

**STATEMENT OF WORK (SOW)**

**FOR**

**AUGMENTOR FUEL CONTROL / MAIN  
FUEL CONTROL (AFC/MFC) TEST STAND**

**BUILDING 3907**

**Oklahoma City Air Logistics Center  
Tinker Air Force Base**

**Prepared by**

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7 November 2022**

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

### Table of Contents

<b>1. SCOPE OF WORK:</b>	<b>5</b>
1.1 SCOPE:	5
1.2 BACKGROUND:	5
<b>2. APPLICABLE GOVERNMENT AND INDUSTRY STANDARDS:</b>	<b>5</b>
2.1 GOVERNMENT STANDARDS:	5
2.2 NON-GOVERNMENT STANDARDS:	6
2.3 ORDER OF PRECEDENCE:	7
2.4 APPLICABLE STANDARDS:	7
2.5 PROHIBITED MATERIALS:	9
<b>3. TEST STAND REQUIREMENTS:</b>	<b>10</b>
3.1 GENERAL:	10
3.2 CALIBRATION EQUIPMENT:	13
3.3 CONSTRUCTION:	13
3.4 INTERCHANGEABILITY:	14
3.5 MAINTAINABILITY:	14
3.6 LUBRICATION:	14
3.7 UTILITIES AND MAINTENANCE ACCESS:	14
3.8 INSTALLATION PLAN:	15
3.9 TEST STAND AREA CLASSIFICATION:	15
3.10 PC AND PLC CONTROL SYSTEM:	15
3.11 TEST STAND PRELIMINARY/FINAL CALIBRATION:	16
3.12 TEST STAND IVV AND AS-BUILT DRAWING REVIEW:	17
3.13 UUT FIXTURES AND TOOLING:	18
3.14 SOFTWARE:	18
3.15 PC AND SOFTWARE SECURITY:	19
3.16 EXTENDED SPARES KIT:	20
<b>4. ACCEPTANCE TESTS</b>	<b>21</b>
4.1 ACCEPTANCE TESTING WITH BASELINE DATA:	21
4.2 VIBRATION BASELINE TESTING:	21
4.3 AUDIBLE NOISE TEST:	21
4.4 FACTORY ACCEPTANCE TEST REPORT:	21
4.5 SOFTWARE TEST REPORT:	22
4.6 CORRELATION TEST REPORT:	22
4.7 MONTHLY STATUS REPORT:	22
4.8 TEST PLAN:	22
4.9 TRAINING PLAN:	22
4.10 WARRANTY:	22
4.11 PERSONNEL:	23
<b>5. QUALITY ASSURANCE PROVISIONS</b>	<b>23</b>
5.1 RESPONSIBILITY FOR INSPECTIONS:	23
5.2 RESPONSIBILITY FOR COMPLIANCE:	23
5.3 ENVIRONMENTAL CONDITIONS:	24
5.4 VISUAL EXAMINATION:	24
<b>6. DESIGN REVIEWS</b>	<b>24</b>
6.1 PRELIMINARY DESIGN REVIEW:	24

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

6.2	INTERMEDIATE DESIGN REVIEW: .....	24
6.3	CRITICAL DESIGN REVIEW: .....	24
6.4	FINAL ACCEPTANCE: .....	25
6.5	UUT FACTORY WITNESS TEST: .....	25
6.6	TEST STAND CORRELATION:.....	25
6.7	EMERGENCY POC: .....	25
<b>7.</b>	<b>TECHNICAL DATA REQUIREMENTS.....</b>	<b>26</b>
7.1	MANUALS/DRAWINGS: .....	26
7.2	WORK PLAN DRAWINGS.....	26
7.3	AS-BUILT DRAWINGS.....	26
7.4	SOFTWARE DOCUMENTATION:.....	27
7.5	COMMERCIAL MANUALS: .....	27
7.6	LEVEL 3 DRAWINGS: .....	28
7.7	DOCUMENTATION: .....	29
<b>8.</b>	<b>TRAINING REQUIREMENTS .....</b>	<b>29</b>
8.1	GENERAL: .....	29
8.2	OPERATOR TRAINING: .....	29
8.3	ELECTRICAL/MECHANICAL TRAINING:.....	30
8.4	CALIBRATION TRAINING: .....	30
8.5	SOFTWARE/PROCESS ENGINEER TRAINING: .....	30
<b>9.</b>	<b>SPECIAL PROVISIONS .....</b>	<b>31</b>
9.1	GOVERNMENT OCCUPANCY OF FACILITIES & RESPONSIBILITIES: .....	31
9.2	GOVERNMENT INSTALLATION ACCESS:.....	32
9.3	WORKING HOURS: .....	32
9.4	SAFETY, FOREIGN OBJECT DEBRIS (FOD), DROPPED OBJECT PREVENTION (DOP) & QUALITY CONTROL .....	32
9.5	HOUSEKEEPING .....	33
9.6	TOOL CONTROL AND ACCOUNTABILITY: .....	33
9.7	FIELD VERIFY: .....	34
<b>10.</b>	<b>PROPOSAL BY CONTRACTOR: .....</b>	<b>34</b>
10.1	DESCRIPTION: .....	34
10.2	REQUIREMENTS:.....	34
10.3	NOTICE:.....	35
<b>11.</b>	<b>OTHER WRITTEN SUBMITTALS:.....</b>	<b>35</b>
11.1	REQUIRED SUBMITTALS .....	35
<b>12.</b>	<b>GOVERNMENT FURNISHED PROPERTY AND SERVICES.....</b>	<b>37</b>
12.1	GOVERNMENT FURNISHED PROPERTY (GFP) .....	37
12.2	SHARED PROPERTY OF THE GOVERNMENT. ....	38
12.3	SHARED STORAGE AREAS .....	38
12.4	CEASE TO USE AND RETURN TO GOVERNMENT.....	38
12.5	GOVERNMENT FURNISHED SERVICES .....	38
12.6	INTANGIBLE GOVERNMENT PROPERTY .....	40
12.7	GOVERNMENT FURNISHED DRAWINGS .....	41

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

### **APPENDICES**

Appendix A: Reliability Centered Maintenance and Vibration Severity Chart

Appendix B: Safety Specifications

Appendix C: Glossary and Definitions

Appendix D: Environmental

Appendix E: Certification Test Plan

Appendix F: Test Stand Technical Manual: Operation and Maintenance Instructions

Appendix G: Drawings-Basis of Design and Component Locations

Appendix H: UUT & Sub-component Test Specifications

Appendix I: Design Guidelines 450

Appendix J: Test Stand Technical Manual: Item Parts Breakdown

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

### 1. SCOPE OF WORK:

- 1.1 Scope: The Contractor shall construct, deliver, and install a new test stand capable of testing Augmentor Fuel Controls (AFCs) and Main Fuel Controls (MFCs) concurrently and independently. Test stand shall also be capable of testing the following Fuel Control components: LRU-AFC Fill Switch Module, LRU-AFC Core Resolver, LRU Sequencing Resolver, AFC Reset Manifold, F100 PLA Resolver, F100 MV Resolver, PS2 Computer Bracket, PLA Rate Limiter, and High Pressure Body. The test stand shall include a pump rack, or equivalent, capable of providing necessary testing pressures and flow rates. The test stand shall meet all of the performance specifications listed in this Statement of Work (SOW) and the most current version of end-item Technical Orders (T.O.s). Final plan shall be approved by the Government Point-of-Contact (POC). The Contractor shall supply all engineering, labor, materials, parts, tools, equipment, supplies, transportation, software, and incidentals necessary to operate the test stand. The Contractor shall also, provide training in the operation, maintenance, and calibration of the test stand. Acceptance testing as specified in this SOW must be performed for final acceptance of the test stand. Acceptance testing must be performed onsite at B3907 and the government shall supply the AFC/MFC end-items for the acceptance testing. The work associated with this contract shall have no impact on production in B3907 testing facility located in Building 3907 at the Oklahoma City Air Logistics Center (OC-ALC), Tinker Air Force Base, OK.
- 1.2 Background: There are currently two AFC and two MFC test stands that support the F-15 and F-16 weapon systems (F100-PW-220 or F100-PW-229 engine). The stands are composed of a hydraulic and electrical section mainly used to provide and control pressures and flows required during testing of AFCs, MFCs, or AFC/MFC components. In addition these stands utilize portable test carts on which the Unit Under Test (UUT) gets mounted and a remote pump system which feeds calibration fluid to the stands at the requested pressure and flow rate. These test stands have been extensively modified by Electrical Manufacturing and Distributors Inc (EMD). EMD installed Wonderware InTouch Human Machine Interface (HMI) software, Siemens SIMATIC NET 6.2 communication software, Siemens CPU 315-2AF03-0AB0 (PLC), and Windows 2000 operating system to the original stands. The new test stand is required to eliminate the single point failure of the pump module and maintain testing capacity during times of test stand maintenance. Additionally, the new test stand will have the added capacity of testing F100-229 AFCs which has been lost on the current AFC stands.

### 2. APPLICABLE GOVERNMENT AND INDUSTRY STANDARDS:

Contractor, at a minimum, is required to comply with the current editions of the following requirements for design, construction, installation and safety as applicable. The term “most recent edition” shall be understood to mean “most recently released edition as of date of issuance of contract.”

- 2.1 Government Standards: The following documents form a part of this purchase description to the extent stipulated herein.
- 2.1.1 U. S. DEPARTMENT OF LABOR

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

- 2.1.1.1 29 CFR 1910 – General Industry, OSHA Safety and Health Standards (29 CFR 1910), 2010 or most recent edition (available at <http://www.osha.gov/>)
- 2.1.1.2 (Application for copies should be addressed to the U.S. Department of Labor, 200 Constitution Ave, Washington, D.C. 20210)
- 2.1.2 ENVIRONMENTAL PROTECTION AGENCY
  - 2.1.2.1 40 CFR 82 – Protection of Stratospheric Ozone, 2010 or most recent edition
  - 2.1.2.2 (Application for copies should be addressed to the U.S. Department of Labor, 200 Constitution Ave, Washington, D.C. 20210)
- 2.1.3 FEDERAL STANDARDS
  - 2.1.3.1 FED-STD-H28A – Screw Thread Standards for Federal Services, 1994 (R2001) or most recent edition
  - 2.1.3.2 FED-STD-H28/21B – Screw Thread Standard for Federal Service, Metric Screw Threads, 1984 (R2006) or most recent edition
  - 2.1.3.3 (Application for copies should be addressed to Superintendent of Documents, Government Printing Office, Washington, D.C. 20402-001).
- 2.2 Non-Government Standards: The following documents form a part of this document to the extent stipulated herein.
  - 2.2.1 NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
    - 2.2.1.1 NFPA 1 – Fire Code, 2010 edition or most recent edition
    - 2.2.1.2 NFPA 70 – National Electrical Code, 2014 edition
    - 2.2.1.3 NFPA 70E – Standard for Electrical Safety in the Workplace, 2011 edition or most recent edition
    - 2.2.1.4 NFPA 79 – Electrical Standards for Industrial Machinery, 2007 or most recent edition
    - 2.2.1.5 (Application for copies should be addressed to National Fire Protection Association, Battermarch Park, Quincy, MA 02269)
  - 2.2.2 TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) STANDARD
    - 2.2.2.1 EIA/TIA-232-F – Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange, 1997 (R 2002) or most recent edition
    - 2.2.2.2 (Application for copies should be addressed to IHS International Inc., <http://www.ihs.com>, or call 1-800-854-7179 for U.S. and Canada)
  - 2.2.3 NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
    - 2.2.3.1 NEMA MG 1 – Motors and Generators, 2009 (R2010) or most recent edition
    - 2.2.3.2 NEMA ICS 6 – Industrial Control and Systems: Enclosures, 1993 (R2006) or most recent edition

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

- 2.2.3.3 (Application for copies should be addressed to National Electrical Manufacturers Association, 1300 N 17th Street, Suite 1752, Rosslyn, VA 22209)
- 2.2.4 AMERICAN NATIONAL STANDARD INSTITUTE
  - 2.2.4.1 ASTM SI 10 – American National Standard for use of the International System of Units (SI): The Modern Metric System, 2010 or most recent edition
  - 2.2.4.2 (Application for copies should be addressed to American National Standards Institute, Attn: Sales Department, 1430 Broadway, New York, NY 10018-3363)
- 2.2.5 AMERICAN WELDING SOCIETY INC (AWS)
  - 2.2.5.1 AWS D14.4 – Specification for Welded Joints in Machinery and Equipment, 1997 or most recent edition
  - 2.2.5.2 (Applications for copies should be addressed to the American Welding Society Inc., 550 North LeJeune Road, Miami, FL 33126)
- 2.2.6 INTERNATIONAL ORGANIZATION FOR STANDARDIZATION
  - 2.2.6.1 ISO 4413 – Hydraulic Fluid Power – General Rules and Safety Requirements for Systems and Their Components, 2010 or most recent edition
  - 2.2.6.2 (Application for copies should be addressed to International Organization for Standardization, 1, Ch. de la Voie-Creuse, Case postale 56, CH-1211 Geneva 20, Switzerland, e-mail central@iso.ch or IHS International Inc., <http://www.ihs.com>, or call 1-800-854-7179 for U.S. and Canada)
- 2.3 Order of Precedence: In the event of a conflict between the test of this specification and the references cited herein, the test of this specification takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exception has been obtained.
- 2.4 Applicable Standards
  - 2.4.1 Dimensional Systems: U.S. Customary System of Units (US) shall be used in the design and construction. In this specification, all measurements, dimensions, sizes, and capacities are given in the U.S. Customary System of Units (US).
  - 2.4.2 Measuring/Indicating Devices: All measuring and indicating devices, such as dial indicators, pressure gauges, temperature indicators, depth stops, and other similar devices used on the machine, shall be graduated in inch-pound units. Marking on all measuring and indicating devices shall be permanently and legibly engraved or etched on a non-glare background. All dials and other type indicating devices shall be securely mounted in place. Such devices shall be located so as to allow reading from the operator's normal workstation.
  - 2.4.3 Safety and Health: Covers, guards, and other safety devices shall be provided for all parts of the machine that present safety hazards. The safety devices shall not interfere with the operation of the machine. The safety devices shall prevent unintentional contact with the guarded part and shall be removable to facilitate inspection, maintenance and repair of the parts. All machine parts, components, mechanisms and assemblies furnished on the machine shall comply with all of the requirements of 29 CFR 1910.

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

- 2.4.4 Cautions–Warning Plates: Corrosion resistant “Caution” or “Warning” Plates shall be securely attached to the equipment in visible locations with any safety precautions to be observed by the operator or maintenance personnel permanently marked on the plates.
- 2.4.5 Noise Levels: The noise level emitted by the equipment under load shall not exceed 80 dBA when measured at the operator’s workstation or at any other point at a distance of three (3) feet from any of the equipment associated with the test stand unit as measured on the “A” weighted scale of a standard Type II sound level meter.
- 2.4.6 Chemicals: The Contractor shall not transport, ship or use any chemical, material or substance used in the performance of this SOW on Tinker AFB prior written approval is provided by 72 ABW/CEIE, Natural Infrastructure Management (Environmental Compliance). The Contractor shall furnish to the Government POC a list of all chemicals used in conjunction with the Installation of the equipment, container sizes and quantities, and their Safety Data Sheets (SDS) ten (10) working days after contract award date. The government reserves the right to reject use of any chemicals and request alternative(s) be proposed for completion of the installation. Proper use, storage and removal of any chemical required during installation of test stand shall be coordinated with the Tinker Unit Environmental Coordinator (UEC). UEC info will be made available to Contractor by Government POC, as needed. Contractor shall remove all unused chemicals from Tinker AFB. Contractor shall comply with all chemical and environmental requirements as stipulated in Appendix D.
- 2.4.7 Instruction Plates: All words on instruction plates shall be in the English language. Words shall be engraved, etched, embossed, or stamped in boldfaced letters on a contrasting background. Lettering shall be a minimum of 18 point font and the plates shall be sized accordingly to accommodate all standard text in this point size. Plates and lettering shall be fully compatible with MIL-PRF-7808L Grade 3 synthetic turbine engine oil and suffer no degradation when subjected to it.
- 2.4.8 Nameplate: A corrosion resistant metal nameplate permanently and legibly marked with the following information shall be securely attached to the machine in a readily visible location. Nameplate and lettering shall be fully compatible with MIL-PRF-7808L Grade 3 synthetic turbine engine oil and shall suffer no degradation when subjected to it. Lettering shall be a minimum of 18 point font.
- 2.4.8.1 Nomenclature of the Machine
  - 2.4.8.2 Manufacturer’s Name and Address
  - 2.4.8.3 Manufacturer’s Model Number
  - 2.4.8.4 Manufacturer’s Serial Number
  - 2.4.8.5 Date of Manufacture
  - 2.4.8.6 Contract Number
  - 2.4.8.7 Services Requirements – All service requirements to be included.
- 2.4.9 Castings and Forgings: All castings and forging shall be free from defects, scale, or mismatching. Processes such as welding, peening, plugging, or filling with solder or paste shall not be used on casting and forgings for reclaiming any parts of the machine. Such processes may only be used for enhancing surface finish and appearance.



# AFC/MFC Test Stand

## Statement of Work

7 November 2022

- 2.4.10 Welding, Brazing, and Soldering: Welding, brazing, or soldering shall be employed only where those operations are included in fabrication of the original design. These operations shall not be employed as repair or reclamation measures for defective parts. Any excess material used for such operations shall be thoroughly removed from the part(s) upon completion of the operations. Weldments shall comply with AWS D14.4.
- 2.4.11 Surface Finish: All surfaces of castings, forgings, molded parts, stampings, and welded parts shall be clean and free from sand, dirt film, sprues, flash, scale flux, and other harmful or extraneous materials. External surface edges shall be either rounded or beveled unless sharpness is required to perform a necessary function. Except as otherwise specified herein, the condition and finish of all surfaces shall be commensurate with the manufacturer's standard commercial practice.
- 2.4.12 Gears: All gears and pinions, if applicable, shall be designed and manufactured of a suitable ferrous material with proper width and size to transmit full-rated torque and horsepower throughout the speed ranges without failure for the expected service life of the machine.
- 2.4.13 Painting: Yellow or orange safety color-coding shall be used for designated physical hazards.
- 2.4.14 Screw Threads: All threaded parts used on the machine and its related attachments and accessories shall conform to FED-STD-H28 or FED-STD-H28/21B.
- 2.4.15 Electrical Items: All electrical/electronic components located within the interior and footprint of test stand shall meet or exceed the minimum requirements defined by NFPA 70 Article 500 Class I, Division I, Group D environment. Areas exterior to this region shall be Class I, Division II rated per NFPA 70, Article 500.
- 2.4.15.1 If purge air cabinets are utilized, purge air requirements shall be limited to 200 scfm. Contractor shall be responsible for tapping into existing supply duct in South Bay as necessary for any required feed to system and shall include a manual volume damper for flow control.
- 2.4.15.2 Purge air system and enclosures shall be protected from over pressurization. The system shall conform to NFPA 496 and International Society of Automation (ISA) 12.4 standards and be Underwriters Laboratory (UL) classified.
- 2.4.16 Electrical System: The machine shall be capable of running using the existing power supply source.
- 2.5 Prohibited Materials:
- 2.5.1 Mercury restriction: The machine shall contain neither mercury nor mercury compounds, or be exposed to free mercury during manufacture.
- 2.5.2 Asbestos restriction: Asbestos and materials containing asbestos shall not be used on or in the machine.
- 2.5.3 Polychlorinated Biphenyl (PCB) restriction: The use of polychlorinated biphenyl on or in the machine is prohibited.
- 2.5.4 Lithium restriction: Lithium batteries used in the computer system are exempt from this requirement.

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

- 2.5.5 Ozone Depleting Chemicals (ODC) Restrictions: Class I ozone depleting substances in accordance with (IAW) section 602(a) of the Clean Air Act Amendments 1990, 42 USC 7671a(a) as implemented by 40 CFR 82 Protection of Stratospheric Ozone, shall not be contained within or used on this equipment.
- 2.5.6 Environmental Protection: Under the operating, service, transportation and storage conditions described herein the machine shall not emit materials hazardous to the ecological system as prohibited by federal, state or local statutes in effect at the point of installation.
- 2.5.7 Other Environmental Compliance: Contractor shall comply with all environmental requirements as stipulated in Appendix D.

### 3. TEST STAND REQUIREMENTS:

- 3.1 General: The AFC/MFC test stand shall be new and unused (not a prototype). AFC/MFC test stand particulars are noted below:
  - 3.1.1 AFC/MFC stand shall be functionally based upon the existing AFC and MFC Test Stands, models PWA53112-1-OC001 and PWA53111-1-OC001 respectively, currently in use at Tinker AFB, Building 3907, Fuel Components Test Facility.
  - 3.1.2 Design shall include a pump rack, or equivalent, capable of providing calibration fluid at the necessary testing pressures and flow rates per UUT T.O.s.
  - 3.1.3 Design shall include provisions for a vent for connecting test stand calibration fluid tank to existing calibration fluid tank vent piping system. Calibration fluid tank shall also include a sight glass.
  - 3.1.4 Design shall be capable of holding UUT as required by the T.O.s, use of separate testing carts to accomplish this is not required. If test carts are used, UUT shall not have intermediary hose connections to the cart, instead all hoses from the UUT shall connect directly to the test stand in opposition to the format of existing AFC and MFC Test Stands.
  - 3.1.5 Test stands shall be outfitted with a calibration fluid dump system for the event of excessive heat or fire within the test stand. Dump system shall be capable of pumping the calibration fluid from the test stands to, and into, the industrial floor system.
    - 3.1.5.1 Dump system shall be capable of a minimum flow of 50 gpm.
    - 3.1.5.2 Contractor shall be responsible for installation of all piping from test stand to floor drain.
    - 3.1.5.3 Test stand shall come with an option to allow manual operation of the pumping system to pump out calibration fluid tank when needed.
  - 3.1.6 Original AFC and MFC test stand design drawings are the property of the USAF and relevant sheets are attached in Appendix G. These design drawings shall form the basis of design of the AFC/MFC stand. Intent of Appendix G is as follows:
    - 3.1.6.1 Provide a baseline for required coatings and layout of stand consoles, panels, regulators, valves, bleed ports, connection ports, drawers, doors, etc.

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

- 3.1.6.2 Denote general location of major components including pumps, motors, pressure transducers, flowmeters, and tanks.
- 3.1.6.3 Provide a level of detail for required panel electrical connectors and the mating connectors for UUT cables.
- 3.1.7 Electrical, hydraulic, and mechanical level 3 drawings of the AFC/MFC test stand shall be updated and provided to the government in .dwg format (AutoCAD 2018 or newer).
- 3.1.8 The AFC/MFC test stand shall be a completely standalone unit, fully capable of successfully testing every UUT and subcomponents IAW their respective T.O.s.
  - 3.1.8.1 Requirements are listed in Appendix H, the UUTs T.O.'s Test Section, and are also available to the Contractor upon request.
  - 3.1.8.2 Contractor shall verify latest Technical Order in use prior to software development.
  - 3.1.8.3 No modification/tweaking, by operator, of any testing control loop shall be required regardless of UUT being tested.
  - 3.1.8.4 Time to test requirement for each known good UUT, as tested by a certified Tinker mechanic, shall not exceed the following:
    - 3.1.8.4.1 F100-220 AFC (T.O. 6J3-2-34-2-2): 11 hours
    - 3.1.8.4.2 F100-229 AFC (T.O. 6J3-2-36-3): 18 hours
    - 3.1.8.4.3 LRU-AFC Fill Switch Module (T.O. 6J3-2-34-8-1): 3 hours
    - 3.1.8.4.4 LRU-AFC Core Resolver (T.O. 6J3-2-34-8-1): 3 hours
    - 3.1.8.4.5 LRU Sequencing Resolver (T.O. 6J3-2-34-8-1): 3 hours
    - 3.1.8.4.6 AFC Reset Manifold (T.O. 6J3-2-34-8-1): 2.6 hours
    - 3.1.8.4.7 AFC Resolver Assembly (T.O. 6J3-2-34-8-1): 6 hours
    - 3.1.8.4.8 F100-220 MFC (441610) (T.O. 6J3-4-118-2-2): 18 hours
    - 3.1.8.4.9 F100-220 MFC (441396) (T.O. 6J3-4-118-2-2): 15 hours
    - 3.1.8.4.10 F100-220 MFC (442645) (T.O. 6J3-4-118-2-2): 15 hours
    - 3.1.8.4.11 F100-229 MFC (T.O. 6J3-4-118-2-2): 17 hours
    - 3.1.8.4.12 F100 PLA Resolver (T.O. 6J3-4-118-2-2): 1.2 hours
    - 3.1.8.4.13 F100 MV Resolver (T.O. 6J3-4-118-2-2): 2 hours
    - 3.1.8.4.14 PS2 Computer Bracket (T.O. 6J3-4-118-2-2): 8 hours
    - 3.1.8.4.15 PLA Rate Limiter (T.O. 6J3-4-118-2-2): 1.5 hours
    - 3.1.8.4.16 High Pressure Body (T.O. 6J3-4-118-2-2): 3 hours
- 3.1.9 Prior to commencement of initial on site work, a pre-job safety meeting shall be conducted with the Contractor, to include but not limited to 76 CMXG Engineering, 76 CMXG Safety, and 76 CMXG Production.
  - 3.1.9.1 A pre-construction job review shall be conducted with Contractor prior to modification of any equipment.

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

- 3.1.10 All test stand components shall be available as commercial-off-the-shelf (COTS) items.
- 3.1.11 The AFC/MFC test stand shall be modular in design and shall be able to fit through an exterior door with maximum opening dimensions of 24' x 25'.
- 3.1.12 No proprietary software or technical data shall be used. The USAF shall have unlimited rights for all technical data and non-COTS software developed for this effort. All non-COTS source code and technical data developed shall be delivered to the government along with the COTS licenses at the end of the contract.
- 3.1.13 The Data Acquisition (DAQ) system shall utilize LabVIEW (2018 or newer) to develop a test program to communicate with Siemens S7 Programmable Logic Controller (PLC).
- 3.1.14 Test variables shall be indicated one of three ways: red if out-of-limits (OOL)-high, green if in limits, and yellow if OOL-low. Substitutions to colors may be used if approved by government POC.
- 3.1.15 The screen displayed readings shall be defined by the testing requirements for all UUTs. The display screen shall be able to display all the monitored parameters, organized in logical groups. The display default parameter display sizes shall be large enough to be seen by the operator and inspector during testing.
- 3.1.16 The footprint size of the test stand shall be approximately equal to twice the existing AFC and MFC test stands and pump rack shall not exceed size of existing B3907 pump module.
- 3.1.17 Delivery date for the test stand shall be no later than eighteen (18) months after date of contract.
- 3.1.18 Test stands shall be outfitted with plexiglass UUT cover that can be easily retracted to allow full access to UUT
- 3.1.19 Contractor shall be present for initial calibration of the test stand and shall remain present until calibration of the stand is complete. Calibration support shall be provided and be responsible for resolving any calibration issues that may arise from the modifications above within 10 days of identification.
- 3.1.20 The Contractor shall attend, or conference call, monthly collaboration meetings with Government POC, including but not limited to 76 CMXG Engineering and 76 CMXG Production, for the purpose of specifying progress to date, any changes to estimated completion date and sharing information to ensure accurate completion of all major milestones to meet performance requirements.
- 3.1.21 Training Sessions, as referenced in Section 8, shall be provided at Tinker AFB.
- 3.1.22 Correlational acceptance testing shall include a comparison run for each type of UUT: F100-220 and F100-229 AFCs, MFCs, and their components. The results for each run shall be comparable to the most current version of their respected T.O.s. Contractor shall successfully run Correlation Testing as detailed in Appendix E. Contractor shall be present for all Correlation Testing to record all data and to produce Correlation Test Reports.
- 3.1.23 Prior to acceptance, test stand and subcomponents shall be cleaned to adhere to Cleaning guidelines as defined in Technical Order. Cleanliness of the test stand is important to

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

satisfactory operation and to promoting a longer life for test stand equipment and components.

### 3.2 Calibration Equipment: Required calibration features for test stands are detailed below:

#### 3.2.1 Design shall include provisions for connecting test stand calibration equipment and be similar to existing test stand configurations.

3.2.1.1 Appendix F contains a list of items requiring calibration based on the current test stand designs. These items, or equivalents, shall be provided and incorporated into the stand design. If calibration procedures change, the Contractor shall be responsible for writing and providing updated calibration procedures to the government.

3.2.1.2 All items requiring calibration shall be currently listed in Air Force Metrology and Calibration Program (AFMETCAL) (Air Force TO 33K-1-100-2) as approved devices.

3.2.1.3 Real-time feedback on HMI of item being calibrated shall be available.

3.2.1.3.1 Raw signal and final units shall both be shown on HMI.

3.2.1.4 As Found and As Left data shall be available on HMI during calibration with an option to save data to hard drive during calibration

3.2.1.5 A minimum of 20 data points must be available for each item requiring calibration.

3.2.1.5.1 Five (5) alignment points minimum.

### 3.3 Construction: The AFC/MFC test stand shall be constructed of parts that are new, without defects, COTS, and free of repairs. Quality of materials used in construction shall be equivalent to or superior to those used in construction of existing AFC and MFC test stands located in B3907. Metals shall be of corrosion resistant materials unless suitably protected to resist corrosion. The machine construction shall include all components, parts, and features necessary to meet the performance requirements specified herein. All parts subject to damage from environmental hazards shall be sealed or otherwise protected. The machine shall be capable of withstanding all forces encountered during operation of the machine at its maximum rating and capacity without distortion or failure. Welding, plugging, or filling with solder or paste shall not be employed as repair or reclamation measures for defective parts. All screws, pins, bolts and similar parts shall be installed with means of preventing loss of tightness. All parts subject to removal or adjustment, shall not be swaged, peened, staked, or otherwise permanently deformed. Test stand shall be built in compliance with Design Guideline 450 as shown in Appendix I. The final design of the AFC/MFC test stand shall be neat, tidy, and match existing B3907 test stand colors.

3.3.1 Component Labeling: All test stand components shall be labeled with an embossed metal tag denoting part number as per the Illustrated Parts Breakdown (IPB). All hoses shall also be labeled with an embossed metal tag and hose schedule included in the IPB that details required pressure rating of hose, hose size, length, fluid compatibility requirements, maximum temperature and nominal location. All electrical wiring shall have heat shrink labels (or equivalent) placed on either end of wire and labels and

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

lettering shall suffer no degradation when subjected to any fluids associated with the AFC/MFC test stand.

- 3.3.2 Test Stand Anchoring: If AFC/MFC test stand is required to be anchored to the slab, anchors shall be no longer than three and three-quarter inches (3.75”) in length. All holes required to be drilled into the slab shall be no more than four inches (4”) deep. Any damage to the existing vapor barrier due to holes deeper than those allowed shall be fully repaired by the Contractor. Repair method and final repair shall be reviewed and approved by Tinker AFB Civil Engineering.
- 3.4 Interchangeability: To provide for replacement of worn parts, all parts bearing the same part number shall be functionally interchangeable and dimensionally identical within the manufacturer’s tolerance limits. Parts shall be the latest version available by the equipment supplier so that any replacement parts are available to the customer throughout the life of the equipment.
- 3.5 Maintainability: The machines shall be designed and constructed to permit effective maintenance. The machines shall be equipped with access covers (if applicable) to facilitate inspection, cleaning, repair and replacement of parts.
- 3.6 Lubrication: Means shall be provided to ensure adequate automatic lubrication for all moving parts. Recirculating systems shall include filters which are cleanable or replaceable. Each lubricant reservoir shall have visible or mechanical means for determining fluid level. All oil holes, grease fittings and filler caps shall be accessible. Parts consuming fluids shall be clearly identified as such along with the recommended periods of additions and the type of fluid that should be used. Contractor shall recommend a remedial maintenance schedule for servicing the lubrication system of the test stand.
- 3.7 Utilities and Maintenance Access: The Contractor shall provide maintenance access to the control panel, filters, pumps, and other parts requiring periodic maintenance or repair. All equipment access doors, control panels, and process sensitive areas shall be lockable. Keying configurations and methods of locking shall be discussed in the design reviews. The Contractor shall label each breaker pulled from the main electrical panel. Electrical schematic(s) shall be attached inside of the control panel with all components labeled and identified. A listing of all components and their ratings shall be provided. Unions and isolation valves shall be placed inline before and after each pump to allow for better maintenance access to the equipment. Catwalks, ladders, platforms, and other access considerations shall be the responsibility of the Contractor. Ladders exceeding twelve (12) feet in height shall contain fall protection. Contractor shall denote on the test stand main electrical device(s) the source panel name, location, and circuit breaker number(s) used to feed the electrical device even if using existing connections.
- 3.7.1 Utilities Interconnection: The Government will provide the required utilities, with the exception of the electrical, to within twenty-five (25) feet of test stand location. Contractor shall make final terminations of utilities to test stand. Contractor shall provide and run all conduit, conductors, and all other required electrical components from this connection point to the stand in order to make the stand fully operational



# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

electrically. All interconnections shall maintain the hazardous classifications for both inside and outside the test stand.

- 3.7.2 Surge Protection: All equipment shall utilize surge protection provided by Contractor with Government approval.
- 3.8 Installation Plan: Contractor shall submit an Installation Plan to the Government POC for review and approval. Installation Plan shall include:
  - 3.8.1 Drawing denoting test stand location on existing floor plan.
  - 3.8.2 Design drawing denoting general locations of major components including, but not limited to pumps, motors, pressure transducers, tanks, conduit sizes, conductor types and sizes, seal off locations, test stand electrical interconnect drawing, and over-current protection devices and sizes.
  - 3.8.3 All subcontractor and partnership information.
  - 3.8.4 Installation Plan shall be submitted to the Government POC a minimum of sixty (60) calendar days prior to initial work on test stand. Stand shall not be delivered until written approval of plan has been received by Contractor from the Government POC. The government shall have 10 working days to review the Installation Plan and initiate contact with Contractor to discuss/review/resolve any issues. Following resolution, Contractor shall have 5 working days to resubmit revised Installation Plan to Government POC for review and approval.
- 3.9 Test Stand Area Classification: The AFC/MFC test stand shall meet the following hazardous area classification requirements:
  - 3.9.1 All electrical/electronic components and connections located within the AFC/MFC test stand footprint - floor to ceiling - shall be Class I Division I Group D rated as defined in NFPA 70 Article 500.
    - 3.9.1.1 All components located inside the stand envelope and not Class I, Division I Group D rated shall be located in purge air enclosures.
      - 3.9.1.1.1 Purge air enclosures may be accessible from test stand interior provided point of access is reasonable from a maintenance perspective. All purge air enclosures shall be configured in accordance with all specifications listed and referenced in this SOW.
  - 3.9.2 All electrical/electronic components outside the test stand footprint shall be a minimum of Class I Division II Group D rated as defined by NFPA 70 Article 500 and shall be mounted in an enclosure(s). Enclosure(s) interior shall only be accessible from outside the MEC Test Stand envelope.
    - 3.9.2.1 While the intent is to maintain the integrity of a Class I Division II environment for all exterior electrical items, the very nature of electrical connections resident on the UUT's prevents strict adherence with this rating.
- 3.10 PC and PLC Control System: AFC/MFC test stand shall be controlled using a Professional Computer (PC) / Programmable Logic Controller (PLC) configuration as noted below:

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

- 3.10.1 PLC shall be Siemens S7 or Government approved equivalent and controlled using LabVIEW, no earlier than 2018, no substitutes accepted.
- 3.10.2 New Computer System with the following requirements:
  - 3.10.2.1 Latest Air Force approved Windows Enterprise version
  - 3.10.2.2 CPU: Quad Core i7 (minimum)
  - 3.10.2.3 Redundant Array of Independent Disks (RAID) array based with a minimum of 1TB SSDs
  - 3.10.2.4 8GB Synchronous Dynamic Random - Access Memory (SDRAM) minimum.
  - 3.10.2.5 Detachable, standard 101 key computer keyboard and mouse, Class I, Division II, Group D rated.
  - 3.10.2.6 USB mass storage device ports.
- 3.10.3 Minimum 15" color flat screen (touch screen) HMI with adjustable StrongArm (or equivalent) mount to test stand.
- 3.10.4 No custom proprietary software shall be used.
- 3.10.5 Local Area Network (LAN) connection capability to existing LAN system allowing full interface with and backup capability of test stand PC and PLC.
- 3.10.6 System shall be configured to backup key information including but not limited to system run state to a central data repository located on premise.
- 3.10.7 System addressing of LAN hardware will be set with guidance from system administrators to comply with existing network standards.
- 3.10.8 Hardware shall be chosen, where feasible, that has error handling capabilities and be tied back through LabVIEW for pre-test verification of operation.
- 3.10.9 PLC software shall be password protected at three separate levels as noted below:
  - 3.10.9.1 Operator level: allows access for testing of UUTs alone. Software changes and access to calibration data are NOT allowed at this level
  - 3.10.9.2 PMEL Tech level: allows access to Operator level as well as Calibration level to permit test stand calibration including entry of calibration data. Software changes are NOT allowed at this level
  - 3.10.9.3 Administrative level: allows access to all previous levels as well as capability to modify any test stand software as necessary. Any changes to software shall cause the associated Rev level of the software to change to the next logical level, i.e., Rev. levels shall not be check sum based.
- 3.11 Test Stand Preliminary/Final Calibration: Calibration process shall be delivered by Contractor for review at Intermediate Design Review. Review comments will be delivered via the Government POC back to Contractor within 10 working days. Contractor shall fully incorporate comments as necessary and resubmit revised procedure prior to Critical Design Review.



# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

- 3.11.1 Following installation of AFC/MFC test stand at Tinker AFB, Contractor shall complete and prove out the entire approved calibration process prior to contacting PMEL personnel. Preliminary calibration process shall include a Calibration Summation spreadsheet completed by Contractor detailing the following:
  - 3.11.1.1 Each item calibrated and calibration results (Pass or Fail).
  - 3.11.1.2 Initials of technician who performed item calibrated and date the calibration was completed.
  - 3.11.1.3 As Left values for each item calibrated.
  - 3.11.1.4 Any alignments or adjustments performed during calibration.
- 3.11.2 Final Calibration process shall be carried out as follows:
  - 3.11.2.1 Contractor shall have appropriate personnel present during the entire Final Calibration process.
  - 3.11.2.2 Review and perform entire calibration process, step-by-step, with PMEL personnel present.
  - 3.11.2.3 Modify calibration procedure and software as recommended and agreed to by PMEL personnel, as necessary.
  - 3.11.2.4 Once the calibration procedure is finalized, revised, and resubmitted by Contractor, PMEL will formally calibrate the test stand.
  - 3.11.2.5 Limitations on the calibration are not acceptable and any limitations noted by PMEL shall be fully resolved by Contractor.
- 3.12 Test Stand IVV and As-Built Drawing Review: Prior to government calibration, contractor shall provide the latest data package to the government. The government will verify the accuracy of all As-Built drawings, to include but not limited to IPB and all drawings associated with the project. Following review, the Government shall list all deficiencies noted and submit list to Contractor for correction. All deficiencies shall be corrected by Contractor prior to final As-Built drawing submittals. Once finalized, the Government shall submit a signed and dated document noting that As-Built drawings are 100 percent accurate. Please note that Level 3 drawings as per MIL-STD-31000B are required. Document shall include a detailed list of As-Built drawings including drawing name, date, and rev level of each drawing.
  - 3.12.1.1 Contractor shall also hire an independent Consultant to verify the accuracy of all As-Built drawings, COM data and all other submitted documentation required as a part of this contract. Following review, Consultant shall list all deficiencies noted and submit list to Contractor for correction. All deficiencies shall be corrected by Contractor prior to final documentation submittals unless otherwise approved by 76 CMXG/ENC Engineering. Once finalized, Consultant shall submit a signed and dated document noting that As-Built drawings, COM data and all other submitted documentation are 100 percent accurate.

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

- 3.13 UUT Fixtures and Tooling: Contractor shall provide all fixtures and tooling necessary for mounting and testing each UUT on AFC/MFC test stand. Tools and fixtures may be reverse engineered and fabricated, or authentic from Original Equipment Manufacturer (OEM).
- 3.13.1 If tools and fixtures are reverse engineered, manufacture drawings shall be included for all tools and fixtures that are reverse engineered and fabricated. Manufacture drawings shall be such that local manufacture of any item can be achieved without further engineering. Requirements for tooling and fixtures can be found in UUT T.O.s (Appendix H).
- 3.14 Software: The Contractor shall develop a Test Executive as well as individual UUT Computer Software Configuration Items (CSCIs) so that they can have separate configuration management at the completion of the contract. The software shall be developed utilizing an object oriented design such that there is an Executive piece that calls independent pieces for each UUT. The software shall perform data acquisition, conversion, limit, and alarm checking, data logging, real time calculations, control loop updates, initiate data saves and computations.
- 3.14.1 Self-Test: The Contractor shall develop self-test software to identify faulty equipment in the test stand and be used for troubleshooting of the stand.
- 3.14.2 Executive Software: Contractor shall develop executive software that is common to all UUT types tested.
- 3.14.2.1 The Executive Software shall run on the latest Air Force approved Windows OS platform. Occasionally, a Windows OS may freeze or lock up when a software program performs an illegal operation, or it may include an Interrupt Request line (IRQ) conflict, incompatible device driver, virus, etc. To prevent such problems, all software updates to OS, device drivers, or anti-virus software, or the addition of hardware shall be performed by an authorized software maintainer.
- 3.14.2.2 A password protected Administrative level shall be used to limit user access to executive software including drives, read/write access, and OS privileges in order to prevent transfer of viruses or unwanted data. However, if it is suspected that a host computer is infected with a computer virus, a qualified user shall be able to initiate a system scan.
- 3.14.2.3 In the event of Windows OS lock ups, a manual E-stop switch shall allow the operator to bring the UUT to a safe condition.
- 3.14.3 UUT Software: Before executing selected UUT test, the software shall capture and archive the UUT specifications such as, but not limited to: weapon system and Individual Tracking Number (ITN), UUT serial number, test stand's On-Condition (OC) number, date, and time. Contractor shall develop menu screens that shall be used for UUT test screens.
- 3.14.3.1 The Test Points (TPs) shall be formatted in accordance with (IAW) the target test equipment style requirements. The main test menu shall display a list each individual TP, matching the most current version of T.O. requirements, prompting the operator to select which semi-automated test to run in as well as prompting the operator afterwards to acknowledge that the selected test has completed.

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

- 3.14.3.2 Once an individual test section is complete, the display shall read, “Operator must confirm test IAW T.O.” and the operator will then confirm the action on the test screen.
- 3.14.3.3 All tests points shall be programmed and carried out IAW the most current version of UUT T.O.s including applicable AF Form 202s.
- 3.14.3.4 The generated test report shall include a comments section to allow the operator to digitally input comments.
- 3.14.3.5 Hardware and Operator Error handling shall be integrated into the software.
- 3.14.4 The software shall use a data acquisition (DAQ) system for capturing data throughout the testing of each UUT. During testing of each UUT, data shall be written to the hard drive in the new computer system at regular intervals.
  - 3.14.4.1 The DAQ system shall meet a minimum sampling rate of 1 sample per second.
  - 3.14.4.2 The data collected shall include all testing parameter requirements IAW T.O. such as, but not limited to: signal voltages, fluid pressures, fluid flow rates, and fluid temperatures.
  - 3.14.4.3 The data collected shall have the capability of being exported to the latest Air Force approved Microsoft Excel Enterprise version.
  - 3.14.4.4 The data from the last one hundred (100) tests, at a minimum, shall be captured and archived on the new computer system. The software shall have a playback simulation function using archived data imported from the latest Air Force approved Microsoft Excel.
- 3.14.5 Test results shall be used to generate and populate UUT test reports. Test reports shall be archived electronically in the test stand’s computer system and be available for easy retrieval by Operator in PDF format. Test results shall also be capable of being printed out from the test stand to locally connected printer.
  - 3.14.5.1 The test reports shall be searchable by, but not limited to, weapon system, ITN, serial number, Control number, and date.
  - 3.14.5.2 The test reports and results shall not be allowed to be electronically changed in any way and may only be allowed to be removed from the PC at the Administrative level.
  - 3.14.5.3 Contractor shall verify UUT test reports can be printed using the Government furnished printer and that test reports are complete and accurate.
- 3.15 PC and Software Security: The contractor shall take the following necessary steps to ensure Government data is safeguarded and secure.
  - 3.15.1 The contractor shall protect Government data by implementing safeguards addressing, at a minimum, the 15 listed areas, which corresponds with the following National Institute of Standards and Technology (NIST) security controls: AC-6, AC-3, AC-20, CA-3, SC-7, AC-22, IA-2, IA-8, MP-6, PE-3, SI-2, SI-3.

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

- 3.15.2 The contractor shall ensure that details about the safeguards for protecting critical program information are not disclosed or published without written consent of the Contracting Officer.
- 3.15.3 The contractor shall allow the Government access to facilities and resources necessary to execute an inspection program to verify that Government data is secured.
- 3.15.4 The contractor shall Safeguard all DoD covered defense information in accordance with DFARS Clauses 252.204-7008, "Compliance with Safeguarding Covered Defense Information Controls" (AUG 2015) and 252.204-7012, "Covered Defense Information and Cyber Incident Reporting" (SEP 2015) on all information systems that are owned, or operated by or for, a contractor and that processes, stores, or transmits covered defense information (SSE Guidebook V1.1, p. 41).
- 3.15.5 The contractor shall report cyber incidents in accordance with Defense Federal Acquisition Regulation Supplement (DFARS) Clauses 252.204-7008, "Compliance with Safeguarding Covered Defense Information Controls" (AUG 2015) and 252.204-7012, "Covered Defense Information and Cyber Incident Reporting" (SEP 2015) (SSE Guidebook V1.1, p. 59).
- 3.15.6 The contractor shall ensure cloud computing services adhere to the requirements in DFARS Clauses 252.239-7009, "Representation of Use of Cloud Computing" (SEP 2015) and 252.239-7010, "Cloud Computing Services" (AUG 2015) (SSE Guidebook V1.1, p. 46).
- 3.15.7 The contractor shall insure that system administrators have access to perform mandatory patch management and security scans in order to comply with current AFSC System Maintenance Plan and Information System Configuration Management.
- 3.15.8 The contractor will insure that any windows operating system can be configured to be domain joined and that contractor access will be restricted upon completion until access is deemed needed for consultation, maintenance, or repair.
- 3.16 Extended Spares Kit: The Contractor shall provide a list of suggested extended spare parts, with manufacturer's lead times and expected service life, for the system.
  - 3.16.1 The list shall identify the part name, the Contractor's part number, the manufacturer's name and address, the manufacturer's part number if different from the Contractor's part number, the part cost, and the number required per system or quantity recommended for spare parts.
  - 3.16.2 The list shall be prioritized from the most used/needed to the least used/needed items, taking into account which items are most susceptible to damage, wear, and the mean time between failures, if established, for replaceable parts.
  - 3.16.3 The list shall include both individual items and kitted parts with unit pricing for each item or kit.
  - 3.16.4 The listing shall include those parts needed for maintenance of the test stand for the first and second year of operation.

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

- 3.16.5 The contractor shall provide a full set of spare flowmeters as used in the test stand. Contractor shall also provide one (1) complete spare parts kit for items listed as being the most susceptible to damage/wear and having a lead time of more than 30 days.

#### 4. Acceptance Tests

- 4.1 Acceptance Testing with Baseline Data: Baseline data is condition monitoring information that is representative of equipment in a new and/or properly operating condition. The baseline data is the foundation of the predictive trending analysis required to forecast equipment condition. Baselining, including Equipment Health Checkout, is detailed in Appendix A and will be completed by personnel from 76 MXSG/MXDEQ. This effort shall be performed following Final Calibration of the test stand and prior to commencement of Correlation Testing and shall be attended by a Contractor's technical representative. Additional information requested in Appendix A shall be provided to the Government POC for distribution.
- 4.2 Vibration Baseline Testing: Contractor shall complete a vibration baseline for each motor, motor/drive and pump/motor combination following factory alignment. All data shall be taken in accordance with ISO10816-3 and acceptable vibration levels are as per the "New machine condition" range detailed in the ISO 10816-3 Vibration Severity Chart (see Appendix A). This data shall form the vibration baseline for each motor and pump/motor combination, provided all data is in Good Condition or better, as per ISO10816-3. Vibrations that are unacceptable as per the ISO 10816-3 Vibration Severity Chart, New Machine Condition shall be remediated prior to install. Vibration data shall be submitted to Government POC for review prior to shipment of stand.
- 4.2.1 Following Final Calibration of the AFC/MFC test stand at Tinker AFB and prior to Correlation Testing, all motor and pump/motor vibrations will be re-checked by 76 MXSG/MXDEQ personnel. Any vibration reading that has increased by twenty-five (25) percent or more from factory readings or falls outside of New Machine Condition, as per ISO 10816-3 Vibration Severity Chart shall be remediated by Contractor, at no cost to the government. Following successful remediation, a final vibration report noting all components/combinations tested, Root Mean Squared (RMS) and "Derived Peak" vibration data in inches per second (ips) as read at Tinker by Contractor and by 76 MXSG/MXDEQ shall be completed by Contractor and submitted to the Government POC for review. Report shall also include class of motor, motor/drive and pump/motor combination tested and zonal results, all as per ISO10816-3.
- 4.3 Audible Noise Test: The equipment shall be evaluated prior to calibration and post correlation in such a manner as to determine compliance with Noise Levels in Section 2.4.5. For each measurement, the microphone shall be located on a straight line which is perpendicular to the surface/corner being measured at the specified distance of three (3) feet. The measurements shall be measured on the "A" weighted scale of a standard Type II sound level meter.
- 4.4 Factory Acceptance Test Report: The Contractor shall provide to the Government POC, a Factory Acceptance Test Report completed at origin. The Factory Acceptance Test Report

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

shall detail all of the testing that took place at the factory and the results thereof, date(s), and attendees.

- 4.5 Software Test Report: The Contractor shall provide to the Government POC a Software Test Report denoting testing dates, attendees, location of testing, and verifying that the test stand Software Acceptance Test Procedure was successfully executed and met T.O. requirements.
- 4.6 Correlation Test Report: Contractor shall complete a Correlation Test Report following completion of Correlation Testing (see example in Appendix E). Correlation Test Report shall be submitted to Government POC for distribution and review within 5 work days following completion of Correlation Testing.
- 4.7 Monthly Status Report: An Integrated Master Schedule (IMS) shall be provided to the Government POC ten (10) working days following contract award for approval. Afterwards, the contractor shall provide a monthly status report to the Government POC as an update on the current status of the project in relation to the IMS, the current and subsequent month's priorities, along with any concerns or constraints. These reports shall be sent to the Government POC by the 5<sup>th</sup> calendar day of each month.
- 4.8 Test Plan: The test plan shall address all testing requirements specified in section 5 and in Appendix E. Contractor shall clearly identify: tests to be performed, test points, evaluation criteria, and a testing schedule to assure complete compliance with this SOW.
- 4.9 Training Plan: The training plan shall address all training requirements specified in section 8. The Contractor shall clearly identify content and scheduling of the training in such a manner as to assure complete compliance with this SOW.
- 4.10 Warranty: The Contractor shall warranty all equipment and workmanship free of defects for a period of no less than 730 calendar days. The Contractor will be notified of defects by the Government in writing. The Contractor shall respond to all reported problems within twenty-four (24) hours or less. Defects shall be remedied at no cost to the Government within 14 calendar days. Contractor shall be responsible for correcting any found defect or inconsistency with this SOW to the Government's satisfaction. If the defect or inconsistency persists beyond the 730 calendar day period or the standard warranty period, whichever is longer, the Contractor shall still be responsible for corrective action until the issue is rectified. All equipment will be subject to usage 24 hours a day, 7 days a week. Warranty shall start after all training, implementation audit(s), testing, deliverables, and final approval(s) are completed and the Government POC has issued their final acceptance of the test stand.
  - 4.10.1 Any spills caused by an equipment defect shall be cleaned up within two (2) hours at no cost to the Government. Contractor shall be responsible for damages caused by the defect and for any damages to the facility during the installation period. All materials and labor for corrective action, modifications, and defects shall be supplied by the Contractor, including a tracking number and carrier name e-mailed to the Government POC.
  - 4.10.2 The period of performance for this contract shall include a minimum of two (2) year warranty. The warranty shall not be considered null and void if governmental personnel



# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

are required to perform emergency shutdown or repairs to the equipment due to a defect that present a clear and present danger, such as could cause grave damage to the environment (i.e. toxic release of chemicals), presents a health hazard to personnel working in and around the equipment, or presents a safety hazard to the building, personnel within the building or other equipment surrounding the Contractor's equipment.

4.10.3 Contractor shall provide a method for reporting problems encountered with the AFC/MFC test stand following installation and throughout the warranty period. Upon receipt of problem report, Contractor shall analyze and respond with their planned corrective action and recommendations to the Oklahoma City Air Logistics Center (OC-ALC).

4.10.3.1 Problem reports shall be classified as by the OC-ALC as urgent or routine. Initial response time for urgent problem reports shall be forty eight (48) clock hours or less. Initial response time for routine problem reports shall be seven (7) calendar days.

4.10.3.2 Contractor shall provide contact information (phone, e-mail address at a minimum) for a primary and back-up POC for reporting problems.

4.11 Personnel: The contractor shall have the following minimum personnel on staff dedicated to the project:

4.11.1 At least one engineer with at least ten (10) years of experience in test stand construction and configuration.

4.11.2 At least one National Instruments Certified LabVIEW Architect with experience in LabVIEW and PLC systems.

4.11.3 At least one technician with at least ten (10) years of experience in the design, fabrication and installation of aircraft component testing equipment.

## **5. QUALITY ASSURANCE PROVISIONS**

5.1 Responsibility for Inspections: The Contractor shall be responsible for the performance of all inspection requirements as specified. The Government reserves the right to perform any inspections where deemed necessary to ensure the machine, supplies and services conform to the prescribed specifications. The Contractor shall provide all tooling, fixtures, measurement indicating devices, material, and programs required for compliance, accuracy, alignment, and machining inspections.

5.2 Responsibility for Compliance: All required inspections shall become a part of the Contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the Contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all the requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements; however, this does not authorize submissions of defective material, either indicated or actual, nor does it commit the Government to accept defective material.

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

- 5.3 Environmental Conditions: All tests shall be performed in an indoor facility with the surrounding ambient conditions, of 41°F to 104°F and 20% to 95% relative humidity as defined in T.O. 00-25-203.
- 5.4 Visual Examination: The test stand shall be visually examined to determine compliance with section 2.

### 6. Design Reviews

- 6.1 Preliminary Design Review: The Contractor shall provide a Preliminary Design Review (PDR). The design review shall be completed at the five to ten percent (5-10%) test stand design stage and identified in the IMS. The Contractor shall be required to conduct a meeting at the OC-ALC or video conference, if approved by the Government POC, for the PDR. The Contractor shall submit one (1) complete hard copy data package and one (1) electronic data package to the Government POC no later than (NLT) fourteen (14) calendar days prior to the on-site meeting. These packages shall include the engineering data, specifications, certificates, and reports and final products including catalog excerpts and salient characteristics. The Contractor shall be responsible for taking minutes during the meeting and shall provide one (1) electronic copy, via email or CD-ROM, to the Government POC NLT seven (7) calendar days after the meeting date.
- 6.1.1 Additional Tinker personnel from Bio-environmental, Fire Department, Safety, Quality, Engineering, and Maintenance organizations may be involved from the Preliminary Design Review forward, as required. These personnel buy-off on all equipment installed at Tinker AFB and may require an Implementation Audit.
- 6.2 Intermediate Design Review: The Contractor shall provide an Intermediate Design Review (IDR). The design review shall be completed fifty percent (50%) into the test stand design stage and identified in the IMS. The Contractor shall be required to conduct a meeting at the OC-ALC or video conference, if approved by the Government POC, for the IDR. The Contractor shall submit one (1) complete hard copy data package and one (1) electronic data package. These packages shall include the engineering data, specifications, certificates, reports and test plans as well as final products including catalog excerpts and salient characteristics. The submittal shall be sent to the Government POC NLT seven (14) calendar days prior to the on-site meeting. The Contractor shall be responsible for taking minutes during the meeting and shall provide one (1) electronic copy to the Government POC NLT seven (7) calendar days after the meeting date.
- 6.3 Critical Design Review: The Contractor shall provide a Critical Design Review. The design review shall be completed ninety percent (90%) into the test stand design stage. The Contractor shall be required to conduct a meeting for the Critical Design Review (CDR). The preferred site for the CDR is the Contractor's location where the test stand is being fabricated, however the CDR may be held at the OC-ALC or video conference, if approved by the Government POC. The Contractor shall submit one (1) complete hard copy data packages and one (1) electronic data package, preferably in pdf format. These packages shall include the engineering data, specifications, certificates and reports, as well as final products including catalog excerpts and salient characteristics. The proposed and baseline hardware



# AFC/MFC Test Stand

## Statement of Work

7 November 2022

and software configurations shall be reviewed to ensure that both are fully, commercially supportable and that a single baseline can exist. The submittal shall be sent to the Government POC NLT seven (14) calendar days prior to the meeting. The Contractor shall be responsible for taking minutes during the meeting and shall provide one (1) electronic copy to the Government POC NLT seven (7) calendar days after the meeting date.

- 6.4 Final Acceptance: Final acceptance shall be conducted upon completion of project at Tinker AFB, OK. Final acceptance of the test stand shall be made after the following items have been documented as completed, received, and approved:
  - 6.4.1 Successful performance demonstration by accomplishing all test plan requirements
  - 6.4.2 Acceptance Test Report
  - 6.4.3 Correlation Test Report
  - 6.4.4 Signed and dated IVV reports
  - 6.4.5 Vibration Report
  - 6.4.6 Test and warranty documentation.
  - 6.4.7 Test stand manuals, engineering drawings, and As-Built drawings.
  - 6.4.8 Software
    - 6.4.8.1 Licenses
    - 6.4.8.2 Source code
  - 6.4.9 Spare Parts
  - 6.4.10 UUT Fixtures and tooling
- 6.5 UUT Factory Witness Test: Prior to performing this witness test, Contractor shall complete a full and successful test stand calibration. Contractor shall run a factory witness test using F100-220 and F100-229 AFC's and MFC's (four UUTs total), subject to availability, furnished by Tinker AFB. Contractor shall run the full test as required by UUT T.O. and with Tinker personnel present. Following successful completion of testing, Contractor shall return the AFC's and MFC's to Tinker AFB in accordance with the instructions cited in section 12. Any and all problems discovered during testing shall be resolved by contractor prior to correlation testing.
- 6.6 Test Stand Correlation: Once Final Calibration is complete and PMEL has placed its calibration sticker on the test stand and the IVV process noted above is complete, Contractor shall successfully run Correlation Testing as detailed in Appendix E.
- 6.7 Emergency POC: An Emergency and Project POC Telephone List shall be jointly developed. An emergency and project telephone list shall be provided by the Contractor to the government inspector.

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

### 7. TECHNICAL DATA REQUIREMENTS

7.1 Manuals/Drawings: The Contractor shall furnish three (3) hard copies of all technical manuals/drawings containing all information necessary for the programming, operation, maintenance (parts list, electrical schematics, ladder logic and I/O diagrams), and repair of the test stand. One (1) complete set of manuals/drawings shall be sent to the Government POC 14 calendar days prior to the shipping date and the remaining two sets concurrently with the completion date. Technical data shall be provided in a digital, editable format on CD-ROM disc (no USB drives allowed). All manuals and other technical data, excluding drawings, shall be provided in .docx (Word 2016 or newer). All drawings shall be provided in .dwg format (AutoCAD 2018 or newer).

7.1.1 Please note that all drawings shall be Level 3 as per MIL-STD 31000B.

#### 7.2 Work Plan Drawings

7.2.1 Contractor shall keep “approved for installation” work plan drawings and specifications on site throughout installation for quick reference for discussions.

7.2.2 Site Preparation Data: A final layout drawing showing outline dimensions (both plan and elevation), floor loading (showing weights and bearing areas), all utility requirements and any other information required to prepare the installation site shall be provided.

7.2.3 Pre-Installation Plan: The Contractor shall provide, to the receiving Government Facility, engineering, installation, and schematic drawings showing the necessary compressed air, water, and electrical utilities of the test stands. The installation drawings shall be provided no later than 60 calendar days after-receipt-of order (ARO) to ensure roughed in utilities are prepared and available for installation.

7.2.4 These drawings shall include but not be limited to:

7.2.4.1 Floor plan noting size, location and footprint of test stand components

7.2.4.2 Wire and conduit sizes

7.2.4.3 Seal-off locations

7.2.4.4 Test stand wire interconnects

7.2.4.5 Overcurrent protection devices and sizes

7.2.4.6 Connection points of all required utilities

7.2.4.7 Equipment grounding requirements

7.2.4.7.1 Grounding requirements shall be the responsibility of the Contractor. The drawings shall be furnished in a .dwg electronic file format (AutoCAD 2018 or newer) via CD-ROM so that the government may use these drawings in preparation of the services support requests. These requests are worked by the civil engineering support group and the maintenance/equipment support group in preparation of the installation site.

#### 7.3 As-Built Drawings

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

- 7.3.1 All drawings associated with the equipment construction and installation phases shall be updated by Contractor as necessary during these phases, in order to accurately convey test stand configuration and requirements of installation. As-builts (post IVV review and approval) shall be furnished to the Government for final acceptance. As-builts shall be furnished both electronically in the .dwg (AutoCAD 2018 or newer) and .pdf formats as well as hard copy for review. The As-builts shall become the property of the Government along with all data rights.
- 7.4 Software Documentation: The following software documentation will be provided as part of each design review and will retain the same completeness requirements as the design review itself.
  - 7.4.1 Concept Requirements:
    - 7.4.1.1 System/Subsystem Specification (DI-IPSC-81431A)
    - 7.4.1.2 Software Requirements Specification (DI-IPSC-81433A)
  - 7.4.2 Design:
    - 7.4.2.1 System/Subsystem Design Description (DI-IPSC-81432A)
    - 7.4.2.2 Software Design Description (DI-IPSC-81435A)
    - 7.4.2.3 Interface Design Description (DI-IPSC-81436A)
  - 7.4.3 Qualification/Test Products:
    - 7.4.3.1 Software Test Plan (DI-IPSC-81438A)
    - 7.4.3.2 Software Test Description (DI-IPSC-81439A)
    - 7.4.3.3 Software Test Report (DI-IPSC-81440A)
  - 7.4.4 User/Operator Manuals:
    - 7.4.4.1 Software Programmer's Guide (DI-IPSC-81633)
  - 7.4.5 Software:
    - 7.4.5.1 Software Product Specification (DI-IPSC-81441A)
    - 7.4.5.2 Software Version Description (DI-IPSC-81442A)
- 7.5 Commercial Manuals: The documentation shall be divided into a minimum of two manuals. One manual shall be configured for operation, maintenance, troubleshooting, and calibration of the test stand; the other manual shall be an IPB. The intent of the Operation and Maintenance and IPB manuals is to provide sufficient information to properly operate, maintain, troubleshoot, and repair the test stand and to follow existing manual formats/contents for ease of use. The Contractor shall deliver a total of three hard copies of each manual and electronic files, before testing the test stand at Tinker AFB. Both manuals shall also be submitted to the Government POC for review and approval at least 30 calendar days prior to installation of the test stand. Corrections to manuals shall be completed by Contractor at no cost to the government. These manuals shall be written in the English language and shall include, as a minimum, the following provisions:

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

7.5.1 Operation & Maintenance Manual: The Operation and Maintenance manual shall at a minimum include the following sections with all necessary details:

7.5.1.1 Table of Contents

7.5.1.2 Record of Changes

7.5.1.3 List of Figures

7.5.1.4 List of Tables

7.5.1.5 Foreword

7.5.1.6 Safety Summary

7.5.1.7 Introduction and General Information

7.5.1.8 Special Tools, Test Equipment, and Consumables

7.5.1.8.1 The spare parts and consumables list shall identify the part name, the Contractor's part number, the manufacturer's name and address, the manufacturer's part number if different from the Contractor's part number, and the number required per system or quantity recommended for spare parts inventory.

7.5.1.9 Preparation for Use, Storage, and Shipment

7.5.1.10 Theory of Operation

7.5.1.11 Operating Instructions

7.5.1.12 Inspection, Cleaning, Maintenance, and Lubrication

7.5.1.13 Troubleshooting

7.5.1.14 Calibration

7.5.1.15 Disassembly, Repair, Replacement, and Assembly

7.5.1.16 Appendices

7.5.1.16.1 Include copies of the OEM manuals and data sheet for all subcomponents of the system.

7.5.2 IPB Manual: IPB manual shall at a minimum include the following sections with all necessary details:

7.5.2.1 Table of Contents

7.5.2.2 Record of Changes

7.5.2.3 Foreword

7.5.2.4 Maintenance Parts List

7.6 Level 3 Drawings: The Contractor shall provide to the receiving Government POC, all necessary engineering installation and schematic drawings showing the necessary compressed air, water and electrical utilities of the test stand. The design drawings shall be provided no later than 10 working days prior to initial work on test stand.

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

7.6.1 These drawings shall comply with MIL-STD 31000B level 3 and include, but not be limited to:

7.6.1.1 Installation drawings

7.6.1.2 Floor plan noting size, location and footprint of test stand

7.6.1.3 System and subsystem design plans

7.6.1.4 Mechanical and Electrical schematics of test stand

7.6.1.4.1 PLC wiring diagrams

7.6.1.4.2 Wire and conduit sizes

7.6.1.4.3 Seal-off locations

7.6.1.4.4 Test stand wire interconnects

7.6.1.4.5 Overcurrent protection devices and sizes

7.6.1.4.6 Connection points of all required utilities

7.6.1.4.7 Equipment grounding requirements

7.6.1.4.7.1 Grounding requirements shall be the responsibility of the Contractor. The drawings shall be furnished in a .dwg electronic file format (AutoCAD 2018 or newer) as well as .pdf format, so that the government may use these drawings in preparation of the services support requests to the civil engineering support group and the maintenance/equipment support group for preparation of the installation site.

7.6.1.4.7.2 Numerical Index

7.7 Documentation: All documentation, i.e. operation manuals, maintenance manuals, repair manuals, programming manuals, student training materials, drawings, vendor literature, laminated note cards, metal name and service plates, service bulletins, upgrade bulletins, and all associated charts/graphs, shall be written in the English language and grammatically correct. All technical data shall identify manufacturer's name, model number, serial number, and contract number. The machine layout shall be furnished in .dwg, (AutoCAD 2018 or newer) readable format as well as .pdf format.

## 8. TRAINING REQUIREMENTS

8.1 General: Training shall be scheduled so as not to interfere with Federal Holidays or weekends. Training shall be scheduled at least 10 working days in advanced and be coordinated with Government POC.

8.1.1 Trainers shall use a sign-in sheet to record personnel attending the training sessions. The Government will supply the sign-in sheet(s).

8.2 Operator Training: The Contractor shall furnish a training session for up to six (6) test stand operators to review the test stand and testing procedures. This session shall be a minimum of 32 hours of on-site training over five (5) consecutive workdays, during the hours of 0530

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

to 1415. Training shall be conducted at Tinker AFB within ten (10) work days of acceptance. Training shall include at a minimum the following:

- 8.2.1 General familiarization with the stand.
  - 8.2.2 Instruction and demonstration of test stand operation.
  - 8.2.3 Unique features of the test stand.
  - 8.2.4 Process for printing test reports.
  - 8.2.5 Process for retrieving current and archived test reports.
  - 8.2.6 Informal testing of a single UUT provided by Tinker AFB.
- 8.3 Electrical/Mechanical Training: The Contractor shall furnish a training session for one (1) to six (6) maintenance personnel to review mechanical and electrical maintenance of the test stand. This session shall be a minimum of two (2) days in length and be conducted during the hours of 0630 to 1430. Training shall be conducted at Tinker AFB following completion of Final Calibration or any time thereafter and shall include at a minimum the following:
- 8.3.1 General layout of test stand.
  - 8.3.2 Information on the frequency of preventative maintenance.
  - 8.3.3 Types of preventative/remedial maintenance required.
  - 8.3.4 Hands-on experience.
  - 8.3.5 Review of maintenance portion of manual.
- 8.4 Calibration Training: The Contractor shall furnish a training session for one (1) to four (4) PMEL personnel to review calibration procedures. This session shall be a minimum of two (2) days in length and shall be conducted during the hours 0630 to 1430. Training shall be conducted at Tinker AFB following completion of Final Calibration or any time thereafter and shall include at a minimum the following:
- 8.4.1 Full review of the calibration procedures. Contactor shall implement proposed changes to procedures as agreed to.
  - 8.4.2 Full review of the calibration process following implementation of changes agreed to above.
- 8.5 Software/Process Engineer Training: The Contractor shall furnish a training session for one (1) to four (4) engineer(s) that are associated with 555 SWES Software and 76 CMXG Commodities groups. This session shall be a minimum of two (2) days in length and shall be conducted during the hours 0730 to 1600. Training shall be conducted at Tinker AFB following completion of Final Calibration or any time thereafter and shall include at a minimum include the following:
- 8.5.1 Overview of the DAQ/computer systems including how these systems interact with one another.
  - 8.5.2 Review of the testing software and process for making software changes.
  - 8.5.3 Process for backing up all programs as necessary.

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

8.5.4 General layout of SSDs including where test data resides.

## 9. SPECIAL PROVISIONS

### 9.1 Government Occupancy of Facilities & Responsibilities:

9.1.1 Facility: The Contractor shall install this equipment in an operational facility that is engaged in the production of aircraft parts. This shop is in operation 24 hours per day Monday through Friday and engages in overtime on the weekend on a regular basis. Contractor shall be required to consult with the Government POC to develop a timeline that accommodates the continued performance of user's mission function during the installation. Contractor shall be responsible for cordoning off work areas.

9.1.1.1 Note that this test stand will be installed in a Class I, Division II environment and any and all work to be carried out during Production times necessitates the use of Class I, Division II rated tools. Non-rated tools are not allowed to be used during times when production is taking place in the test bay where the test stand is to be located.

9.1.2 Electrical Service Terminations: Contractor shall connect electrical services to the terminated circuit provided by the Government.

9.1.3 Project Team: As a part of the contract, the Contractor, or sub-contractor, shall provide the necessary staff to accomplish the requirements in the SOW, which includes the following members:

9.1.3.1 At least one (1) mechanical engineer on staff with a minimum of ten (10) years of experience in test stand construction and configuration.

9.1.3.2 At least one (1) National Instruments Certified LabVIEW Architect on staff with ten (10) years of experience with LabVIEW and PLC systems.

9.1.3.3 At least one (1) member with ten (10) years of experience in the design, fabrication and installation of aircraft component testing equipment.

9.1.3.4 At least one (1) member assigned as a Program Manager who shall have overall responsibility for meeting the contract requirements stated within this SOW.

9.1.3.5 At least one (1) member assigned as a Field Service Engineer who shall be available for technical direction during receipt, installation and testing of the test stands at Tinker AFB.

9.1.4 Receipt and Acceptance: The Contractor shall be responsible for receipt and acceptance of all test stand shipments to Tinker AFB, both prior to and during installation. The Contractor shall direct the unloading, staging, and site location of all test stand shipments.

9.1.4.1 The Contractor shall provide all forklifts, cranes, equipment operators, and rigging service necessary for test stand unloading at site location.

9.1.4.2 Contractor shall be responsible for any damages to the facility during the installation of the test stand.



# AFC/MFC Test Stand

## Statement of Work

7 November 2022

- 9.2 Government Installation Access: Project is located in a Government Installation secured area. Contractor personnel will be issued access badges by the Security Office located on the north side of Tinker just north of the Air Depot security gate. Badge issuance process shall be coordinated by the Government POC. Badges (including temporary badges) shall be displayed at all times while on the base. Access badges allowing Contractor personnel access to the project areas shall be coordinated by the Government POC following issuance of access badges. Equipment and large items shall be required to enter base through the Truck Gate located just north and east of the Air Depot and 59<sup>th</sup> Street intersection. The Government reserves the right to inspect any and all deliveries being made to the base before entrance is permitted.
- 9.3 Working Hours:
- 9.3.1 Work Hours: Construction/installation shall typically take place as follows:
- 9.3.1.1 During second shift, 2:00 PM to 10:30 PM except for holidays and weekends (see Contractor Usage limitations below)
- 9.3.1.2 During first shift, 5:30 AM to 2:15 PM (see Contractor Usage limitations below)
- 9.3.1.3 No work during holidays or weekends without written approval from the Government POC. Any such requests, made and approved, are carried out at no additional cost to the Government.
- 9.3.1.4 Working Days are to be interpreted as calendar days excluding federal holidays and weekends.
- 9.3.2 Contractor Usage: Class I, Division II rated electrical outlets (120V/60Hz/15A) and compressed air (100 psig) for power tools will be available for use by the Contractor at the work site. The Contractor shall provide extension cords and compressed-air extension hoses to connect into the utilities for construction use. Any and all tools to be used during production times, regardless of shift times shall be Class I, Division II rated. Non-rated tools may be used only during times when no production is occurring. All work must be coordinated with Production Supervision (Mr. Tivis Jessee, or Mr. Mike Horton, or Mr. Gary Larimore).
- 9.3.3 Outages: Power and fire suppression outages shall be limited to 8 clock hours and shall be accomplished during after-hour shifts (during the week). At the option of the Government outages may occur on Saturday and Sunday during the day. Local outages for utility interconnections shall be coordinated with the Government. This usually requires a twenty-one (21) calendar day notice.
- 9.4 Safety, Foreign Object Debris (FOD), Dropped Object Prevention (DOP) & Quality Control
- 9.4.1 Safety and Quality Control
- 9.4.1.1 Contractor is responsible for ensuring and enforcing industry safety practices and quality control of the job site.
- 9.4.1.2 Contractor shall comply with all safety practices posted in the assigned work area and Personal Protection Equipment (PPE) requirements. PPE shall include, but is not limited to, safety glasses and hearing protection.



# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

9.4.1.3 Contractor and their representatives shall have appropriate environmental and safety training required by the state and federal government according to Resource Conservation Recovery Act (RCRA).

9.4.1.4 The Contractor is advised that electric service is in the work area. Fall protection, PPE, and any other safety related material needed shall be provided by the Contractor for contract employees. All safety signage in the work area and OSHA regulations shall be strictly followed by the Contractor. The Contractor's onsite supervision shall be responsible for ensuring personnel related to this project observe and follow the safety guidelines and properly wear the correct PPE. Hard hats shall be required in the facility periodically due to the ongoing construction, as well as hearing and eye protection.

### **9.4.2 FOD and DOP**

9.4.2.1 All Contractor personnel and their subcontractors working on this project are required to receive and comply with AFMCI 21-122, Foreign Object Damage (FOD) and Dropped Object Prevention (DOP) training.

9.4.2.1.1 FOD/DOP Awareness and Prevention Training is available on the Tinker Intranet, <https://wwwmil.tinker.af.mil/76mxw/FOD.asp>. This training is also available via CD-ROM upon request by the Contractor.

9.4.2.2 Contractor shall be responsible for ensuring and enforcing compliance with FOD requirements of the job site.

9.4.2.2.1 The work to be performed in this area will require Contractor to work in or travel through areas near equipment producing flight capable parts for use on military aircraft, engines, munitions, missiles, support equipment, and/or Aerospace Ground Equipment (AGE).

### **9.5 Housekeeping**

9.5.1 Contractor shall keep the work areas clean and neat in accordance with Industry Standards, Occupational, Safety, and Health Administration (OSHA), fire and safety standards, and this SOW.

9.5.2 Cleanup at the end of each day is required.

9.5.3 All tools shall be properly stored in a lockable tool box and trash removed. All hardware shall be properly stored in Ziploc bags and the work area left in orderly condition, no exceptions.

9.5.4 Packing material, material remnants, rubbish, and debris shall be removed from Government property daily, unless otherwise directed, to avoid accumulation at the work site. Materials that cannot be removed daily shall be stored in areas specified by the government project engineer.

9.6 Tool Control and Accountability: Contractor shall comply with AFMCI 21-107, Tool Control and Accountability Program and Tinker Instruction 21-112, Tool Management while performing contract services in or around Maintenance Production Shops, including Ramp areas.

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

- 9.6.1 Tool Listing: Contractor shall identify and list each tool separately on a “tool listing” sheet kept inside each container or bag.
  - 9.6.2 Securing Tools: Contractor personnel shall ensure all tools are secured when not in use.
  - 9.6.3 Unattended Tools: Contractor personnel shall ensure no tools are left unattended at any time.
  - 9.6.4 Beginning Inventory: Contractor personnel shall inventory the container or bag of tools at the beginning of the day.
  - 9.6.5 Ending Inventory: Contractor personnel shall inventory the container or bag of tools at the end of each day.
  - 9.6.6 Missing Tools: Contractor personnel shall immediately (within 1 clock hour) notify the Government POC of any tools that are missing.
- 9.7 Field Verify:
- 9.7.1 All plan information such as floor plan layouts with dimensions provided by the Government for existing and new equipment are based on available documentation. This information is to be considered approximate and shall be field verified by Contractor.
  - 9.7.2 Contractor shall field verify that sufficient space is provided for the equipment prior to beginning installation. Issues with available space versus space need for the installation and equipment shall immediately (within 1 clock hour) be brought to the attention of the project engineer and contracting officer.

## **10. PROPOSAL BY CONTRACTOR:**

- 10.1 Description: The information being provided by the Government’s SOW reflects a concept design. Contractor shall be responsible for providing to the Government (at proposal submittal) any sketches, drawings, verbiage or a combination of these items to provide an accurate picture of their proposed solution for design completion and installation.
- 10.2 Requirements: Each Contractor’s proposal shall include, but not be limited to:
  - 10.2.1 Description of how the Contractor plans to meet each element of the SOW.
    - 10.2.1.1 An acceptable approach with detailed descriptions to upgrade existing equipment to achieve the requirements for each element. The approach must include descriptions, manufacturer(s) and model(s), or sketches of the equipment to be installed.
  - 10.2.2 Itemized pricing breakdown.
  - 10.2.3 Project Integrated Master Schedule (IMS) (Gantt chart format).
  - 10.2.4 Warranty statement.
  - 10.2.5 Examples of any experience with past projects of similar magnitude and scope. Provide details on these projects.

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

10.2.6 Confirmation of being able to provide the necessary staff to accomplish the requirements in the SOW, to include:

10.2.6.1 Confirmation of at least one (1) National Instruments Certified LabVIEW Architect on staff with experience in LabVIEW and PLC systems.

10.2.6.2 Confirmation of at least one (1) member with ten (10) years of experience in the design, fabrication, and installation of aircraft component testing equipment.

10.2.7 Types of utilities required (e.g. compressed air, water, and electrical service) and the size of utilities required (e.g. 80 cfm of 90 psi air, 5 gpm of potable water, 480V-45FLA- 3Ph- 60 Hz) so that the service lines furnished by the Government are properly sized for the required draw.

10.3 Notice: Unless otherwise directed by the Government Contracting Officer, Contractor shall not begin construction activities until Installation Plan and Drawings have been reviewed and approved by the government.

## **11. OTHER WRITTEN SUBMITTALS:**

11.1 Required Submittals

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

Table 1- Summary Table of Required Submittals

<u>Timeline for Deliverables</u>	<u>Paragraph</u>	<u>Info Required</u>	<u>Responsible Party</u>
10 working days after award date, Monthly	4.7	Integrated Master Schedule (IMS) Monthly Status Report	Contractor
10 working days after award date	2.4.6	All SDS sheets and completed OC-ALC Form 152	Contractor
14 days prior to Preliminary Design Review (PDR)	6.1	PDR documents	Contractor
14 days prior to Intermediate Design Review (IDR)	6.2	IDR documents	Contractor
	3.11	Calibration Procedure	Contractor
14 days prior to Critical Design Review (CDR)	6.3	CDR documents	Contractor
	3.11	Calibration Procedure w/IDR changes implemented	Contractor
60 days prior to initial work	3.8.4	Installation Plan, Design Drawings	Contractor
60 days prior to installation	7.5	Manuals/Drawings	Contractor
Prior to Shipping	4.4	Factory Acceptance Test	Contractor
Prior to Calibration	4.2	Vibration Data	Contractor
	4.3	Audible Noise Test	Contractor
Post-Preliminary Calibration	3.11.1	Calibration Summation Spreadsheet	Contractor
Post-Final Calibration, Pre-Correlation	3.11.2	Cal Procedure w/Final Cal Modifications	Contractor
Post-Final Calibration, Post-Correlation	4.2.1	Final Vibration Report	Contractor
	4.1	Equipment Health Checkout	Contractor
	4.9	Training Plan	Contractor
	4.9	Correlation Test Reports	Contractor
Post-Correlation Prior to Final Acceptance	4.3	Audible Noise Test	Contractor
	3.12.1.1	Independently verified As-Built	Contractor
All testing completed w/results	6.4.2	Acceptance Test Report	Contractor
Prior to Final Acceptance	3.16	Extended Spares Kit	Contractor
	7.1	Final Manuals/Drawings	Contractor

11.1.1 Contractor shall furnish submittal/document data on the required items listed in this SOW.

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

- 11.1.2 Material requirements detailed list, including material descriptions, shall be submitted to the Government for review/approval prior to installation.

## **12. Government Furnished Property and Services**

### **12.1 Government Furnished Property (GFP)**

- 12.1.1 When applicable, the Government will furnish, without cost, the F100-220 and F110-229 AFCs and MFCs to the Contractor.

- 12.1.1.1 The Contractor shall ensure all GFP is secured at the close of each workday.

- 12.1.1.2 The GFP shall only be used for the performance of this contract.

- 12.1.1.3 All GFP shall remain property of the Government during contract performance, contract completion, or contract termination.

- 12.1.1.4 The GFP shall be managed in accordance with FAR Part 45, Government Property plus supplements, applicable contract clauses, and this SOW.

### **12.1.2 GFP Shipment to Contractor's Facility**

- 12.1.2.1 The Government will package and ship the GFP to the Contractor's facility, FOB Destination, (Government's expense).

### **12.1.3 GFP Return Shipment to Government**

- 12.1.3.1 The Contractor shall package and ship the GFP to the Government, FOB Destination (Contractor's expense). The Contractor shall be responsible for all costs associated with the return shipment.

- 12.1.3.2 Upon shipping, the Contractor shall notify the Government POC of the date shipped and the shipment identification tracking information.

- Ship to:

- Attn: David Prado, 405-736-1894, RM 106

- 9160 Turbine Drive B3902

- Tinker AFB, OK 73145

- Contract/Purchase Order:

### **12.1.4 Loss of Government Property**

- 12.1.4.1 In accordance with Government Property contract clauses.

### **12.1.5 GFP Identification Labels**

- 12.1.5.1 When applicable, the Contractor shall clearly label (without damaging) Government Furnished Property to distinguish it from Contractor Furnished Property, in accordance with the contract terms and conditions and this SOW.

### **12.1.6 Plant Clearance (Disposition) Instructions**

# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

12.1.6.1 The Plant Clearance Automated Reutilization Screening System (PCARSS) is not required for disposal of Government Property. The Contractor shall use the GFP Return Shipment to Government instructions cited in this section (section 12).

### **12.1.7 Standard Form 30, Contract Modification**

12.1.7.1 The Standard Form (SF) 30 is the only form that may be used to update (replace, add, and remove), closeout, and transfer GFP by contract modification.

## **12.2 Shared Property of the Government.**

12.2.1 In accordance with (IAW) Government procedures, the Contractor is authorized to share Property of the Government, without cost, with Government personnel at Tinker AFB, OK, for the duration of this contract and only as needed for performance of this contract. The Government retains title to all Shared Property of the Government, until the Government properly disposes of this property as authorized by law and regulation. The Government will maintain accountability (property records) for Government reporting requirements. The Contractor shall ensure this property is secured at the close of each workday.

12.2.2 This Shared Property of the Government is not considered Government Furnished Property (GFP) requiring property administration IAW FAR Parts 45 and 52.245 plus supplements. However, this Shared Property of the Government will be administered IAW the provisions of this PWS and FAR 52.237-2, Protection of Government Buildings, Equipment, And Vegetation. The Contractor shall comply with the contract terms and conditions and this SOW.

## **12.3 Shared Storage Areas**

12.3.1 The Contractor shall make arrangements with the Government POC for storage of Contractor materials, equipment, and incidentals between its delivery and its installation, as availability of space and security during non-working hours cannot be guaranteed. These areas are on a first-come first-served basis and are very limited.

12.3.2 The Contractor shall limit all applicable storage of Contractor materials, equipment, and incidentals to the immediate installation site.

## **12.4 Cease to Use and Return to Government**

12.4.1 During contract performance, contract completion, or contract termination, the Contractor shall cease to use and shall return all Shared Property of the Government to the Government POC.

## **12.5 Government Furnished Services: The Government will furnish, without cost, the following services at Tinker AFB (TAFB), OK:**

12.5.1 Security Forces: The Government will provide general on-base security forces' service. The security forces' telephone numbers are 911 for emergencies, 405-734-2000 for crimes in progress and 405-734-3737 for non-emergency calls.

# AFC/MFC Test Stand

## Statement of Work

7 November 2022

- 12.5.1.1 The off-base 911 center receives 911 cell phone calls. Cell phone callers need to advise the 911 off-base center they are on TAFB in order to be connected with the on-base 911 center\*.
- 12.5.2 Fire Emergency and Routine Services: The Government will provide general on-base fire protection services. The Contractor shall comply with fire prevention rules and regulations enforced by the TAFB Fire Prevention Branch. For emergencies call 911\*. For routine fire prevention matters call 405-734-3981 or 405-734-3982. For after hours, weekends, and routine calls to dispatch call 405-734-7964.
- 12.5.3 Paramedics/Ambulance Services: The Government will provide 24-hour on-base state certified paramedic level emergency response and patient transport services for all personnel on Tinker AFB limited to the services provided in the Operational (Base) Paramedics/Ambulance Services Contract for Tinker AFB\*.
- \*Note: If using a cell phone or non-government phone, then request 911 emergency call be forwarded to the Tinker 911 Center for emergency response.***
- 12.5.4 Utilities: The Government will provide utility services. These utilities include natural gas, electricity, water, and sewer for the sole purpose of accomplishing this contract. If the Contractor requires additional utility services, it shall be the Contractor's responsibility to provide. The Contractor shall use due care and diligence in efforts to conserve utilities to reduce utility costs.
- 12.5.5 Postal Distribution: The Government will provide on-base mail distribution -United States Postal Service (USPS)- only for official Government mail required under terms of this contract.
- 12.5.6 Custodial Services: The Government will provide custodial services limited to the extent provided in the Base Custodial Contract(s) for the Government provided facilities.
- 12.5.7 Refuse Collection: The Government will provide refuse collection services limited to the extent provided in the Base Refuse Collection Contract(s) for the Government provided facilities. The Government will only allow non-hazardous refuse to be emptied into the nearest authorized refuse dumpster for trash collection. Do not use Government dumpsters to dispose of construction debris.
- 12.5.8 Insect and Rodent Control: The Base Civil Engineering Entomology will provide service for Government provided facilities.
- 12.5.9 Grounds Maintenance: The Government will provide grounds maintenance services limited to the extent provided in the Base Grounds Maintenance Contract(s) for the Government provided facilities.
- 12.5.10 Real Property Maintenance/Repair: The Government will provide maintenance and repair of Real Property in accordance with and compliance with Government procedures. The Contractor shall submit written requests to the Government Contracting Officer Representative (COR) or Government Point of Contract (GPOC) for Real Property maintenance and repairs.
- 12.5.11 Workspace: The Government will provide access to the equipment and adequate workspace around the equipment.



# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

12.5.12 Local Area Network (LAN): The Government will provide LAN access and support. Contractor shall comply with all security requirements pertaining to LAN usage and shall ensure that these services are utilized only for official contract matters pertaining to this contract.

12.5.13 Computer Connectivity: The Government will provide connectivity to the base systems for Government official business based on the number of connections the Government determines are required to perform services for this contract. The Contractor shall ensure that terminated employees network access is removed within 24 clock hours of termination.

12.5.14 Computer and Network Access Contractor Requirements.

12.5.14.1 Contractor personnel working on this contract must be designated in one of the below AIS positions and complete the required security investigation to obtain the required security clearance. This must be accomplished before operating government furnished computer workstations or systems that have access to Air Force e-mail systems or computer systems that access classified information. The contractor shall comply with the DoDM 5200.02\_AFMAN 16-1405, Air Force Personnel Security Program; AFI 17-130 "Cybersecurity Program Management" with a minimum: Chapter 4, Attachment 2, and Annex 1 in their entirety; AFMAN 17-1301, Computer Security (COMPUSEC) Paragraph 4.2; and AFMAN 33-152, User Responsibilities and Guidance for Information Systems requirements. (Please check one):

(       ) AIS-II Position - Noncritical-Sensitive Positions. Security Clearance: SECRET; based on a Tier3 (T3) background investigation. Responsibility for systems design, operation, testing, maintenance and/or monitoring that is carried out under technical review of higher authority in the AIS-I category, includes but is not limited to access to and/or processing of proprietary data, information requiring protection under the Privacy Act of 18 1974 and Government-developed privileged information involving the award of.

( X ) AIS-III Position – Non-sensitive Positions. No security clearance required but is a Trusted Position based on a favorable Tier1 (T1) background investigation. All other positions involved in U.S. Government computer activities.

### **12.6 Intangible Government Property**

12.6.1 Intangible Government Property (Patents, Data, Copyrights, Software, etc.) is not covered by FAR Part 45 plus supplements, but is covered by FAR Part 27 and DFARS Part 227 plus supplements.

12.6.2 When applicable and in accordance with Government procedures, the Government will furnish, without cost, Intangible Government Property to the Contractor.

12.6.3 All Intangible Government Property shall remain at all times sole property of the U.S. Government. Including all Intangible Government Property used, input, processed, acquired, modified, developed, and/or generated by the Contractor in support of this contract.



# **AFC/MFC Test Stand**

## **Statement of Work**

**7 November 2022**

- 12.6.4 The Contractor may not use or disclose any Intangible Government Property for any purpose or in any manner not specifically authorized or required by the contract and this SOW.
  - 12.6.5 The Contractor shall ensure all Intangible Government Property is secured at the close of each workday. The Contractor shall use reasonable care to avoid losing and/or damaging Intangible Government Property. If the Contractor's failure to use reasonable care causes loss and/or damage to Intangible Government Property, the Contractor shall be liable for the cost to replace the Intangible Government Property, which may be deducted from the contract price.
  - 12.6.6 The Contractor shall use, input, process, maintain, and return all Intangible Government Property in the English language, readable, and in a readily retrievable format, which requires no additional software or tools to read and retrieve beyond those already installed on the affected U.S. Government computers. The Contractor shall not return any intangible Government Property using Universal Serial Bus (USB) thumb drives or equivalent devices.
  - 12.6.7 During contract performance, contract completion, or contract termination, the Contractor shall return all Intangible Government Property to the Government POC. The Contractor shall comply with the applicable contract clauses and this SOW.
- 12.7 Government Furnished Drawings
- 12.7.1 All work plan drawings prepared by the Government for this project are available in electronic format (AutoCAD 2010, .dwg) from the Government POC.