

STATEMENT OF WORK
Indoor Antenna Range and Radome Range Upgrade for the Fleet Readiness Center
Southeast (FRCSE)

PART 1
GENERAL INFORMATION

1. General. This is a contract to provide Indoor Antenna and Radome Range Upgrade. The Government will not exercise any supervision or control over the contract providers delivering the required items herein. Such contract providers shall be accountable solely to the Contractor who, in turn is responsible to the Government.

1.1. Description of Requirement/Introduction. The Contractor shall provide all personnel, equipment, supplies, facilities, transportation, tools, materials, supervision, and other items necessary to perform antenna and radome range upgrade at Fleet Readiness Center Southeast (FRCSE), Naval Air Station (NAS) Jacksonville, FL as defined in this Statement of Work (SOW) except for those items specified as Government equipment furnished and services. The Contractor shall provide the requested items to the standards in this contract.

1.2. Background.

1.2.1. Antenna Range Description

- a. The FRCSE Antenna Range is a 20'(w) x 20'(h) x 50'(l) anechoic chamber constructed to meet TEMPEST requirements for classified testing. The chamber and test equipment were originally installed and used at a Virginia Navy Base in the 1980s. During the late 1990s, most of the equipment was relocated to Jacksonville, FL, at which time a few minor upgrades were performed. The chamber is configured with a Scientific Atlanta (now MI Technologies) Model SA-5751 18-foot parabolic reflector on the front wall for compact range mode operation and a direct illumination feed horn on the opposite wall for far-field measurements. Pocket doors slide in place in front of the reflector when the range is used in the far field mode and the length of the chamber is reduced to 38 feet. An eight (8) foot wide external entrance and an overhead crane permit testing large antennas up to 200 pounds. An adjacent room houses the data acquisition, data analysis, positioner control, and positioner display systems. A block diagram of the Antenna Range is shown in Figure 1.
- b. The Antenna Measurement System is an MI 2095 with the following major components:
 - (1) MI-1795 Receiver
 - (2) MI-2180 Signal Source
 - (3) MI-2186 Frequency Synthesizer
 - (4) MI-1885 Position Indicator
 - (5) MI-1886 Position Data Processor
 - (6) MI-2012A Programmer Positioner Controller
 - (7) MI-4180A Positioner Controller

- (8) MI-4180A SCR Amplifier
- (9) MI-4131 Positioner Controller
- (10) MI-327 Data Acquisition Co-Processor (DAC)
- (11) Windows PC with MI 3000 Software

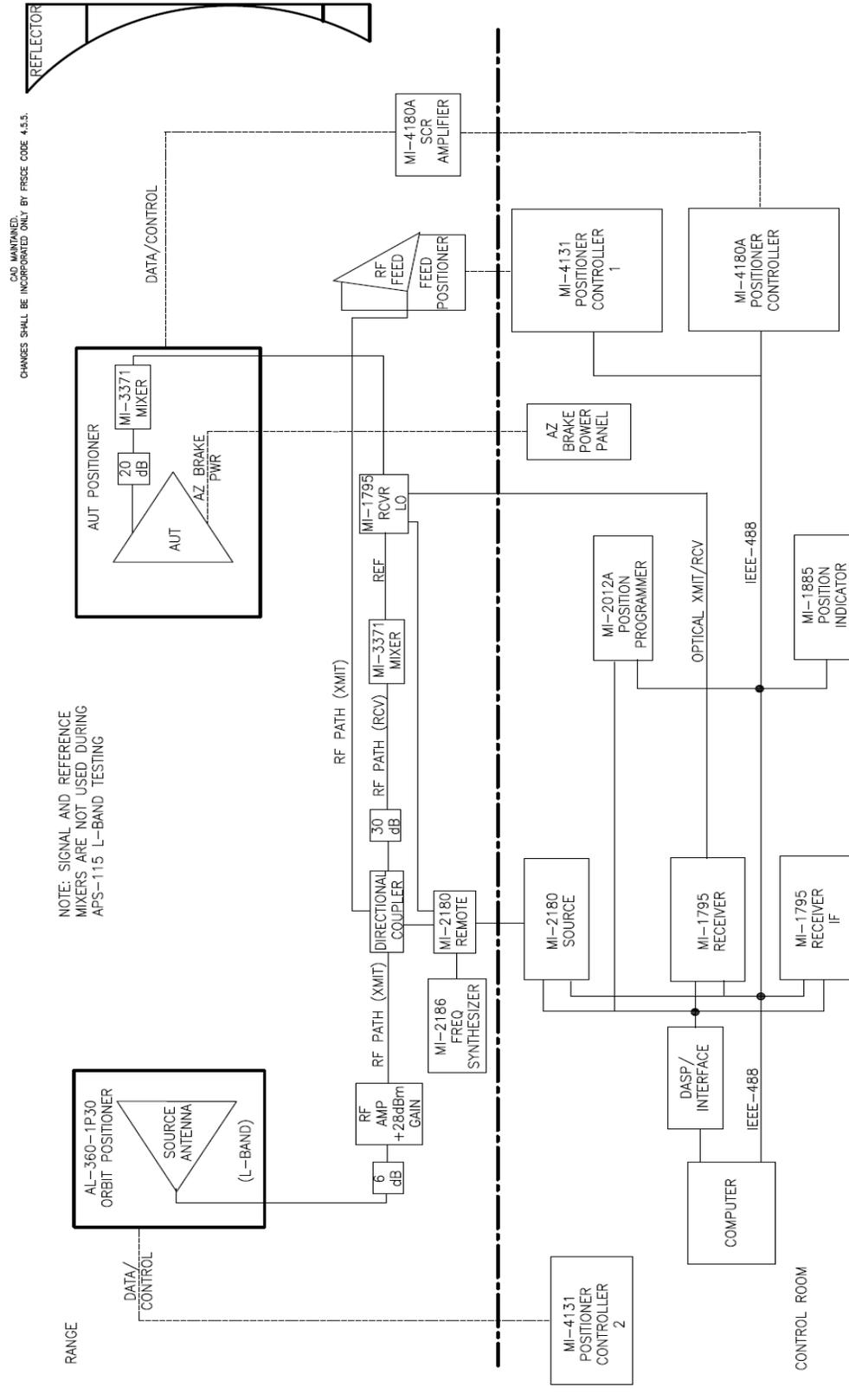


Figure 1. Compact Range Functional Diagram

c. In the Compact Range Mode, the system was delivered with the following minimum specification:

- (1) Frequency Range: 1.7 GHz to 20 GHz
- (2) Test Zone: 6 foot cylindrical quiet zone (4.0 - 40 GHz)
- (3) Amplitude Taper within the Test Zone:
 ≤ 0.5 dB (4.0 -18 GHz)
 ≤ 1.0 dB (18 - 40 GHz)
- (4) Phase Variation within the Test Zone: $\leq 10^\circ$ (4.0 - 40 GHz)
- (5) Polarization: Vertical, Horizontal, Slant or Rotating Linear
- (6) Cross Polarization: < -25 dB
- (7) Extraneous Signals / Internal Reflections:
 < -35 dB (1.7 - 4.0 GHz)
 < -40 dB (4.0 - 8.0 GHz)
 < -45 dB (8.0 - 20 GHz)

d. In the Far-Field Mode the system meets the following minimum specifications:

- (1) Frequency Range: 0.5 GHz to 20.0 GHz
- (2) Range Length: 30 ft.
- (3) Test Zone: Cylindrical, 30 in diameter
- (4) Amplitude Taper within the Test Zone: ≤ 1.0 dB
- (5) Phase Variation within the Test Zone: $< 22.5^\circ$
- (6) Polarization: Vertical, Horizontal, Slant or Rotating Linear
- (7) Cross Polarization: < -25 dB
- (8) Extraneous Signals / Internal Reflections:
 ≤ -25 dB (0.5 - 1.0 GHz)
 ≤ -35 dB (1.0 - 4.0 GHz)
 < -40 dB (4.0 - 8.0 GHz)
 < -45 dB (8.0 - 20 GHz)

e. The Antenna Positioner System was delivered with the following minimum specifications:

- (1) Axis Orientation: Roll over Elevation over Azimuth over Elevation over Slide
- (2) Upper Elevation positioner error: $\leq 0.06^\circ$ rms
- (3) Azimuth position error: $\leq 0.03^\circ$ rms.
- (4) Lower Elevation positioner error: $\leq 0.06^\circ$ rms
- (5) Polarization position errors: $\leq 0.06^\circ$ rms
- (6) Boresight alignment repeatability: $< \pm 0.03^\circ$
- (7) Boresight measurement accuracy: $\pm 0.03^\circ$ (without autocollimator)
- (8) Boresight measurement accuracy: $\pm 0.005^\circ$ (with autocollimator)
- (9) Maximum antenna weight: 200 lbs.

f. The Microwave Measurement System meets the following minimum specifications:

- (1) Sensitivity: -126 dBm
- (2) Signal Source: Pulsed or CW
- (3) Receiver: CW only
- (4) Frequency: 500 MHz to 18 GHz
- (5) Measurement Channels: 4 measurement channels high speed switching
- (6) Frequency Accuracy: 1ppm (synthesized)
- (7) Amplitude Linearity: ± 0.06 dB
- (8) Phase Accuracy: ± 0.5 degrees
- (9) Measurement Speed: 5,000 measurements/second

1.2.2. Radome Range Description

- a. The Radome Test Range located at the FRCSE Jacksonville, FL, also incorporates a Scientific Atlanta (now MI Technologies) system that was produced in the 1980's. The system features a model MI-1795 Receiver, MI-2180 signal source, AeroTech motion control (model EDU-187 Ensemble CP) with Renishaw position feedback devices, and CompuQuest software. The chamber itself is configured as a Compact Range with an SA-5751 Reflector (2 - 18 GHz operation). Presently, FRCSE's Compact Range is used for test and analysis of EA-6B Radomes, but F-18C/D/E/F Radome workload is anticipated in the near future.

- b. The FRCSE Radome anechoic test chamber [20' (w) x 20' (h) x 50' (l)] is a separate Compact Range located adjacent to the Antenna test Range. The two chambers share a common control room but each has its own, dedicated test equipment. Similar to the Antenna Range, control and Radio Frequency (RF) cables pass without the use of interface panels (from test chamber to control room) underneath the floor in a trough that is accessible from above by removing floor tiles. The Radome Range is equipped for measuring performance of radomes up to five feet in diameter and up to 500 pounds, and is the only one of its type that is owned and operated by the Navy. Beam deflection characteristics can be measured to within six arc-seconds, and radar energy transmission efficiency accuracy is within 1.5% through a radome structure. The range operates with a radar-adapted position system and measurement electronics. Similar to the Antenna Range, the Radome Range can also be used in a far-field configuration. Other features include:
 - (1) Frequency range from 100MHz to 18GHz, pulsed or Continuous Wave
 - (2) -126dBm sensitivity or better (Measurement System specifications identical to section 1.2.1(f))
 - (3) Positioner subsystem is elevation over azimuth for the antenna under test with roll over elevation over azimuth for the Radome itself
 - (4) Five motion axes with less than 0.06° root mean square (rms) positioning error
 - (5) Custom CompuQuest software routines to interrogate and analyze nearly any aircraft radar and radome configuration (refer to Technical Exhibit (TE) 1 Radome Chamber Control & Analysis Software Specification, Radome Chamber Control and Analysis Software Specification).

- (6) Upgraded motion control and position sensing devices using Aerotech and Renishaw products (see Table 1 and Figure 2, section 5.2.15)
- (7) APG-65 Radar Antenna Gimbal, adaptable for use with various arrays

1.3. Objectives. The objective of this contract is the development, installation and testing of indoor antenna and radome range upgrades to include training of Government personnel in the theory and use of the upgraded systems.

1.4. Scope. This contract includes all functions, tasks and responsibilities normally provided by a Senior Engineer I and Senior Engineer II. The Contractor shall be responsible for upgrading FRCSE's existing Antenna and Radome Ranges by developing and installing systems upgrades that include, but are not limited to, calibration of system components, perform functional testing of the systems after such installation, and provide training of Government personnel in the theory and use of the upgraded systems. The Contractor shall comply with all applicable laws and regulations, including but not limited to Federal Law, Florida State Law(s), Occupational Safety and Health Administration (OSHA) regulations, Navy and installation regulations.

1.5. Delivery Date. The expected delivery date shall be nine (9) months after time of award.

1.6. Hours of Operation.

1.6.1. Normal Duty Hours. The Contractor is responsible for providing items and performance between the hours of 0600 to 1430 EST, Monday through Friday, except on Federal holidays or when the Government facility is closed due to local or national emergencies, administrative closings, or similar Government directed facility closings. The Contractor must at all times maintain an adequate workforce for the uninterrupted performance of all tasks defined within this SOW when the Government facility is not closed for the above reasons. When hiring personnel, the Contractor shall keep in mind that the stability and continuity of the workforce are essential.

1.6.2. Federal Government Holidays.

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| a. | New Years Day | 1st day of January |
| | Martin Luther King Jr.'s Birthday | 3rd Monday of January |
| | Presidents Day | 3rd Monday of February |
| | Memorial Day | Last Monday of May |
| | Independence Day | 4th day of July |
| | Labor Day | 1st Monday of September |
| | Columbus Day | 2nd Monday of October |
| | Veterans Day | 11th day of November |
| | Thanksgiving Day | 4th Thursday of November |
| | Christmas Day | 25th day of December |
- b. When one of the above designated legal holidays falls on a Sunday, the following Monday will be observed as a legal holiday. When a legal holiday falls on a Saturday, the proceeding Friday is observed as a legal holiday. This list of holidays relates to

Government duty days and is not intended to supplement or otherwise alter the provisions of any Wage Determination regarding applicable paid holidays.

1.6.3. Incident Weather Operations. In cases of severe weather, the Contracting Officer (KO) may authorize exceptions. When exceptions are granted, the Contractor shall make up all missed requirements within 24 hours after the severe weather has terminated, unless the KO authorizes additional time. Rescheduling to provide make-up requirements shall not be a basis for a claim by the Contractor for additional compensation.

1.7. Place of Performance. The work to be provided under this contract shall be performed at FRCSE, Building 168A Albemarle Ave., NAS Jacksonville, FL 32212.

1.8. Type of Contract. The Government will award a Firm Fixed Price (FFP) Contract.

1.9. Quality Control. Quality Control is the responsibility of the Contractor. The Contractor is responsible for the delivery of quality items and services to the Government in accordance with (IAW) the terms and conditions contained in Federal Acquisition Regulation (FAR) Subpart 52.246-1 entitled, "Contractor Inspection Requirements" and applicable sub-clauses pertaining to quality control.

1.9.1. The Contractor shall develop, implement and maintain an effective Quality Control System which includes a written Quality Control Plan (QCP). The QCP shall implement standardized procedure/methodology for monitoring and documenting contract performance to ensure all contract requirements are met. The Contractors' QCP shall contain a systematic approach to monitor operations to ensure acceptable items and services are provided to the Government. The QCP, as a minimum, shall address continuous process improvement; procedures for scheduling, conducting and documentation of inspection; discrepancy identification and correction; corrective action procedures to include procedures for addressing Government discovered non-conformances; procedures for root cause analysis to identify the root cause and root cause corrective action to prevent re-occurrence of discrepancies; procedures for trend analysis; procedures for collecting and addressing customer feedback/complaints. The Contractor shall provide to the Government their quality control documentation with their proposal for use as an evaluation factor; changes to the QCP after award shall be submitted to the KO and Government Representative in an electronic copy within five (5) calendar days prior to the proposed changes thereafter. After acceptance of the QCP the Contractor shall receive the Contracting Officer's acceptance in writing of any proposed change to their QC System in regard to this contract.

1.9.2. Corrective Actions. At any time it is determined by the KO that the quality control system, personnel, instructions, controls, tests, or records are not providing results which conform to contract requirements, action shall be taken by the Contractor to correct the deficiency. If a Contract Deficiency Report (CDR) is issued the Contractor shall develop a Corrective Action Plan (CAP) which identifies the root cause, Corrective Action (CA) for the root cause, CA for the specific non-conformance and CA to the root cause to prevent recurrence and a corrective action including the timeline for completion.

1.10. Post Award Conference/Periodic Progress Meetings. The Contractor agrees to attend any post award conference convened by the contracting activity or contract administration office IAW FAR Subpart 42.5, Post Award Orientation. The KO and other Government personnel, as appropriate, may meet periodically with the Contractor to review the Contractor's performance. At these meetings the KO will apprise the Contractor of how the Government views the Contractor's performance and the Contractor shall apprise the Government of problems, if any, being experienced. Appropriate action shall be taken to resolve outstanding issues. These meetings shall be considered into the overall contract price.

1.11. Operations Security (OPSEC) Security.

1.11.1. Access and General Protection/Security: Policy and Procedures. Contractor and all associated subcontractors 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. Contractor workforce must comply with all personal identity verification requirements as directed by DoD, Department of the Navy (DoN) 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.

1.11.2. Contractor Unclassified Access to Federally Controlled Facilities, Sensitive Information, Information Technology (IT) Systems or Protected Health Information. Homeland Security Presidential Directive (HSPD)-12, requires Government agencies to develop and implement Federal security standards for Federal employees and Contractors. The Deputy Secretary of Defense Directive-Type Memorandum (DTM) 08-006 - "DoD Implementation of Homeland Security Presidential Directive - 12 (HSPD-12)" dated November 26, 2008 (or its subsequent DoD instruction) directs implementation of HSPD-12. This clause is in accordance with HSPD-12 and its implementing directives.

APPLICABILITY

This clause applies to Contractor employees requiring physical access to any area of a federally controlled base, facility or activity and/or requiring access to a DoN or DoD computer/network/system to perform certain unclassified sensitive duties. This clause also applies to Contractor employees who access Privacy Act and Protected Health Information, provide support associated with fiduciary duties, or perform duties that have been identified by DON as National Security Position, as advised by the command security manager. It is the responsibility of the responsible security officer of the command/facility where the work is performed to ensure compliance.

Each Contractor employee providing services at a Navy Command under this contract is required to obtain a Department of Defense Common Access Card (DOD CAC). Additionally, depending on the level of computer/network access, the contract employee will require a successful investigation as detailed below.

ACCESS TO FEDERAL FACILITIES

Per HSPD-12 and implementing guidance, all Contractor employees working at a federally controlled base, facility or activity under this clause will require a DoD CAC. When access to a base, facility or activity is required Contractor employees shall in-process with the Navy Command's Security Manager upon arrival to the Navy Command and shall out-process prior to their departure at the completion of the individual's performance under the contract.

ACCESS TO DOD IT SYSTEMS

In accordance with SECNAV M-5510.30, Contractor employees who require access to DoN or DoD networks are categorized as IT-I, IT-II, or IT-III. The IT-II level, defined in detail in SECNAV M-5510.30, includes positions which require access to information protected under the Privacy Act, to include Protected Health Information (PHI). All Contractor employees under this contract who require access to Privacy Act protected information are therefore categorized no lower than IT-II. IT Levels are determined by the requiring activity's Command Information Assurance Manager. Contractor employees requiring privileged or IT-I level access, (when specified by the terms of the contract) require a Single Scope Background Investigation (SSBI) which is a higher level investigation than the National Agency Check with Law and Credit (NACLC) described below. Due to the privileged system access, a SSBI suitable for High Risk public trusts positions is required. Individuals who have access to system control, monitoring, or administration functions (e.g. system administrator, database administrator) require training and certification to Information Assurance Technical Level 1, and must be trained and certified on the Operating System or Computing Environment they are required to maintain.

Access to sensitive IT systems is contingent upon a favorably adjudicated background investigation. When access to IT systems is required for performance of the Contractor employee's duties, such employees shall in-process with the Navy Command's Security Manager and Information Assurance Manager upon arrival to the Navy command and shall out-process prior to their departure at the completion of the individual's performance under the contract. Completion and approval of a System Authorization Access Request Navy (SAAR-N) form is required for all individuals accessing Navy Information Technology resources. The decision to authorize access to a Government IT system /network is inherently governmental. The Contractor supervisor is not authorized to sign the SAAR-N; therefore, the Government employee with knowledge of the system/network access required or the Government Representative shall sign the SAAR-N as the "supervisor".

The SAAR-N shall be forwarded to the Navy Command's Security Manager at least 30 days prior to the individual's start date. Failure to provide the required documentation at least 30 days prior to the individual's start date may result in delaying the individual's start date.

When required to maintain access to required IT systems or networks, the Contractor shall ensure that all employees requiring access complete annual Information Assurance (IA) training, and maintain a current requisite background investigation. The Contractor's Security Representative shall contact the Command Security Manager for guidance when reinvestigations are required.

INTERIM ACCESS

The Navy Command's Security Manager may authorize issuance of a DoD CAC and interim access to a DoN or DoD unclassified computer/network upon a favorable review of the investigative questionnaire and advance favorable fingerprint results. When the results of the investigation are received and a favorable determination is not made, the Contractor employee working on the contract under interim access will be denied access to the computer network and this denial will not relieve the Contractor of his/her responsibility to perform.

DENIAL OR TERMINATION OF ACCESS

The potential consequences of any requirement under this clause including denial or termination of physical or system access in no way relieves the Contractor from the requirement to execute performance under the contract within the timeframes specified in the contract. Contractors shall plan ahead in processing their employees and subcontractor employees. The Contractor shall insert this clause in all subcontracts when the subcontractor is permitted to have unclassified access to a federally controlled facility, federally-controlled information system/network and/or to Government information, meaning information not authorized for public release.

CONTRACTOR'S SECURITY REPRESENTATIVE

The Contractor shall designate an employee to serve as the Contractor's Security Representative. Within three work days after contract award, the Contractor shall provide to the requiring activity's Security Manager and the Contracting Officer, in writing, the name, title, address and phone number for the Contractor's Security Representative. The Contractor's Security Representative shall be the primary point of contact on any security matter. The Contractor's Security Representative shall not be replaced or removed without prior notice to the Contracting Officer and Command Security Manager.

BACKGROUND INVESTIGATION REQUIREMENTS AND SECURITY APPROVAL PROCESS FOR CONTRACTORS ASSIGNED TO NATIONAL SECURITY POSITIONS OR PERFORMING SENSITIVE DUTIES

Navy security policy requires that all positions be given a sensitivity value based on level of risk factors to ensure appropriate protective measures are applied. Navy recognizes Contractor employees under this contract as Non-Critical

Sensitive [ADP/IT -II] when the contract scope of work require physical access to a federally controlled base, facility or activity and/or requiring access to a DoD computer/network, to perform unclassified sensitive duties. This designation is also applied to Contractor employees who access Privacy Act and Protected Health Information (PHI), provide support associated with fiduciary duties, or perform duties that have been identified by DON as National Security Positions. At a minimum, each Contractor employee must be a US citizen and have a favorably completed NACLCL to obtain a favorable determination for assignment to a non-critical sensitive or IT-II position. The NACLCL consists of a standard NAC and a FBI fingerprint check plus law enforcement checks and credit check. Each Contractor employee filling a non-critical sensitive or IT-II position is required to complete:

- SF-86 Questionnaire for National Security Positions (or equivalent OPM investigative product)

- Two FD-258 Applicant Fingerprint Cards (or an electronic fingerprint submission)
- Original Signed Release Statements

Failure to provide the required documentation at least 30 days prior to the individual's start date shall result in delaying the individual's start date. Background investigations shall be reinitiated as required to ensure investigations remain current (not older than 10 years) throughout the contract performance period. The Contractor's Security Representative shall contact the Command Security Manager for guidance when reinvestigations are required.

Regardless of their duties or IT access requirements ALL Contractor employees shall in-process with the Navy Command's Security Manager upon arrival to the Navy command and shall out-process prior to their departure at the completion of the individual's performance under the contract. Employees requiring IT access shall also check-in and check-out with the Navy Command's Information Assurance Manager. Completion and approval of a System Authorization Access Request Navy (SAAR-N) form is required for all individuals accessing Navy Information Technology resources. The SAAR-N shall be forwarded to the Navy Command's Security Manager at least 30 days prior to the individual's start date. Failure to provide the required documentation at least 30 days prior to the individual's start date shall result in delaying the individual's start date.

The Contractor shall ensure that each contract employee requiring access to IT systems or networks complete annual Information Assurance (IA) training, and maintain a current requisite background investigation. Contractor employees shall accurately complete the required investigative forms prior to submission to the Navy Command Security Manager. The Navy Command's Security Manager will review the submitted documentation for completeness prior to submitting it to the Office of Personnel Management (OPM). Suitability/security issues identified by the Navy may render the Contractor employee ineligible for the assignment. An unfavorable determination made by the Navy is final (subject to SF-86 appeal procedures) and such a determination does not relieve the Contractor from meeting any contractual obligation under the contract. The Navy Command's Security Manager will forward the required forms to OPM for processing. Once the investigation is complete, the results will be forwarded by OPM to the DON Central Adjudication Facility (CAF) for a determination.

If the Contractor employee already possesses a current favorably adjudicated investigation, the Contractor shall submit a Visit Authorization Request (VAR) via the Joint Personnel Adjudication System (JPAS) or a hard copy VAR directly from the Contractor's Security Representative. Although the Contractor will take JPAS "Owning" role over the Contractor employee, the Navy Command will take JPAS "Servicing" role over the Contractor employee during the hiring process and for the duration of assignment under that contract. The Contractor shall include the IT Position Category per SECNAV M-5510.30 for each employee designated on a VAR. The VAR requires annual renewal for the duration of the employee's performance under the contract.

**BACKGROUND INVESTIGATION REQUIREMENTS AND SECURITY APPROVAL
PROCESS FOR CONTRACTORS ASSIGNED TO OR PERFORMING NON-SENSITIVE
DUTIES**

Contractor employee whose work is unclassified and non-sensitive (e.g., performing certain duties such as lawn maintenance, vendor services, etc...) and who require physical access to publicly accessible areas to perform those duties shall meet the following minimum requirements:

- Must be either a US citizen or a US permanent resident with a minimum of 3 years legal residency in the United States (as required by The Deputy Secretary of Defense DTM 08-006 or its subsequent DoD instruction) and
- Must have a favorably completed National Agency Check with Written Inquiries (NACI) including a FBI fingerprint check prior to installation access.

To be considered for a favorable trustworthiness determination, the Contractor's Security Representative must submit for all employees each of the following:

- SF-85 Questionnaire for Non-Sensitive Positions
- Two FD-258 Applicant Fingerprint Cards (or an electronic fingerprint submission)
- Original Signed Release Statements

The Contractor shall ensure each individual employee has a current favorably completed National Agency Check with Written Inquiries (NACI) or ensure successful FBI fingerprint results have been gained and investigation has been processed with OPM

Failure to provide the required documentation at least 30 days prior to the individual's start date may result in delaying the individual's start date.

* Consult with your Command Security Manager and Information Assurance Manager for local policy when IT-III (non-sensitive) access is required for non-US citizens outside the United States.

1.12. Security.

1.12.1. Security Requirements. Contractor personnel performing work under this shall pass a background check for entry to NAS Jacksonville and FRCSE. The Contractor shall submit a completed U.S. NAVY Form FRCSE 5500/17 to the Government Representative one (1) week prior to contract start date.

1.12.2. Physical Security. The Contractor shall be responsible for safeguarding all Government equipment, information and property provided for Contractor use IAW OPNAVINST 5530.14E CH-2, Navy Physical Security and Law Enforcement Program. Contractor shall maintain a physical security checklist/log which will be forwarded to the Government Representative on a weekly basis. At the close of each work period, Government facilities, equipment and materials shall be secured.

1.12.3. Security of Classified Items, Systems and Information. The Contractor shall not access, view, possess, or use classified information under this contract. The Contractor shall immediately contact the Government Representative for instructions if access to classified

information becomes necessary or if the Contractor falls into the possession of classified information while performing services under this contract.

1.13. Safety. The Contractor shall establish and maintain a safety plan.

1.13.1. In order to provide safety control for protection to the life and health of employees and other persons; for prevention of damage to property, materials, supplies, and equipment; and for avoidance of work interruptions in the performance of this contract, the Contractor shall comply with 29 CFR 1910, Occupational Safety and Health Standards. The Contractor shall comply with the above and all other applicable DoD, Navy, Federal, State and Local safety and health requirements.

1.13.2. Environment and OSHA. The Contractor shall comply with all local, State, and Federal environmental and occupational safety laws, rules, and regulations. Any apparent conflict between compliance with such local, State, and Federal environmental and occupational safety laws, rules, regulations, and compliance with the requirements of the contract shall be immediately brought to the attention of the KO or authorized representative for final resolution. The Contractor shall notify the KO or authorized representative in writing in addition to any verbal notification of such conflict. The Contractor shall be liable for all fines, penalties, and costs which result from violations of, or failure to comply with, all such local State, or Federal laws, rules, and regulations. All unsafe acts or conditions fostered by the Contractor or Contractor personnel may be grounds for the KO or authorized representative to halt any and all Contractor performance with a commensurate deduction of monies due to the Contractor until such unsafe conditions are corrected. The Contractor shall take due caution not to endanger personnel during performance of this contract. Upon discovery of a serious hazard such as, but not limited to, fire, or large fuel spill, the Contractor shall notify the KO or designated representative.

1.13.3. Reporting Mishaps. The Contractor shall train personnel to recognize fire and safety hazards and encourage personnel in the performance of their duties to report fire and safety hazards and unsafe conditions to their supervisor. The Contractor shall take corrective action to remedy reported deficiencies IAW the terms of this contract. The Government Representative shall be notified of deficiencies beyond the terms of this contract. The Contractor shall adhere to reporting of mishaps IAW OPNAVINST 5102.1D MCO P5102.1B, Navy & Marine Corps Mishap and Safety Investigation, Reporting, And Record Keeping Manual. In addition the Contractor shall report injury or occupational illness to on-duty Contractors and Contractor accidents involving Navy property and personnel.

1.13.4. Emergency Services.

- a. The Contractor shall have competent personnel trained and capable of dealing with minor personnel injuries. The Contractor or their employees shall immediately notify their supervisor of any accident requiring emergency medical treatment. The Contractor shall, in turn, notify the KO or Government Representative within 30 minutes of the incident.

- b. Emergency medical treatment and services for Contractor personnel is the responsibility of the Contractor.

1.13.5. Personnel Safety. The Contractor shall immediately correct all safety deficiencies upon notification of the deficiencies by the KO or designated representative and shall notify the KO of the corrective action to be taken.

1.14. Personnel. For purposes of this paragraph, the term “personnel” or “employee(s)” refers to any person performing work related to this contract, including but not limited to, the Contractor’s employees, agents, representatives, or subcontractor. The Contractor shall staff this effort with trained, competent and capable employee(s) for the discipline they are assigned to. Contractor personnel shall present a clean, neat and professional appearance. The Contractor shall ensure that employees meet all applicable federal, state, local, and installation certification, licensing, medical requirements, and qualifications to perform all assigned tasks and functions as defined in this contract prior to commencement of work. The Contractor shall not permit any personnel to work under this contract if such person is identified by a Government authorized representative to the Contractor as a potential threat to the health, safety, security, general well being, or operational mission of the Navy and NAS Jacksonville, FL. All Contractor personnel shall comply with installation security and access procedures and the Contractor’s final Safety Plan.

1.14.1. Motor Vehicle Operators. Contractor’s personnel, whose tasks involve operation of any vehicles, shall possess a valid U.S. state driver’s license, certificates and permits, applicable for the type and class of vehicle being operated.

1.14.2. Authorization to Work. Contractor’s personnel shall either be a United States Citizen or authorized to work in the United States or possess a valid U.S. Immigration T-151 or I-94, Alien Registration Card. If Contractor person is not a US Citizen they must submit a foreign national visit request through the State Department and their embassy. This process can take up to 60 days.

1.14.3. Speaking, Reading, and Understanding English. Contractor shall hire and staff personnel who can communicate with Government representatives and where reading, understanding, and discussing environmental, health, and safety warnings are an integral part of an employee’s duties. Contractor’s employee shall be able to understand, read, write, and speak the English language fluently. English shall be the only language used with regard to this contract for written correspondence, discussions and other business transactions.

1.14.4. Identification of Contractor Employees.

- a. The Government will issue ID badges to all Contractor personnel for the duration of the contract. ID Badges shall be worn at all times during which the employee is performing work under this contract. Each Contractor (to include subcontractors) employee shall wear the ID Badge in a conspicuous place on the front of exterior clothing and above the waist except when safety or health reasons prohibit. A listing of personnel requiring identification cards shall be furnished to the KO prior to the contract start date and

updated as needed to reflect Contractor and subcontractor personnel changes. If badged Contractor personnel are terminated, the KO shall be notified immediately.

- b. All Contractor personnel, attending meetings and working in other situations where their Contractor status is not obvious to third parties, are required to identify themselves as such to avoid creating an impression in the minds of members of the public that they are Government officials.
- c. Contractor personnel shall ensure that all documents or reports produced by the Contractor are suitably marked as Contractor products or that Contractor participation is appropriately disclosed.

1.14.5. Conflict of Interest.

- a. Organizational Conflict of Interest. Contractor and subcontractor personnel performing work under this contract may receive, have access to, or participate in the development of proprietary or source selection information (e.g., cost or pricing information, budget information or analyses, specifications or work statements, etc.), or perform evaluation services which may create a current or subsequent Organizational Conflict of Interests (OCI) as defined in FAR Subpart 9.5, Organizational and Consultant Conflicts of Interest. The Contractor shall notify the KO immediately whenever it becomes aware that such access or participation may result in any actual or potential OCI and shall promptly submit a plan to the KO to avoid or mitigate any such OCI. The Contractor's mitigation plan will be determined to be acceptable solely at the discretion of the KO, and in the event the KO unilaterally determines that any such OCI cannot be satisfactorily avoided or mitigated, the KO may affect other remedies as he or she deems necessary, including prohibiting the Contractor from participation in subsequent contracted requirements which may be affected by the OCI.
- b. Employment of Government Personnel. The Contractor shall not knowingly employ any person who is a U.S. Government employee if employing that person would create a conflict of interest. Additionally, the Contractor shall not knowingly employ any person who is an employee of the Government, either military or civilian, unless such person seeks and receives written approval according to DoD 5500.7-R, Joint Ethics Regulations (JER) by the individual's commander or director. A copy of the authorization will be provided to the Government Representative. In addition, the Contractor is prohibited from employing Government Quality Assurance Representatives (QAR) whom the Contractor knows or should have known are responsible for monitoring any contracts/subcontracts awarded to the service provider.

1.14.6. Conduct of Employees. Contractor personnel's conduct shall not reflect discredit upon the Government. The Contractor shall ensure that personnel present a professional appearance. The Contractor's employees shall observe and comply with all local policies and procedures concerning fire, safety, environmental protection, sanitation, security, and possession of firearms or other lethal or illegal weapons or substance. The Contractor is responsible for ensuring that any Contractor employees providing items and services under this contract conduct themselves

and perform in a professional, safe, and responsible manner. The Contractor shall remove from the job site any employee for reasons of misconduct or security. In accordance with Department of Defense (DOD) Directive 5500.7-R, "Joint Ethics Regulation", Contractor employees must avoid being improperly influenced in the execution of their duties under the contract. Particular attention should be paid to acceptance of gifts/ gratuities, and on non-disclosure of sensitive or classified information. The Contractor shall ensure employee conduct complies with 41 U.S. C 423 relative to release of acquisition related information or actions or discussions which may prejudice future competitions. The Contractor shall ensure no contractor employees conduct political related activities or events on United States of America (USA) Facilities.

1.14.7. Contractor Vehicles. All vehicles and their operators entering NAS Jacksonville shall be properly licensed, registered, and insured according to state law.

1.14.8. Contractor Advertising. The Contractor shall not place or display advertising of any kind on Government property.

1.14.9. Special Qualifications.

- a. Experience: The Contractor shall have experience in building or upgrading radar range control systems.
- b. Proof of experience in at least two (2) instances shall be provided with the Contractor's proposal.

1.14.10. Key Personnel: The Project Manager (PM)/alternate PM are considered key personnel by the Government.

- a. The Contractor shall provide a PM who shall be responsible for the performance of the work. The name of this person and an alternate who shall act for the Contractor when the manager is absent shall be designated in writing to the KO within five (5) calendar days after contract award; thereafter any changes shall be provided five (5) business days prior to expected change and no less than 24-hours after unplanned changes. The PM or alternate shall have full authority to act for the Contractor on all contract matters relating to daily operation of this contract.
- b. The PM or alternate shall be available between 0600 and 1430 Monday through Friday except Federal holidays or when the Government facility is closed for administrative reasons.
- c. Key personnel shall possess the experience stated in Section 1.14.9. Special Qualifications above.

1.14.11. Supervision of Contractor Employees. The Government will not exercise any supervision or control over Contractor or Subcontractor employees while performing work under the contract. Such employees shall be accountable solely to the Contractor, not the Government.

The Contractor, in turn, shall be accountable to the Government for Contractor or Subcontractor employees.

1.15. Data Rights. The Government has unlimited rights to all documents/material produced under this contract. All documents and materials, to include the source codes of any software, produced under this contract shall be Government-owned and are the property of the Government with all rights and privileges of ownership/copyright belonging exclusively to the Government. These documents and materials may not be used or sold by the Contractor without written permission from the KO. All materials supplied to the Government shall be the sole property of the Government and may not be used for any other purpose. This right does not abrogate any other Government rights.

PART 2 DEFINITIONS, ACRONYMS & ABBREVIATIONS

2. Definitions and Acronyms.

2.1. Definitions.

2.1.1. Cannibalize. Remove parts from Government property for use or for installation on other Government property.

2.1.2. Contract Administrator. The official Government representative delegated authority by the Contracting Officer to administer a contract. This individual is normally a member of the appropriate Contracting/Procurement career field and advises on all technical contractual matters.

2.1.3. Contractor. A supplier or vendor awarded a contract to provide specific supplies or services to the Government. The term used in this contract refers to the prime.

2.1.4. Contractor Acquired Property. Property acquired, fabricated, or otherwise provided by the contractor for performing a contract and to which the Government has title.

2.1.5. Contracting Officer (KO). A person with authority to enter into, administer, and/or terminate contracts, and make related determinations and findings on behalf of the Government. Note: The only individual who can legally bind the Government.

2.1.6. Controlled Area. A controlled space extending upward and outward from a specified point. This area is typically designated by a commander or director, wherein sensitive information or operations occur and requires limitations of access.

2.1.7. Defective Service. A service output that does not meet the standard of performance associated with the SOW.

2.1.8. Deliverable. Anything that can be physically delivered, but may include non-manufactured things such as meeting minutes or reports.

2.1.9. Equipment. A tangible item that is functionally complete for its intended purpose, durable, nonexpendable, and needed for the performance of a contract. Equipment is not intended for sale, and does not ordinarily lose its identity or become a component part of another article when put into use. Equipment does not include material, real property, special test equipment or special tooling.

2.1.10. Government Equipment Furnished. Government property that is incidental to the place of performance, when the contract requires contractor personnel to be located on a Government site or installation, and when the property used by the contractor within the location remains accountable to the Government. Items considered to be incidental to the place of performance include, for example, office space, desks, chairs, telephones, computers, and fax machines.

2.1.11. Key Personnel. Contractor personnel that are evaluated in a source selection process and that may be required to be used in the performance of a contract by the Key Personnel listed in the SOW. When key personnel are used as an evaluation factor in best value procurement, an offer can be rejected if it does not have a firm commitment from the persons that are listed in the proposal. The prime contractor is responsible for performance of all subcontractors.

2.1.12. Material. Property that may be consumed or expended during the performance of a contract, component parts of a higher assembly, or items that lose their individual identity through incorporation into an end-item. Material does not include equipment, special tooling, and special test equipment or real property.

2.1.13. Physical Security. Actions that prevent the loss or damage of Government property.

2.1.14. Property. All tangible property, both real and personal.

2.1.15. Property Administrator (PA) or Plant Clearance Officer (PLCO). An authorized representative of the Contracting Officer appointed in accordance with agency procedures, responsible for administering the contract requirements and obligations relating to Government property in the possession of the Contractor.

2.1.16. Property Records. Records created and maintained by the Contractor in support of its stewardship responsibilities for the management of Government property.

2.1.17. Provide. To furnish, as in Government-furnished property, or to acquire, as in contractor-acquired property.

2.1.18. Quality Assurance. The Government procedures to verify that services being performed by the Contractor are acceptable IAW established standards and requirements of this contract.

2.1.19. Quality Assurance Specialist. An official Government representative concerned with matters pertaining to the contract administration process and quality assurance/quality control. Acts as technical advisor to the Contracting Officer in these areas.

2.1.20. Quality Control. All necessary measures taken by the Contractor to assure that the quality of an end product or service shall meet contract requirements.

2.1.21. Real Property. See Federal Management Regulation 102-71.20 (41 CFR 102-71.20).

2.1.22. Sensitive Property means property potentially dangerous to the public safety or security if stolen, lost, or misplaced, or that shall be subject to exceptional physical security, protection, control, and accountability. Examples include weapons, ammunition, explosives, controlled substances, radioactive materials, hazardous materials or wastes, or precious metals.

2.1.23. Subcontractor. One that enters into a contract with a prime Contractor. The Government does not have privity of contract with the subcontractor.

2.1.24. Unit Acquisition Cost means—

- a. For Government-furnished property, the dollar value assigned by the Government and identified in the contract; and
- b. For contractor-acquired property, the cost derived from the contractor's records that reflect consistently applied generally accepted accounting principles.

2.1.25. Wide Area Work Flow (WAWF). A secure web based system for electronic invoicing, receipt, and acceptance. WAWF allows Government vendors to submit and track invoices and receipt/acceptance documents over the web and allows Government personnel to process those invoices in a real-time, paperless environment.

2.1.26. Work Day. The number of hours per day the Contractor provides services IAW the contract.

2.1.27. Work Week. Monday through Friday, except for Federal holidays unless specified otherwise.

2.2. Acronyms.

AESA	Advanced Electronically Steered Array
AQL	Acceptable Quality Level
AT	Antiterrorism
ATE	Average Transmission Efficiency
AUT	Antenna Under Test
CA	Corrective Action
CAP	Contractor Acquired Property
CDR	Contract Deficiency Report
CDRL	Contract Data Requirements List
CFR	Code of Federal Regulations
CMR	Contract Manpower Reporting
CONUS	Continental United States (excludes Alaska and Hawaii)

COTS	Commercial-Off-the-Shelf
CST	Central Standard Time
DAC	Data Acquisition Co-Processor
DFARS	Defense Federal Acquisition Regulation Supplement
DoD	Department of Defense
DoN	Department of the Navy
EAD	Enhanced Antenna Detector
ECMRA	Enterprise-Wide Contractor Manpower Reporting Application
FAR	Federal Acquisition Regulation
FFP	Firm Fixed Price
FRCSE	Fleet Readiness Center Southeast
FY	Fiscal Year
GPIB	General Purpose Interface Bus
HIPAA	Health Insurance Portability and Accountability Act of 1996
IAW	In Accordance With
ID	Identification
JER	Joint Ethics Regulation
KO	Contracting Officer
MS	Microsoft
NAS	Naval Air Station
NLT	No Later Than
OCI	Organizational Conflict of Interest
OCONUS	Outside Continental United States (includes Alaska and Hawaii)
OSHA	Occupational Safety and Health Administration
PLCO	Plant Clearance Officer
PM	Program Manager
PO	Purchase Order
QA	Quality Assurance
QAP	Quality Assurance Program
QC	Quality Control
QCP	Quality Control Program
RF	Radio Frequency
RMS	Root Mean Square
SOW	Statement of Work
TCP/IP	Transmission Control Protocol/Internet Protocol
TE	Technical Exhibit
VSWR	Voltage Standing Wave Ratio
WAWF	Wide Area Work Flow
ZATE	Zone Average Transmission Efficiency

PART 3
GOVERNMENT EQUIPMENT FURNISHED AND SERVICES

3. Government Equipment Furnished and Services.

3.1. Services. The Government will provide services to facilitate Contractor access to NAS Jacksonville and FRCSE facilities.

3.2. Facilities. The Government will provide access to facilities for the Contractor's use in support of this contract. The Compact RADAR Range located in Building 168A will be available for the training requirement listed in Part 5 of this SOW. Any alterations to facilities shall be approved in writing and property shall be returned to its original condition prior to completion of this contract. Contractor shall be responsible for any damages or loss of use due to their negligence. Any signage shall conform to standard Army/Installation signs/format and must be approved by the KO and Government Representative in writing prior to placement and may not be permanently affixed to any Government property or structure.

3.3. Utilities. The Government will provide all utilities in the facility and will be available for the Contractor's use in performance of tasks outlined in this SOW. The Contractor shall instruct employees in utilities conservation practices. The Contractor shall be responsible for operating under conditions that preclude the waste of utilities, which include turning off the water faucets or valves after using the required amount to accomplish cleaning vehicles and equipment.

3.4. Equipment. The Government will provide the following equipment that will remain on Government facility under Government control; Scientific Atlanta SA-5751 Compact Ranges and Antenna Far-Field Range (2 Anechoic Chambers for Radome and Antenna testing, and Control Room), AC Power and Climate Control, Compact Range Feed Positioners, MI-33 Series Feed Horns (2.6 to 18 GHz), Antenna Positioner and Radome Positioner, and Radome Positioner Gimbal for antenna azimuth and elevation motion. Any alterations to equipment shall be approved prior in writing and equipment shall be returned to its original condition, if applicable, prior to completion of this contract. Contractor shall be responsible for any damages or loss of use due to their negligence.

3.5. Documentations. The Government will provide the following documentations:

- a. Local Engineering Specification No. 45500-01-2014, ALR-67 V(3) Antenna Detectors, Electrical Testing Of
- b. Local Engineering Specification No. 45500-01-2015, APS-115 Radar Antennas, Electrical Range Testing Of

PART 4 CONTRACTOR FURNISHED ITEMS AND SERVICES

4. Contractor Furnished Items and Responsibilities.

4.1. Contractor Furnished Items. Everything included in Part 4, its paragraphs and subparagraphs, is basic to the contract and should be included in the contract price.

4.1.1. The Contractor shall provide all labor, supervision, transportation, vehicles, supplies, equipment, materials, facilities and services required to perform work under this contract that are not listed under Section 3 of this SOW.

4.2. Materials. The Contractor shall provide the following materials in support of this requirement:

4.2.1. Technical Documentation. The Contractor shall provide three (3) hardcopies and one (1) electronic copy in Adobe PDF or MS Office of the following technical documents at least two (2) weeks prior to the training listed in Section 5.10.:

- a. Schematic Block Diagram
- b. Operations and Maintenance Training Lesson Plans
- c. System Reference Manual
- d. Hardware Operator Manuals
- e. Software Operator Manuals
- f. Hardware Maintenance Manuals with Illustrated Parts Breakdown
- g. Preventative Maintenance Manual
- h. Calibration and Measurements Requirements
- i. System Commercial Off-the Shelf Manuals
- j. System Supplemental Data for Commercial Off-the Shelf Manuals

4.2.2. All manpower, tools, and equipment required for unpacking and installing of equipment.

4.2.3. Training Materials. The Contractor shall provide a hardcopy of the training guide used for classroom instruction for each student, up to 10 students. The guides shall be distributed to the students at the beginning of the first classroom session. Additionally, an electronic copy in Adobe PDF or MS Office of the training guide shall be available to each student in CD format, presented along with the hardcopy.

4.3. Equipment. The Contractor shall provide the following equipment in support of this requirement:

4.3.1. Computer Workstation Systems. The Contractor shall provide a total of two (2) separate computer workstations with industry standard hardware for the Radome Range and Antenna Range upgrades; one for each Range. The Contractor shall provide all hardware including, but not limited to, graphics cards and data bus interfaces, and software required to collect, store, analyze, report, plot, and retrieve antenna and Radome test data. The Radome Range software shall have a comprehensive Radome Data Acquisition and Analysis package as specified in TE 1, Radome Chamber Control and Analysis Software Specification. As a minimum, the computers supplied shall meet the requirements stated herein.

- a. Hardware.

- (1) 4 Ghz Intel Quad Core Microprocessor with integrated graphics core (or equivalent)
- (2) 8 GB DDR3 1600 MHZ RAM

- (3) 500 GB hard drive
- (4) CD-R/DVD-RW drive
- (5) Dual 22" LCD Monitors
- (6) Color Laser Printer

b. Software.

- (1) Windows 7 Operating System
- (2) Microsoft Office Professional 2012 or later
- (3) Visual Studio 2012 or later
- (4) Adobe Acrobat 10 or later
- (5) MATLAB (2010 or latest version)

c. Security Provisions.

- (1) The hardware and software platforms provided shall be unclassified.
- (2) The Contractor shall provide means whereby the user can input the security classification of the reports, graphs, and other data produced by the system and automatically create such reports, graphs and other data with the appropriate security classification labels.
- (3) The Contractor shall provide a means whereby, in lieu of the actual frequencies and/or amplitudes used during antenna testing, user entered alternate designations (e.g., F1) are used on all outputs.
- (4) Reports shall be capable of being produced without absolute values.
- (5) A provision for requiring the entry of a password or smart card to boot-up a computer shall be included.

4.4. Responsibilities of the Contractor.

- a. The Contractor shall provide a safe working environment for key consultants and all persons in his/her employ as prescribed by 29 CFR Part 1910 "Occupational Health and Safety". The Contractor shall be responsible for all damages to persons and property that occur in connection with the work and service under this contract, without recourse against the Government.
- b. Contractor shall exercise extreme caution to protect building finishes, private property, military property, etc., from damage during the performance of these contract requirements. Contractor shall be responsible for all loss or damage or whatsoever kind and nature to all Government property, while in the performance of these contract requirements, which result in whole or in part from the negligence or omissions of Contractor, any of his Subcontractors or any employee, agent or any representative of the Contractor or Subcontractor(s).

- c. The Contractor shall also be responsible for all materials delivered and work performed until completion and acceptance of the entire work, except for any completed unit of work which may have been accepted under the contract.

PART 5 SPECIFIC TASKS

5. General. The Contractor shall provide all skilled personnel, equipment, supplies, tools, materials, supervision, and other items necessary to perform this prescribed project as defined in this SOW to meet the requirements, except for those items specified as Government equipment furnished and services.

5.1. Antenna Range. The Contractor shall be responsible for upgrading the indoor antenna range. All upgrades shall be compatible with Visual Studio programming software.

5.1.1. The Contractor shall replace all existing signal source and receiver hardware (with the exception of the existing feed horns capable of operating between 2.6 and 18 GHz) with new hardware, to include but not limited to, mixers, cabling, couplers, attenuators, and junction boxes required to transmit and receive signals from 0.1 to 40 GHz (for far-field operation) and 2 to 18 GHz (for Compact Range operation).

5.1.2. The measurement system shall have a dynamic range of 130 dB minimum and sensitivity of at least -150 dBm. Automatic mixer drive level adjustment to compensate for cable loss shall be provided.

5.1.3. The system shall provide multiplexing capability for testing antennas with sum and difference signals.

5.1.4. The Contractor shall provide all software required to control the transmission and reception of the signals produced by the hardware. Switching between the far-field source and the compact range source shall be accomplished from the control room.

5.1.5. The measurement system shall synchronize signal transmission with positioner rotation to allow for maximum data throughput while performing data acquisition during antenna testing and allow beam steering with 16 channels and a minimum of 1024 beam states.

5.1.6. The system shall be capable of performing automatic analysis and applying user input Pass/Fail criteria for the following measurements:

- a. Planar Pattern
- b. Polar Pattern
- c. Monopulse Pattern
- d. Directivity
- e. Beam width (3dB and xdB where x is a user input)
- f. Beam Peak Gain

- g. Boresight Position (Null and Peak)
- h. Boresight Error
- i. Side Lobe Levels for first three (3) Side Lobes
- j. Side Lobe Angular Position for first three (3) Side Lobes
- k. Null Depth
- l. Null Location
- m. Antenna Gain (Absolute and Referenced to a Standard Gain Horn)
- n. Multi-Pattern Comparison

5.1.7. The system shall display acquired raw data in real time.

5.1.8. The system shall be capable of generating and printing the following plot formats in both two (2) and three (3) dimensions:

- a. Rectangular
- b. Polar
- c. Contour
- d. Color Fill
- e. Overlay
- f. Log
- g. Linear

5.1.9. Plots shall be capable of being auto scaled or being scaled in accordance with user defined limits, combined, displayed simultaneously, normalized, and labeled with appropriate headings.

5.1.10. Collected (raw) and processed data shall be available for export in MS-Access and MS-Excel formats. Data shall be stored in MS-Access format, and the use of data translation utilities is acceptable to achieve this format.

5.1.11. Data files shall be capable of being merged so that multiple test runs can be analyzed as though they were conducted as a single test. Multiple single frequency tests shall be able to be analyzed as though a single, multiple frequency-scan tests were run.

5.1.12. Software shall be compatible with existing MI-3000 software to restore legacy test (APS-115 and ALR-67 antennas) capability after the upgrade have been performed.

5.1.13. The measurement system shall be capable of automatically positioning the antenna under test in accordance with user input parameters, to include but not limited to, start angle, end angle, and scan rate. The proposed system shall be compatible with the existing positioner and provide control of a minimum of seven (7) axes with simultaneous control of at least two (2) axes. Control commands shall be through commercially sustainable, industry standard interfaces. The Contractor shall be responsible for any upgrades or modifications to the existing positioner required to make it compatible with the Contractor provided system.

5.1.14. The positioner shall be controlled with a hand-held unit for operation of the positioner by a user in the test chamber.

5.1.15. Radio Frequency (RF) Probing is required to document Compact Range and Far-Field Range performance after upgrade installs are completed. Quiet Zone quality shall be assessed.

5.2. Radome Range. The Contractor shall be responsible for upgrading the radome range and provide a system that can maintain 0.1 – 18 GHz operational testing in the Compact Range and far-field configurations. The capability to develop software in Visual Studio for unique testing and data analysis shall be provided.

5.2.1. Upgrades shall be compatible and sufficient to accomplish electrical testing of F-18C/D Radomes and F-18E/F Radomes per major requirements, to include but not limited to Transmission Efficiency, Beam Deflection, Pattern Distortion, and Reflectivity as stated in TE 2, F-18 Radome Performance Acceptance Tests. Radome transmission efficiency tests shall have an accuracy to repeatedly measure minimum averages of approximately 90%, and beam deflection measurements shall be able to discern changes of 3.6 milliradians and less. In the case of F-18E/F (Active Electronically Scanned Array) Radomes, a Government furnished APG-65 (or AV-8B) array shall be used for electrical compatibility testing.

5.2.2. Data files shall be created and maintained in a Microsoft Access format.

5.2.3. The Contractor shall provide rack-mounted RF Measurement System that includes a Microwave Receiver with speeds and features that is on-par with the best microwave measurement systems presently available. The Receiver shall be versatile, have high fidelity and maximum sensitivity, and be suitable for Advanced Electronically Steered Array (AESA) testing. A Dynamic Range of 130 dB (min) and a sensitivity of -150 dBm are required. Automatic Mixer drive level adjustment for cable loss compensation is required when mixers are utilized in signal paths.

5.2.4. The Contractor shall provide a Motion Control System that is fully compatible with present Range Positioner and shall be maintained in the final design. Control System must be suitable for a minimum of six (6) position axes. Simultaneous control of a minimum two (2) axes is required. A local handheld control unit is required for all axis control to include gimbal axes within the test chamber. Control commands shall be via serial, General Purpose Interface Bus (GPIB) and Transmission Control Protocol/Internet Protocol (TCP/IP) interfaces. Contractors shall note that the antenna is mounted to the test positioner so that it moves with the radome scan axis, coordinated motion is required to counter steer the antenna as the radome is scanned; this coordination maintains the pointing direction of the test antenna relative to the source antenna.

5.2.5. The Contractor shall provide a data acquisition control device that is integrated into the system design to process triggering between the Position Controller, Network Analyzer, or RF Receiver. The device shall buffer the control computer while enhancing throughput, providing RF multiplexer and beam steering control at a minimum of 16 channels and 1024 beam states for the device under test.

5.2.6. The Contractor shall provide interconnection elements to include but not limited to, low-loss cabling, couplers, attenuators, and junction boxes for integration of control/measurement system. All RF and control cables shall be replaced, with the exception of Positioner through-axis cables that shall remain original unless these cables are not compatible with upgrade functions.

5.2.7. Broadband Mixer(s) shall support operation from 2 to 18GHz in the Compact Range configuration and from .1 to 2GHz in the far field configuration.

5.2.8. The Contractor shall provide a 4-Port Multiplexer on the Antenna Under Test (AUT) side of the roll stage (0.1 – 18 GHz operation).

5.2.9. The Contractor shall provide Synthesized Signal Source for total frequency range of operation.

5.2.10. System engineering survey and reviews for preliminary and critical designs, and factory integration testing of all equipment shall be provided by the Contractor prior to delivery. All reviews shall include completion reports as necessary. The Government's Positioners shall not be removed and used as test equipment at the Contractor's facility or elsewhere. Factory integration testing, including Positioner axes verifications, shall be accomplished using Contractor-provided software and hardware. The Contractor shall verify Positioner set-up is comparable in function to what the Government will be using. In the event that the above requirement is not feasible it is permissible to use simulation to model Positioner axis movement and proof of concept shall first be established to obtain Government concurrence for how this will be accomplished and justified by the Contractor.

5.2.11. The Contractor shall complete manufacturer installation/mounting of all new elements, including all hardware and software for turn-key operation. The Contractor shall ensure that full system verification and acceptance test demonstration after integration, to include validation that legacy test procedure functionality for EA-6B radomes shall be completely restored and that existing test programs are fully compatible with upgrades. The Contractor shall demonstrate all F-18 Radome test functionality in the absence of the actual Radome. Refer to Technical Exhibit 2. Tuning of all motion axes at installation is required by the Contractor.

5.2.12. Full documentation of upgrade items including system interconnect drawings, schematics, and wire diagrams pertinent to the changes that were made in the Radome Range shall be delivered by the Contractor upon completion of this contract. The Contractor shall provide three (3) copies of all applicable factory owner/operators manuals and service manuals for all new assemblies to include a site-specific System Manual.

5.2.13. The Contractor shall provide RF Probing to document Radome Compact Range performance upon completion of upgrade installation to include Quiet Zone quality assessment. Contractor shall submit report of probing results to the Government at contract completion.

5.2.14. The Contractor shall provide calibration procedures and specifications for all new equipment. The specifications shall be suitable for testing with the use of standard, non-proprietary support equipment presently in the Navy system.

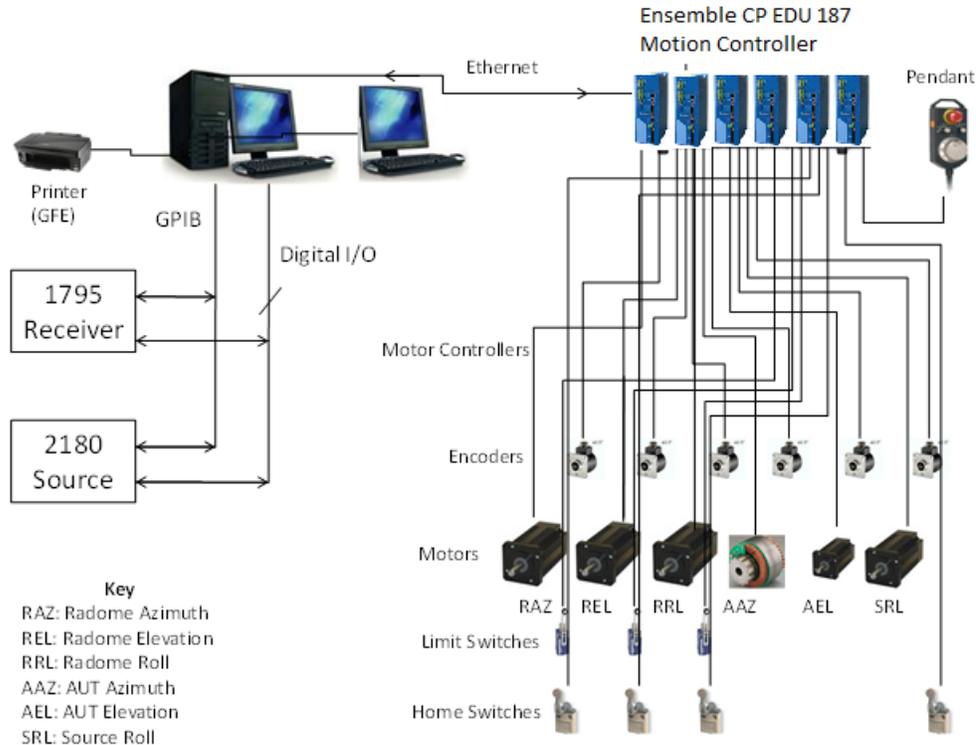
5.2.15. Motion control hardware is currently configured as shown in Table 1. The resulting motion control system after upgrade shall provide boresight error/beam deflection measurement readout accuracy of +/- 0.1 mrad (0.0057 degrees) and transmission efficiency measurement repeatability of +/- 2.0% (0.08 dB). Incorporation of the existing feedback systems in the upgrade design shall require the Contractor to make the Radome Azimuth (RAZ) feedback functional (presently not reliably operational). Replacing the entire motion control system in the upgrade design using the APG-65 gimbal or a new gimbal with equivalent array adaptive features is also permissive.

Table 1 Radome Range Motion Control Hardware

Location Axis	Motor/ Encoder	Manufacturer	Model	Torque	Speed (RPM)	Lines per revolution	Graduation Error (degrees)
Radome Azimuth (RAZ)	Motor	Aerotech	BM800-MS-E1000H NEMA 42	5.6 N-m cont., 9.4 N-m peak	3000		
	Encoder	Renishaw	RESR20U SA150 with RGH20Z5 0A00A read head			23,600	0.00038
Radome Elevation (REL)	Motor	Aerotech	BM800E-MS-E1000H NEMA 42	5.6 N-m cont., 9.4 N-m peak	3000		
	Encoder	Renishaw	RESR20U SA115 with RGH20Z5 0A00A read head			18,000	0.0005
Radome Roll (RRL)	Motor	Aerotech	BM800-MS-E2000H NEMA 42	5.6 N-m cont., 9.4 N-m peak	3,000		
	Encoder	Aerotech	Integral with motor			2,000	0.09
Antenna Azimuth (AAZ)	Motor	Aerotech	S130-81 Frameless	5.89N.m cont., 23.55N.m peak	1,500		

	Encoder	Renishaw	RESR20U SA115 with RGH20Z5 0A00A read head			18,000	0.0005
Antenna Elevation (AEL)	Motor	Aerotech	S130-60 Frameless	4.18N.m cont., 16.73N.m peak	2,000		
	Encoder	Renishaw	RESR20U SA150 with RGH20Z5 0A00A read head			23,600	0.00038
Source Roll (SRL)	Motor	Aerotech	BM250- MS- E2000H NEMA 34	2.0 N-m cont., 5.0 N-m peak	4,000		
	Encoder	Aerotech	Integral with motor			2,000	0.09

Figure 2. Radome Range Motion Control Hardware Architecture Block Diagram



5.2.16. The software shall have the ability to analyze Transmission Efficiency by applying beam deflection correction to compensate for boresight errors induced by the radome under test. The new software package shall also provide the ability to zero-reference all axes and command any axis to a desired location while satisfying the accuracy requirements in section 5.2.15.

5.2.17. The Contractor shall develop and perform a test procedure to demonstrate that the requirements in sections 5.2.15 and 5.2.16 are met. The test procedure shall include, but not limited to, the method defined in Section 5.3.

5.3. Baseline Establishment. The Contractor shall perform tests to demonstrate, after all installations are completed, that the new performance levels of the Ranges are at or beyond the performance levels before the upgrade. Antenna test units shall be furnished by the Government for post-upgrade tests. Pre-upgrade testing will be performed by the Government using the same antennas and the data results will be made available to the Contractor. The Contractor shall submit reports of all testing in this section to the Government for evaluation at least two (2) days prior to training listed in Section 5.10. to validate operational check-out.

a. Antenna Test Range. The Contractor shall perform the following tests:

(1) Far-Field Range. ALR-67V(3) Enhanced Antenna Detector (EAD) Swept Boresight Gain Tests equivalent to the tests established in the Government's Local Engineering Specification using an EAD golden unit.

(2) Compact Range. APS-115 Antenna Electrical Range Tests equivalent to tests established in the Government's Local Engineering Specification using an APS-115 Antenna Shop Test Unit.

b. Radome Test Range. The Contractor shall perform the following tests:

(1) Minimum of five (5) back-to-back Transmission Efficiency tests using the APG-65 antenna array without Radome on two (2) consecutive days. Data comparison of the simultaneous tests shall demonstrate 98% or higher efficiency.

(2) Minimum of five (5) back-to-back Beam Deflection Error tests using the APG-65 antenna array without Radome on two (2) consecutive days. Data comparison of the simultaneous tests shall demonstrate 0.0057 degrees or less beam deflection.

5.4. Design and Production. The Contractor shall design and produce a fully operational Antenna/Radome performance measurement system, using commercially available, off-the-shelf equipment with features and speeds on par with the latest, most sophisticated and advanced technology developments that shall meet or exceed the performance specifications. Except for that equipment specified in Section 3.4, the new system shall replace all existing equipment.

5.5. Packing and Shipping. The Contractor shall be responsible for packing and shipping all hardware and software, to include documentation.

5.6. Unpacking and Installing. The Contractor shall unpack, inspect, and install all hardware and software included as part of the system upgrade.

5.7. Operational Verification and Check Out. The Contractor shall conduct all operational testing necessary to ensure that equipment is installed and operating correctly after installation. A Government Technical Point of Contact will observe the final check and verify the system is fully operational prior to final acceptance of the equipment. Testing shall ensure that the system is capable of testing legacy APS-115/ALR-67 antennas and EA-6B Radomes, and Government developed software will run on the new system. Range procedures used for testing specific antennas and Radomes will be available upon request.

5.8. Calibration. The Contractor shall certify calibration of all electronic equipment used in the upgrade prior to installation and validate proper functionality of new equipment after system integration. Calibration procedures for Government maintenance of the delivered system shall be included and make use of standard, non-proprietary support equipment currently owned/used by the US Navy.

5.9. Warranty. The Contractor shall provide a one (1) year warranty for all parts and labor after Government acceptance of the system. The Contractor shall provide a one (1) year warranty to include telephone and on-site support after software acceptance. All software defect remedies and software upgrades during this one (1) year period shall be included in the Contractor's overall price.

5.10. Training. The Contractor shall provide on-site comprehensive training for up to ten (10) Government personnel covering the operation and maintenance of all upgraded system components and software. Training topics, at a minimum, shall include discussions and demonstrations of design features, theory of operation, user procedures, and maintenance/calibration actions for upgraded equipment. Training shall be conducted within the first full work week following final check-out of upgrades and consists of a minimum of 24 contact hours conducted in no more than three (3) days. The Contractor shall provide each student with appropriate training materials, which shall include a Training Guide.

5.11. Deliverables.

5.11.1. Antenna Range. The Contractor shall provide fully upgraded indoor antenna range as specified in the SOW.

5.11.2. Radome Range. The Contractor shall provide fully upgraded radome range as specified in the SOW.

5.11.3. Technical Documentation. The Contractor shall provide three (3) copies of all applicable factory owner/operators manuals and service manuals for all new assemblies to include a site-specific System Manual [Contract Data Requirements List (CDRL) A0001].

5.11.4. Training Materials. The Contractor shall provide one (1) copy of all training materials, consisting of one (1) hard copy and one (1) CD, per Section 4.2.3. for up to ten (10) Government personnel (CDRL A0002).

5.11.5. Reports. The Contractor shall provide the following reports to the Government Representative:

- a. RF Probing. The Contractor shall provide report of probing results to the Government at contract completion (CDRL A0003).
- b. Baseline Establishment. The Contractor shall submit reports of all testing of the Baseline Establishment to the Government for evaluation at least two (2) days prior to training to validate operational check-out (CDRL A0004).

5.12. Inspection Requirements. The Contractor shall provide quality services and/or products IAW this contract.

5.12.1. When the Contractor's performance is unsatisfactory; a CDR shall be issued. If a CDR has to be issued, the Contractor shall reply in writing, giving the reason for the unsatisfactory condition, and what corrective action has been taken; and procedures to prevent recurrence.

5.13. Enterprise-Wide Contractor Manpower Reporting Application (ECMRA) NMCARS 5237.102(90).

5.13.1. The Contractor shall report ALL Contractor labor hours (including Subcontractor labor hours) required for performance of services provided under this contract for the Fleet Readiness Center Southeast (FRCSE) 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/>, and then click on “Department of the Navy CMRA” or the icon of the DoD organization that is receiving or benefitting from the contracted services.

5.13.2. Reporting inputs will be for the labor executed during the period of performance during each Government fiscal year (FY), which runs October 1 through September 30. While inputs may be reported any time during the FY, all data shall be reported no later than October 31 of each calendar year, beginning with 2016. Contractors may direct questions to the help desk at help desk at: <http://www.ecmra.mil/>. Contractors may direct questions to the help desk by clicking on “Send an email” which is located under the Help Resources ribbon on the right side of the login page of the applicable Service/Component’s CMR website.

PART 6 APPLICABLE PUBLICATIONS AND FORMS

6. Applicable Publications (Current Editions)

6.1. The Contractor (to include Subcontractors) must abide by all applicable regulations, publications, manuals, and local policies and procedures.

- a. 29 CFR 1910, Occupational Health and Safety
- b. DoD 5500.7-R Joint Ethics Regulations (JER)
- c. OPNAVINST 5530.14E CH-2, Navy Physical Security and Law Enforcement Program
- d. OPNAVINST 5102.1D MCO P5102.1B, Navy & Marine Corps Mishap and Safety Investigation, Reporting, And Record Keeping Manual

6.2. Forms. Mandatory report form is listed below.

FRCSE 5500/17 – Visit And Access Request, available at https://navalforms.documentservices.dla.mil/formsDir/FRCSE_5500_17_8791.pdf

PART 7 TECHNICAL EXHIBIT LISTING

Technical Exhibit 1: Radome Chamber Control & Analysis Software Specification

Technical Exhibit 2: F-18 Radome Performance Acceptance Tests

Technical Exhibit 3: Contract Data Requirements List (CDRL)