



**Statement of Work (SOW)
for the
Calibration and Metrology Services (CAMS) Contract**

**National Aeronautics and Space Administration
Johnson Space Center
Houston, Texas**

INDEX**1.0 Introduction**

- 1.1 Background
- 1.2 Special Terminology Used Within this Statement Of Work
- 1.3 Acronyms Used Within this Statement Of Work

2.0 Management

- 2.1 General
- 2.2 Phase-in
- 2.3 Quality
- 2.4 Safety, Health and Environmental Compliance

3.0 Technical

- 3.1 Calibration Lab Equipment and Facilities
 - 3.1.1 Maintenance
 - 3.1.2 Equipment and Work Area Cleaning
- 3.2 Logistics and Records
 - 3.2.1 Local Pick-up and delivery of Customer Instrumentation
 - 3.2.2 Material Control – Shipping and Receiving.
 - 3.2.3 Calibration and Metrology Record Keeping and Scheduling
- 3.3 Meeting Support
- 3.4 Metrology
 - 3.4.1 Reference Standards and Working Standards
 - 3.4.2 Working Groups
- 3.5 Calibration of Customer Provided Instrumentation
 - 3.5.1 Calibration Inventory and Expected Workload
 - 3.5.2 Calibrations Performed in the Calibration Lab
 - 3.5.3 Calibrations Performed “In Place”
 - 3.5.4 Calibrations Conducted by Outside Suppliers
 - 3.5.5 Customer Instruments Requiring Repair
- 3.6 Oversight of Calibrations Performed by User-Operated Calibration Laboratories

1.0 Introduction

1.1 Background

The contractor shall operate and maintain an existing calibration lab located at the NASA-Johnson Space Center (JSC) in Houston TX. The work performed under this contract shall be performed at JSC, primarily in JSC buildings 15 and 343 and in other JSC or off-site facilities as needed.

The calibration lab serves its customers (primarily JSC, its contractors, and their subcontractors) by performing approximately 30,000 calibration operations per year on approximately 15,000 customer-provided equipment items. (These numbers are background information and are not a limitation on or expectation of contract obligation, ref. H.7) Most customer-provided items are commercial off-the-shelf instruments used to measure physical, mechanical, and electrical properties such as torque wrenches, pressure transducers and voltmeters.

1.2 Special Terminology Used Within this Statement Of Work

The facilities, equipment and personnel used to perform the functions outlined in this SOW will be referred to as the “calibration lab”, “laboratory” or “lab” throughout this document.

Items calibrated by the calibration lab for its customers are referred to as “customer-provided instrumentation” or “customer-provided equipment”

The following terms are used in this SOW as they are defined in ISO VIM: 1995 International Vocabulary of Basic and General Terms in Metrology:

Standard, Measurement Standard, Reference Standard, Working Standard and Transfer Standard

1.3 Acronyms Used Within this Statement Of Work

AC – Alternating Current
CAMS – Calibration And Metrology Services
CO – Contracting Officer
COSS – Center Operations Support Services
COTR – Contracting Officer’s Technical Representative
DC – Direct Current
DRD – Data Requirements Description
GFE – Government-Furnished Equipment
HVAC – Heating Ventilation and Air-Conditioning
IT – Information Technology
JSC – Johnson Space Center
MAP – Measurement Assurance Program
MCWG – Metrology and Calibration Working Group
MIMS – Metrology Information Management System
NIST – National Institute of Standards and Technology
OSHA – Occupational Safety and Health Administration
QMS – Quality Management System
RF – Radio Frequency

RMA – Return Material Authorization
SOP – Standard Operating Procedure
SOW – Statement Of Work
TMR – Technical Management Representative
TRL – Technical Reference Library
UPS – Uninterruptible Power Supply
VPP – Voluntary Protection Program
WI – Work Instruction

2.0 Management

2.1 General

- a) The contractor shall perform this Statement Of Work in its entirety.
- b) The contractor shall provide all data and perform all requirements of the Data Requirements Descriptions (DRDs) per the delivery schedule listed in the Data Requirements List.
- c) The contractor shall provide and implement a Management Plan in accordance with DRD-01.
- d) The contractor shall provide a single point of contact and an alternate, to represent the contractor on all contract issues and interface with the Contracting Officer (CO), Contracting Officers Technical Representative (COTR) or their designees.
- e) The contractor shall manage the labor, material, and other resources required to satisfy the requirements of this contract. The contractor shall maintain working shifts to support the requirements of JSC's calibration customers. This may require that services be provided outside normal business hours (i.e., night shifts, weekends, holidays).
- f) Lessons Learned shall be generated and reported in accordance with DRD-05.
- g) The contractor shall provide re-procurement support and a Re-procurement Data Package in accordance with DRD-09.
- h) The contractor shall provide Calibration and Metrology Periodic Progress Reports in accordance with DRD-11.
- i) The contractor shall provide and implement an Information Technology (IT) Security plan in accordance with DRD-12.
- j) The contractor shall provide Wage/Salary and Fringe Benefit Data in accordance with DRD-13.
- k) The contractor shall provide Performance Metrics Reports and 533 Financial Management Reports on a periodic basis as specified in DRD-15 and DRD-17.
- l) The contractor shall provide and implement an Information Technology (IT) Capital Planning & Investment Control (CPIC) plan in accordance with DRD-16.

- m) The Government may assign a civil service Technical Management Representative (TMR) to reside in the calibration lab during the performance of this contract. The contractor shall aid in training the TMR in becoming proficient in the technical aspects of the calibration lab. The TMR will serve as the day-to-day point of contact between the contractor and the Government. The contractor shall provide to the TMR, CO, COTR and their designees, free and open access of the calibration laboratory facilities, databases, libraries, test reports and other data generated by the contractor.
- n) Personnel Requirements: The experience, educational, and staffing level stated in the management plan will be maintained to meet contract objectives for the period of the contract.
- o) The contractor shall furnish all resources and facilities necessary for the performance of this SOW. The resources include personnel, materials, supplies, and equipment necessary to provide the required services, except for those specifically identified as Government-furnished or installation-provided, in accordance with the contract terms and conditions.

2.2 Phase-in

The contractor shall phase-in its work on this contract over a thirty-one day period, prior to contract start. During this period, the contractor shall work with the incumbent to ensure that the contractor is prepared to fully execute the contract on the contract start date.

The contractor shall prepare and comply with a Contract Phase-in Plan in accordance with DRD-06.

2.3 Quality

The contractor shall establish and maintain a Quality Management System (QMS) that is compliant with ANSI ASQC Q9001-2000, and in accordance with the Quality Plan DRD-07.

The QMS established by the contractor shall incorporate the following periodic product sampling methods for all instruments the calibration lab is responsible for.

- a) Quality Review (QR): A complete review of one instrument that has been calibrated prior to return to the customer. The QR alone does not sample enough instruments to assess the overall quality of production. However, it does reveal product quality defects that may be the result of a faulty laboratory process. These defects point management toward areas that require further investigation using root cause analysis. Instruments shall be randomly selected from production. The review shall include safety compliance, full parameter verification, physical condition, documentation, and traceability.
- b) Standard Review (SR): A complete review of a standard certified by the calibration lab and used to calibrate other instruments. The SR alone does not sample enough laboratory standards to assess overall quality. However, it does reveal product quality defects that may be the result of a faulty laboratory process.

These defects point management toward areas that require further investigation using root cause analysis. Standards shall be randomly selected from the production and the review shall include safety compliance, full parameter verification, physical condition, documentation, and traceability.

- c) Process Review (PR): A management tool used to target calibration lab processes for investigation and improvement. The PR is to seek out and document procedural problems in order to correct them. Management shall observe the selected process as it normally occurs and document any process improvement opportunities before intervening or making comment (except in the case of safety or imminent equipment damage).

The QR and SR sampling rates shall be reviewed periodically per the contractors QMS. The contractor shall adjust sampling rates when negative or positive quality trends are observed, when changes occur in the overall skill level of the workforce, or when there are changes in the calibration lab workload.

Quality processes and procedures shall be created and maintained in accordance with Quality Processes (Procedures) DRD-08.

The contractor shall bring the calibration lab, its procedures, equipment, management and personnel into compliance with ISO/IEC 17025 – General Requirements for the Competence of Testing and Calibration Laboratories and achieve formal third-party accreditation, from a source approved by the Contracting Officer, as an ISO/IEC 17025 certified lab within twelve months of the beginning of the contract in the following disciplines:

- Electromagnetics – DC / Low Frequency and RF / Microwave
- Dimensional
- Mechanical
- Thermodynamic
- Time and Frequency

The third party accreditation and ISO/IEC 17025 certification shall be maintained for the duration of the contract.

Upon receipt the contractor shall submit a copy of audit reports generated by internal or external auditors of the calibration lab to the COTR. The contractor shall provide weekly written status of any open work remaining after an audit (such as auditor findings and observations) until the open work is completed and approved by the auditing organization.

2.4 Safety, Health and Environmental Compliance

The contractor shall:

- a) Ensure the protection of personnel, property, equipment, and the environment in all contractor products and activities in this contract in accordance with the contractor's NASA-approved Safety and Health Plan, in accordance with DRD-02.
- b) Develop and implement risk management techniques to eliminate or control hazards in the contractor's work environment and products, in accordance with the contractors NASA approved Management Plan DRD-01.

- c) Provide Monthly Safety and Health Metrics, in accordance with DRD-03.
- d) Conduct Safety and Health Program Self Evaluations, in accordance with DRD-04.

3.0 Technical

3.1 Calibration Lab Equipment and Facilities

The equipment provided by the Government (referred to as Government-Furnished Equipment or GFE), for the contractor to perform this contract, is listed in Attachment J-12. The contractor shall provide an Inventory Management Plan in accordance with DRD-10.

The Government will supply laboratory and office space in JSC Buildings 15 and 343 for the contractor to perform its duties under this contract.

The Government may re-allocate, move, and change the size of the calibration lab as determined by the Government to meet the needs of the calibration lab or other JSC organizations.

3.1.1 Maintenance

The contractor shall be responsible for the maintenance of the laboratory and its equipment, with the exception of the building infrastructure (e.g. primary HVAC systems, bathrooms). Maintenance and repair of the building infrastructure is provided by the NASA-JSC Center Operations Support Services (COSS) Contract.

3.1.2 Equipment and Work Area Cleaning

The contractor shall be responsible for housekeeping of the contractor assigned laboratory areas. The level and frequency of cleaning shall promote safety and a positive appearance. The NASA JSC COSS contract is responsible for janitorial and grounds-keeping services.

3.2 Logistics and Records

The contractor shall provide Reports Required for Logistics in accordance with DRD-14.

3.2.1 Local Pick-up and Delivery of Customer Instrumentation

- a) The contractor shall provide hand pick-up of customer instrumentation prior to its calibration.
- b) The contractor shall provide hand delivery of customer instruments to the customer after calibration work is completed.
- c) The contractor shall provide the number and type of motor vehicles needed to support pick-up and delivery of customer-provided instrumentation. These motor vehicles shall be suitable for use on public roadways.

3.2.2 Material Control – Shipping and Receiving

- a) The contractor shall use the JSC Shipping and Receiving departments located in building 419 (shipping) and building 421 (receiving) for all items being shipped or received by commercial package delivery (e.g. DHL, FedEx, UPS) or by the United States Postal Service.

- b) For local pickup and delivery of customer instrumentation using contractor personnel and contractor vehicles the contractor shall operate the calibration lab internal shipping and receiving area in Building 343.
- c) The Contractor shall coordinate the pickup and delivery of all equipment leaving or entering the calibration lab including commercial shipments sent through the JSC Shipping and Receiving department. The Contractor shall record the time, date, and equipment identifier when equipment leaves the calibration lab. The Contractor shall also record the origin of items being received and the destination of items being shipped along with any other data needed to fully track the equipment such as carrier provided tracking codes, purchase order information or Return Material Authorization (RMA) Codes.

3.2.3 Calibration and Metrology Record Keeping and Scheduling

The contractor shall operate and maintain the Government-furnished Metrology Information Management System (MIMS) running Fluke METCAL software on a Microsoft Windows based server. MIMS contains instrument calibration and repair records, calibration standard measurement uncertainty determinations, software control records, and other calibration records required to operate the calibration lab and maintain compliance with ISO/IEC 17025.

The MIMS is used in the calibration of customer-provided equipment and calibration lab reference, transfer and working standards.

The contractor shall allow read-only access of the MIMS database to the CO, COTR or their designees on a continuing basis. Upon request from the CO, COTR or designee the Government shall be given full read, write and delete access to the MIMS database.

The contractor shall arrange for nightly off-site (not in the same building) storage of backup data matching the MIMS server data in addition to monthly backups being stored off-site for the contract duration. This service can be arranged through the JSC mail code NA Chief Information Officer. With prior Government approval backup services may be provided by alternate means.

Within three months of the effective date of the contract, the contractor shall improve the MIMS system by ensuring that:

- a) The MIMS hardware and software are available to its users with no more than 5 hours per year of unplanned downtime.
- b) The MIMS hardware is contained in a dedicated physically secure room, closet, or rack enclosure along with an Uninterruptible Power Supply (UPS) capable of supplying at least six hours of standby power to the MIMS hardware. The MIMS hardware shall be physically accessible only to the contractor's system administrator and designees.
- c) The MIMS software is no more than one version behind the most recently released version made available by Fluke.
- d) The MIMS software response time for login is no more than fifteen seconds under worst case conditions and that 90% of data retrieval operations are complete within five seconds of user submittal.

- e) With prior Government approval, the contractor may use an alternate provider of the MIMS database.

The contractor shall maintain the calibration lab Technical Library. This hard-copy library includes all Work Instructions (WIs), technical manuals, equipment manuals, reference documents, reference standards reports, personnel training certifications, and calibration data packages.

The contractor shall schedule the calibration and maintenance of calibration lab working standards, reference standards and transfer standards in such a manner as to avoid having to outsource more than 1% of calibration jobs per year due to calibration lab equipment downtime without Contracting Officer approval.

The contractor shall ensure that all customer instruments are recalled before calibration expiration or are appropriately dispositioned in accordance with laboratory Standard Operating Procedures (SOPs).

The contractor shall schedule its operations such that 90% of customer instrumentation not requiring calibration by outside suppliers is returned to the customer within five business days of pickup.

The contractor shall make provisions for handling priority calibration work from its customers. It is expected that approximately 5% of work will be done on a priority basis.

3.3 Technical Representation

The contractor shall supply technical representation for meetings with NASA, JSC customers, and JSC contractors as part of normal business operations. These meetings include, but are not limited to; control boards, incident investigations, scheduling meetings, quality reviews and meetings with the CO, COTR or their designees. The contractor shall support these meetings with appropriate technical disciplines or management.

3.4 Metrology

3.4.1 Reference Standards and Working Standards

The contractor shall maintain metrology reference, transfer, and working standards for the units of mass, length, frequency, temperature, resistance, capacitance, inductance, AC phase and DC ratio, AC power, pressure, flow, force, acceleration, surface roughness, flatness, angle, photometry, fiber optic power, and acoustics.

All calibration standards shall comply with ISO/IEC 17025 and be traceable to the National Institute of Standards and Technology (NIST).

The contractor shall prepare and archive test reports documenting testing operations performed on reference, transfer, and working standards. The results of these operations shall be recorded in the MIMS database. Test reports shall contain a description of the test, the test conditions, a tabulation of results of test associated uncertainties, and a statement of any limitation in use of the unit under test, with the appropriate signature attesting to the authenticity of such test. [Reference Attachment J-04 for example test reports.]

3.4.2 Working Groups

The NASA Measurement Assurance Program (MAP) is a collaboration amongst calibration labs at various NASA centers. Each calibration lab maintains reference standards in different areas of specialization such as voltage, capacitance or mass. These standards are rotated amongst the NASA centers and are compared to their reference standards to ensure the quality of measurements made within NASA programs and to establish measurement uncertainties.

The contractor shall participate in the NASA MAP by maintaining the MAP reference standards for Fiber Optics and Capacitance and by performing comparison measurements between the calibration lab's reference standards and MAP standards sent to the calibration lab by other NASA centers.

The contractor shall represent the calibration lab at MAP meetings, which occur twice each year at different NASA centers. The contractor shall host one MAP meeting. [Reference the MAP Charter contained in the Technical Reference Library.]

The contractor shall represent the calibration lab at the Metrology and Calibration Working Group (MCWG). Activities typically include videoconferences, teleconferences, and participation in the annual NASA MCWG meeting which is held at different NASA centers on a rotating basis.

Participation in these working groups requires the contractor to prepare and give presentations on technical aspects of the calibration lab.

3.5 Calibration of Customer Provided Instrumentation

3.5.1 Calibration Inventory and Expected Workload

- a) The contractor shall manage a calibration inventory of approximately 30,000 instruments used by NASA JSC and its contractors. Of these 30,000 instruments approximately 15,000 instruments are "active" at any given time.
- b) Active instruments are those instruments recalled by the calibration lab prior to each instrument's calibration due date, picked up from the customer, calibrated by the calibration lab and returned to the customer's worksite.
- c) Inactive instruments are those instruments scheduled for calibration when the customer needs to use the instrument at which point the instrument is placed in active status.
- d) In-place calibrations are those, for which the item cannot be removed from the customer's area, and must be performed on equipment at its current location.
- e) Approximately 2,000 instruments per year migrate between the active and the inactive lists while maintaining approximately 15,000 active instruments.
- f) The baseline workload of customer-provided equipment can be derived from Attachments J-05, J-06 and J-07. These sections contain a baseline listing of the active, inactive and in-place calibrated instruments in the calibration inventory

including information on equipment description, manufacturer name, and the number of months between recall dates.

3.5.2 Calibrations Performed in the Calibration Lab

The contractor shall perform calibrations in accordance with the approved release of ISO/IEC 17025 – General Requirements for the Competence of Testing and Calibration Laboratories. (Reference contract section H.8)

3.5.3 Calibrations Performed In Place

Equipment items or systems listed in Attachment J-07 cannot be removed from the customer's area and sent to the calibration lab. These items must be calibrated in place by calibration lab personnel.

The contractor shall provide the number and type of motor vehicles needed to support in place calibration of customer-provided instrumentation. These motor vehicles shall be suitable for use on public roadways.

3.5.4 Calibrations Conducted by Outside Suppliers

3.5.4.1 In any year, the contractor may outsource the calibration of up to 10% of customer-provided instrumentation, in any the following instances:

- a) During periods of very high workload.
- b) When it would not be cost effective to perform the calibration within the lab.

3.5.4.2 The contractor shall maintain an approved vendor list and provide oversight of all instrument calibrations. The contractor oversight shall include evaluation of the outside suppliers compliance with ISO/IEC 17025 and the calibration data provided by the outside calibration suppliers.

The contractor shall assign re-calibration dates for and apply labels to equipment calibrated by outside suppliers according to laboratory SOPs

The contractor shall record calibration data provided by outside suppliers in the MIMS database.

3.5.5 Customer Instruments Requiring Repair

All customer-provided instrumentation requiring repair in order to achieve proper calibration shall be tagged as such by the contractor and returned to the customer that submitted the instrument. The contractor shall submit a brief report to the customer describing the problem preventing calibration, if the problem is known. If the problem is not readily identifiable the report shall indicate which parameter(s) were not calibrated.

3.6 Oversight of Calibrations Performed by User-Operated Calibration Laboratories

The contractor shall evaluate up to fifty (50) user calibration procedures per year. If the contractor does not concur with the evaluated procedure, the contractor shall forward the procedure with comments to the COTR or the COTR's designee.

Once each year, the contractor shall request and review an ISO 17025 self-evaluation report from each user-operated calibration lab. Within thirty days of receipt, the report

shall be forwarded to the COTR or the COTR's designee with the contractor's assessment of the report. [Reference Attachment J-10 for a list of user-operated laboratories.]

[End of Section]