permit modification to add diesel particulate filters to the existing diesel generators. The letter stated that the permit modification requests are hereby denied. The engines remain non-compliant with the State of California's Airborne Toxic Control Measure for Stationary Compression Ignition Engines, 17 CCR 93115 and cannot be operated as prime use stationary engines within the District. Based upon the Mojave Desert AQMD finding, the generators can no longer be operated. The diesel generators and ATS provide power to the FSS Facility.

## 2.4 FON Terminus Shelters Generator and ATS

The FON terminus shelters are located at the following seven (7) locations:

Terminus Shelter	GRID
Bldg. 987	NV285012
Four Corners	NV370120
Tiefert City	NV435110
C2 Live Fire	NV485265
El Grazio	NV572042
Pioneer	NV130195
Eastern Expansion	NV752146

The FON terminus shelters, 35 KW diesel generators and ATS; 100 Amp, 3 phase, 208 Volts, respectively, were initially installed in 2006. These diesel generators and transfer switches are no longer supported by their respective vendors and have reached end of life. The diesel generators and transfer switches support all power sensitive fiber networks Head-In equipment within the terminus shelter that provides fiber connectivity throughout the NTC down range instrumentation system.

## 3.0 REQUIREMENT

The contractor shall provide all required software and hardware, installation, and configuration efforts for the replacement of the existing generators and ATS at Tiefort Mountain, Granite Mountain, NASA facility, FSS facility, and at the seven (7) Fiber Optic Network (FON) terminus shelters. Prior to purchasing the equipment, the contractor shall complete the System Verification Review. Government approval is required prior to ordering any equipment.

**All generators shall meet the State of California's emission control standards.**

The project actions associated with this effort cannot interfere with NTC training; therefore, the contractor shall consider the impact of having to work around the training rotation schedule and the limited availability of NTC assets to support this project when preparing the technical approach.

### 3.1 Tiefort and Granite Mountains Generators and ATS

The contractor shall perform technology refresh of the indoor, standby, diesel generators and ATS for Tiefort and Granite Mountains. The replacement generators and ATS, one at each mountain, shall meet the requirements listed in Table 1:

**Table 1: Tiefert and Granite Mountains Generator and ATS**

<b>Component</b>	<b>Specification</b>	<b>Quantity</b>	<b>Spare Quantity</b>	<b>Total Quantity</b>
Diesel Generator	100 KW Prime, 3 Phase 120V/208 60Hz Diesel	2	0	2
Automatic Transfer Switch	400 Amp, 3 Phase and 208 Volts	2	0	2

### 3.2 NASA Facility Generator and ATS

The contractor shall perform technology refresh of the outdoor diesel generator and ATS for the NASA facility. The replacement generator and ATS, shall meet the requirements listed in Table 2:

**Table 2: NASA Facility Generator and ATS**

<b>Component</b>	<b>Specification</b>	<b>Quantity</b>	<b>Spare Quantity</b>	<b>Total Quantity</b>
Diesel Generator	20 KW Prime, 3 Phase 120V/240 60Hz Diesel	1	0	1
Automatic Transfer Switch	100 Amp, 1 Phase and 240 Volts	1	0	1

### 3.3 FSS Facility Generators and ATS

The contractor shall perform technology refresh of the outdoor diesel generators and ATS for the FSS facility. The replacement generators and ATS, shall meet the requirements listed in Table 3:

**Table 3: FSS Facility Generator and ATS**

<b>Component</b>	<b>Specification</b>	<b>Quantity</b>	<b>Spare Quantity</b>	<b>Total Quantity</b>
Diesel Generator	250 KW Prime, 3 Phase 277/480V 60Hz Diesel, with 400A breaker and 500 Gallon UL listed 142 sub-base fuel tank	2	0	2
Automatic Transfer Switch	600 Amp, 3 Phase and 480 Volts	1	0	1

The contractor shall also replace two sets of four (4) 500, thousand circular mil (Kcmil) Primary feeders, one (1) 1/0 Ground and two (2) #10 Battery Charger Wires between each generator and the ATS.

**3.4 FON Terminus Shelters Generators and ATS**

The contractor shall perform technology refresh of the outdoor, standby diesel generators and ATS for the seven (7) FON Terminus Shelters at NTC. The replacement generators and ATS, one at each shelter, shall meet the requirements listed in Table 3:

**Table 3: FON Terminus Shelters Generators and Automatic Transfer Switches**

Component	Specification	Quantity	Spare Quantity	Total Quantity
Diesel Generator	35 KW (43.7 KVA) Prime, 3 Phase 120V/208 60Hz Diesel	7	0	7
Automatic Transfer Switch	100 Amp, 3 Phase and 208 Volts, 4 Pole  (Simultaneous make-before-break contactor action is used for 4-pole switches. On 4-pole/switched neutral switches).	7	0	7

**3.5 Commercial Helicopter Lift**

The contractor shall provide helicopter lift for the removal and replacement of the 100KW generator for Tiefert Mountain and the 20KW generator for the NASA facility, because these sites are inaccessible by road. The lifts shall be from NTC cantonment to the designated sites. The contractor shall provide two helicopter lifts, one for the 100KW generator to Tiefert Mountain and another for the 20KW generator to the NASA facility. The contractor shall provide two additional helicopter lifts to remove the existing generators from Tiefert Mountain and the NASA facility.

**3.6 Program Management**

The contractor shall maintain program management and administrative support to ensure the requirements of this SOW are successfully implemented. The contractor shall provide a monthly status report regarding program status and accomplishments, upcoming activities, identified issues and their planned or actual resolution, a top level program schedule or any other items that should be brought to Government attention.

DI-MGMT-80227 Contractor's Progress Status and Management Report

### 3.6.1 Integrated Master Schedule (IMS)

The Contractor shall develop, implement, manage, update, and maintain the contract IMS no later than System Verification Review. All contract schedule information delivered or presented at program reviews shall originate from the IMS and shall contain all critical events and exit criteria, accomplishments, predecessor and successor events, and their dependencies. The IMS shall address total program activities including activities performed by major subcontractors. The Contractor shall develop an IMS that accurately portrays the sequence and relationship of activities defining the total program. The IMS shall be implemented on a computer based program management control system which utilizes critical path method network analysis, accepts parametric data input, and can be utilized to determine a probabilistic estimate of the program schedules for reporting project progress. The network activities time data shall be updated to reflect accomplished activities and any changes in activity time estimates. The Contractor shall conduct critical path analysis of the tasks and identify problem areas and corrective actions required to eliminate or reduce schedule impacts.

DI-MGMT-81861 Integrated Program Management Report (IPMR): IMS only

### 3.7 System Verification Review (SVR)

The contractor shall perform a System Verification Review (SVR) to ensure that the system can proceed into procurement and deployment within cost, schedule, risk, and other system constraints. The SVR will assess the system functionality, and determine if the system meets the functional requirements of the existing system. The SVR will establish and verify the final product performance. The results of the SVR for the Generators and Automatic Transfer replacement shall be documented in the meeting minutes. Attendees for the SVR, at a minimum, shall include the contractor, any subcontractors, and the Government (both NTC and PEO STRI). The purpose of the SVR is to present the following:

The SVR shall include:

- a. Results of internal technical design reviews.
- b. Results of site surveys.
- c. Results of technical interchange meetings (local and remote).
- d. Required software integration/modification, if software is required.
- e. Review of System Documentation specified for delivery.
- f. Results of the logistics support analysis.
- g. A schedule and inventory of all equipment being decommissioned and disposed of.
- h. A list of the proposed replacement equipment to include: Manufacturer, Manufacturer Part Number, Nomenclature, Quantity, and a brief description of proposed equipment.

The SVR shall ensure:

- a. Each subcomponent is sufficiently mature to meet Technology Readiness Level 9.
- b. The program schedule is executable within the anticipated cost and technical risks.
- c. Program risks are known and manageable.
- d. Electrical Design satisfies electrical design standards, best practices, and safety requirements.
- e. Design documentation reflects that the system requirements are understood.
- f. Component selections versus logistical tradeoffs have been conducted, to include results of the logistics support analysis.
- g. Life Cycle Cost estimates has been addressed to the maximum extent possible for a Final Design.
- h. The program is properly staffed.
- i. Procurement processes are in place to procure component hardware and software (if applicable).

### **3.8 Safety Assessment and Health Hazard Analysis**

The contractor shall ensure that the Tiefert and Granite Mountains, NASA facility, FSS facility and the seven Fiber Optic Network (FON) terminus shelters technology refresh components are safe for personnel to transport, install, operate, maintain, support and dispose of. The contractor shall identify hazards, assess the risk, track hazards, mitigate hazards, verify corrective actions have been implemented and verify hazards have been eliminated or reduced to acceptable risk levels.

DI-SAFT-80102B Safety Assessment Report (SAR)

### **3.9 Operator and Maintenance Manuals**

The contractor shall supply Commercial Off-the-Shelf (COTS) Operator's Manuals that provide instructions suitable for use by the intended audience of the systems. The COTS Operator's Manual shall also include operator maintenance tasks such as preventive maintenance checks and services, inspection, lubrication, adjustment, and operator level repair and replacement tasks as needed. The contractor shall supply COTS Maintenance Manuals that identify and document maintenance tasks to maintain the systems in an operational condition. The COTS Maintenance Manuals shall identify all required spare parts, consumables, tools, and test/support equipment associated with each task and identify the level of maintenance at which each task shall be performed. The contractor shall prepare supplemental data in accordance with MIL-PRF-32216A evaluation forms. MIL-PRF-32216 Appendix A, B, and C will be used for the evaluation of all COTS OEM documentation. The contractor shall compile a soft copy of all COTS Operation, Installation, and Maintenance Manuals and provide on CD or DVD. A hard copy of all COTS Operation, Installation and Maintenance Manuals shall be placed in tabbed binders with table of contents, indexed if necessary.

DI-TMSS-80527C Commercial Off-the-Shelf (COTS) manuals

### **3.10 Test Readiness Review (TRR)**

The contractor shall conduct a technical review to ensure the product is ready to proceed to verification and execution of the Test Procedures. The TRR will assess test objectives, test methods and procedures, scope of the test, and locations of test events. The TRR will confirm that resources are identified and coordinated. The contractor shall schedule the TRR to provide sufficient time to correct issues prior to execution of the GAT.

### **3.11 Government Acceptance Testing (GAT)**

The contractor shall conduct a Government-witnessed acceptance test of the technology refresh systems installed at the NTC Tiefert Mountain, Granite Mountain, NASA facility, FSS facility and the seven Fiber Optic Network (FON) terminus shelters to verify that the delivered capability meets the technology refresh requirements for the respective sites. The contractor shall develop test procedures for the GAT, which shall be approved by the Government prior to beginning government acceptance testing. The contractor shall document the results of the GAT in a test report.

DI-NDTI-80603A Test Procedures

DI-NDTI-80809B Test Reports

### **3.12 Physical Configuration Audit (PCA)**

After the completion of the GAT, the contractor shall plan and conduct a PCA to inventory the system equipment with the PM CTIS Government representative and NTC Property Book Representative. The

PCA shall also include a review of a representative number of drawings from the Commercial Drawings/Models and Associated Lists, associated commercial manuals, and the Item Unique Identification (IUID) tags. The review shall determine their accuracy in accordance with the final product configuration design. The results of the PCA shall be documented.

DI-MISC-80711A Scientific and Technical Reports (PCA Report)

### **3.13 Decommissioning and Disposition**

The contractor shall provide a schedule and inventory of all equipment being decommissioned and disposed of at SVR. The contractor in coordination with the Government shall coordinate the schedule and inventory with the NTC-IS Operations Group Property Book Officer for hand receipt control of property being removed.

The contractor shall decommission and dispose of the existing generators and automatic transfer switches in coordination with the PEO-STRI Customer Service Representative (CSR) per Property Disposition Orders (PDO). Removed equipment shall be stored in a secure location, tagged and marked IAW property disposition guidelines until such time as disposal. The contractor shall provide a final receipt of disposal as directed with the Property Disposition Orders prior to the end of period of performance and DD250 sign-off.

DI-ILSS-81251 Existing Equipment Inventory Report

### **3.14 Item Unique Identification (IUID) of Tangible Items**

The contractor shall coordinate with PEO STRI and identify IUID type, the IUID to be used, and items requiring IUID, including embedded subassemblies, components and parts. IUID means a set of data marked on items that is globally unique, unambiguous, and robust enough to ensure data information quality throughout life and to support multi-faceted business applications and users. The format of the IUID labels shall be IAW MIL-STD-130N. These requirements apply to developed and commercial items. The contractor shall provide unique IUID labels, or a DoD recognized IUID equivalent for all identified items delivered. The contractor shall submit required IUID data to the IUID central registry. IUID marking of items shall be both machine readable and human readable in accordance with MIL-STD-130N.

DI-MGMT-81804A Unique Identification (IUID) Marking and Verification Report

### **3.15 Warranty**

The contractor shall ensure the replacement equipment has a replacement warranty of two (2) years, at a minimum. The contractor shall provide all associated warranty information for each of the generators and automatic transfer switches of the PEC equipment to include the start and end dates of the warranty and the point of contact information for the warranty to include: name, company, telephone number, and email address.

### **3.16 Logistics Support Analysis**

#### **3.16.1 Supportability**

The contractor shall ensure supportability of the systems through planning, implementation, and verification of material and services to meet operational requirements. Readiness, availability, and supportability shall be the primary design factors. Results of the logistics support analysis shall be presented at SVR.

#### **3.16.2 Sparing**

The contractor shall provide sparing of equipment as stated on Tables 1 through 4 and any spares identified in the COTS Maintenance Manuals.

### **3.16.3 Technical Data Package (TDP)**

The contractor shall replace or update existing documentation with documentation that reflects the replaced equipment for Tiefert and Granite Mountains, NASA facility, FSS facility, FON Terminus Shelters and associated ATS. If there is no existing documentation, the contractor shall produce and maintain, for the duration of the program, a TDP that accurately and completely depicts the life cycle replaced site equipment. For all elements of this program and for modifications to commercial and non-developmental program elements, the contractor shall develop, produce, and maintain a production level TDP IAW MIL-STD-31000A that provides design, engineering, manufacturing and quality assurance requirements information sufficient to procure or manufacture an interchangeable item that duplicated the physical and performance characteristics of the original product, without additional design engineering effort or recourse to the original design activity. For existing commercial and non-developmental program elements, the contractor shall develop, produce, and maintain commercial documentation IAW MIL-STD-31000A containing the engineering, and manufacturing information necessary to assemble and integrate these items into the remote sites and verify performance. The contractor shall utilize existing commercial drawings, documentation and specifications where possible. The contractor shall verify, validate, and maintain a TDP that includes all required documents, drawings, and information required to support and maintain the Tiefert and Granite Mountains generators, NASA facility generator, FSS facility generator, FON Terminus Shelters generators and associated ATS. The TDP will include, at a minimum, the following:

1. Product Drawings and Associated Lists (PDAL) (DI-SESS-81000D)
2. Technical Data Package Index (TDP) (DI-EGDS-80918)
3. Commercial Drawings and Associated Lists (DI-SESS-81003D)
4. Logistics Product Data (DI-SESS-81758) consisting of:
  - a. LSA 080-Bill of Materials
  - b. LSA-030- Indentured Parts List
5. Logistics Product Data Summaries (DI-SESS-81759)

The TDP shall be verified, kept current, and shall be available to the Government for review at any time.

### **3.17 Contractor Training**

#### **3.17.1 AT Level I Training**

All contractor employees, to include subcontractor employees, requiring access to Army installations, facilities and controlled access areas shall complete AT Level I awareness training within 90 calendar days after contract award. The contractor shall submit certificates of completion for each affected contractor employee and subcontractor employee, to the COR or to the contracting officer, if a COR is not assigned, within 15 calendar days after completion of training by all employees and subcontractor personnel. AT Level I awareness training is available at the following website: <https://atlevel1.dtic.mil/at>.

#### **3.17.2 Access and General Protection/Security Policy and Procedures**

All contractor and all associated sub-contractors employees shall comply with applicable installation, facility and area commander installation/facility access and local security policies and procedures (provided by government representative). The contractor shall also provide all information required for background checks to meet installation access requirements to be accomplished by installation Provost Marshal Office, Director of Emergency Services or Security Office. All contractor workforces must comply with all personal identity verification requirements as directed by DOD, HQDA and/or local policy. In addition to the changes otherwise authorized by the changes clause of this contract, should the Force Protection

Condition (FPCON) at any individual facility or installation change, the Government may require changes in contractor security matters or processes.

### **3.18 Contractor Manpower Reporting Application (CMRA)**

The contractor shall report ALL contractor labor hours (including subcontractor labor hours) required for performance of services under this contract for the Power Element Technology refresh program via a secure data collection site. The contractor is required to completely fill in all required data fields using the following web address: <http://www.ecmra.mil/>. Reporting inputs will be for labor executed during the period of performance during each Government Fiscal Year (FY) which runs October 1 through 30 September. While inputs may be reported any time during the FY, all data shall be reported no later than October 31 of each calendar year. Contractors can find User Guides, Frequently Asked Questions and may direct questions to the help desk at <http://www.ecmra.mil/>.

### **3.19 Period of Performance**

The period of performance is twelve (12) months from Contract Award Date (CAD).