

Statement of Work (SOW)
For
Large Force Shaker System for White Sands Missile Range (WSMR)



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**Version 1.0
26 May 2017**

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DISTRIBUTION LIST STATEMENT A

Approved for Public Release; distribution unlimited

Revision History

[illegible]

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**Statement of Work (SOW)
For
Large Force Shaker System (LFSS)
For White Sands Missile Range (WSMR)**

1. SCOPE.

This SOW identifies the effort required for fabricating, integrating, testing, managing, documenting and delivering a new large force electrodynamic vibration system used for conducting shock and vibration testing of Army material at WSMR. Existing test capabilities that simulate operational environments require upgrade and modernization as a result of obsolescence, unreliability, and inefficiency. White Sands Missile Range (WSMR) has a need to perform dynamics testing to evaluate the survivability and vulnerability of military systems when exposed to handling, transportation, and service environments. This testing is conducted in a laboratory setting that provides controlled and reproducible conditions and it replicates the shock and vibration environment that a material may be exposed to throughout its life cycle. MIL-STD-810G CN1, Method 514.7 (Vibration), and Method 516.7 (Shock) provide guidance and detailed methodology for developing the life cycle environmental profile and procedures for conducting many of the laboratory shock and vibration tests. The Contractor shall procure all necessary equipment/parts, conduct necessary up-front site survey, install equipment, and test/commission/calibrate the equipment.

1.1 BACKGROUND.

The U.S. Army Program Executive Office for Simulation, Training and Instrumentation, Project Manager for Instrumentation, Targets, Threat Simulators and SOF Training Systems, Instrumentation Management Office (PM ITTS, IMO) provides test instrumentation to the test and evaluation community, and is the materiel developer for the Large Force Shaker System (LFSS) at WSMR.

2. APPLICABLE DOCUMENTS.

The following documents form a part of this Statement of Work (SOW) to the extent specified herein. In the event of a conflict between documents referenced herein and the contents of this SOW, the contents of the SOW shall be the governing requirement.

2.1 Department of Defense Standards.

MIL-STD-810G, CN1	Method 514.7 (Vibration) and Method 516.7 (Shock)
MIL-STD-882E	System Safety, Appendix A, 11 May 2012
MIL-STD-130N	Identification Marking of U.S. Military Property w/Change 1, 16 November 2012
MIL-STD-40051-2C	Preparation of Digital Technical Information for Page-Based Technical Manuals (TMs), 15 December 2015
MIL-HDBK-831	Preparation of Test Reports

2.2 Department of Defense Directives.

N/A

2.3 Department of Defense Instructions.

N/A

2.4 Other Government Documents, Drawings, and Publications.

PRF-PT- 691	PEO STRI Performance Specification (PS) for Large Force Shaker Tables, 2 May 2017
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3. REQUIREMENTS.

3.1 General.

The Contractor shall fabricate, configure the standard design to the installation location, integrate, test, and deliver a LFSS that meets performance criteria per the System Performance Specification PRF-PT- 691, in accordance with the requirements below. This shall be a standalone system. The major components of a complete LFSS are the Shaker, Slip Table/Base Assembly, Head Expander and Power Amp.

3.2 Program Management.

The Contractor shall provide overall management and administration to ensure the requirements of this contract are accomplished.

3.2.1 Integrated Master Schedule (IMS).

The Contractor shall develop, implement, manage, update, and maintain an IMS. The Contractor shall participate with the Government in the assessment of program risk and the degree to which the following have been established. Ensure project schedule key milestones are identified in accordance with supporting schedules.

INTEGRATED PROGRAM MANAGEMENT REPORT (IPMR) (DI-MGMT-81861A)

3.2.2 Quality Control.

The Contractor shall adhere to quality control standards already established in industry.

3.2.3 Risk Management Framework (RMF) Process.

The Cybersecurity Office at each test center will have the responsibility for RMF. The Cybersecurity requirements for DoD information technologies will be consistent with the principles established in NIST Special Publication 800-37 in accordance with DoD 8510.01 RMF for DoD Information Technology . The Cybersecurity team will be present during the Start of Work Meeting and throughout the duration of the project to assist the Contractor with the required documentation. The Contractor shall provide the following RMF documentation required to implement the RMF Controls for Confidentiality, Integrity and Availability Levels of Low-Low-Low:

- a. Security Plan
- b. Hardware / Software List
- c. Continuity of Operations Plan / Contingency Plan
- d. Compliance Deviation Report

The Government Cybersecurity team will provide the Contractor with samples and templates of these documents. The Government will work with the Contractor to ensure that the security requirements and procedures are met in accordance with all required DoD and Army regulations per the Mission Assurance Category and Confidentiality levels agreed upon for the system.

CYBERSECURITY ARTIFACTS (DI-MISC-80711A)

3.2.4 Access and General Protection/Security Policy and Procedures.

Test center visitor credential requirements are as follows:

http://www.arl.army.mil/www/pages/45/VG_WSMR_rev3_12_s.pdf

3.2.5 Management Reviews

3.2.5.1 Post Award Conference (PAC)

A PAC shall be held via telecon seven (7) calendar days after contract award. The conference shall introduce the key participants, identify points of contact and discuss both parties' understanding of the scope of work and other contract issues. The Government will produce the agenda and documentation and lead the PAC.

3.2.5.2 Start of Work Meeting

A Start of Work Meeting will be held at the contractor's location within 14 calendar days after contract award to establish the framework of the Contractor and Government interaction during the duration of the contract. Discussion topics include:

- a. Identify key coordination events, timelines and test readiness.
- b. Presentation of a top level and realistic IMS, critical paths, and supporting events.
- c. Product configuration approach, reliability and maintainability analysis, testing, and acceptance approach.
- d. Team participants, responsibilities and contact list to include names, location, phone numbers, and email addresses.
- e. Long lead time item identification and status.
- f. Metrics collection process, analysis, and reporting.

3.2.5.3 Program Status Reviews

The Contractor shall schedule a monthly telecon with the Government to discuss the status of the schedule.

3.3 Systems Engineering.

The Contractor shall plan, document, implement and control an integrated technical effort that meets the requirements in PRF-PT- 691. The product configuration shall address performance; industry acceptance; long term availability and supportability; and

upgrade potential. The LFSS shall utilize specifications and standards adopted by industry and set by the marketplace for interfaces, products, practices, and tools to the extent practical.

3.3.1 Technical Interchange Meetings (TIMs)

The Contractor shall lead, conduct, and participate in TIMs as needed throughout the duration of the contract. The TIMs will be conducted via telecon. The Contractor shall prepare drawings and other data, as required, to aid in discussions. The Contractor shall ensure that all required personnel and resources are present, document significant discussions in meeting minutes, and track the status of action items as required.

3.4 Building Facility Infrastructure and Site Activation.

3.4.1 Building Facility Infrastructure.

The Government will provide the building facility for the LFSS installation at WSMR and infrastructure required to support the LFSS and subsystems based on timely identification of system requirements. This infrastructure includes structural floor trenches, HVAC, electrical power connection points, cable tray systems, domestic water connections, floor drains, cable tray systems for low voltage wiring, and radiation shielding to make the LFSS operational.

The Contractor shall provide necessary drawings and information to support the Department of Public Works Work Order process. The Contractor cannot complete final terminations/connections to Real Property service (water, electric, gas, etc.). Government personnel will coordinate this effort, and will require input from the Contractor for scope and scheduling.

3.4.1.1 Site Survey.

The Contractor shall conduct a survey at the site installation site no later than 14 calendar days after the Start of Work meeting. The purpose of the survey is to discuss and confirm installation requirements and to provide information on any modifications required at the installation site. During the survey, the contractor shall:

- a. Review the status of the building or location where the system will be installed.

- b. Confirm the required positions of equipment, assemblies, cableways, access ways, and any other unique feature, and measure to ensure clearance during the installation.
- c. Review and confirm the existing and proposed location of power distribution boxes; switches; water and air supply points and air ducting; and other unique building or location features.
- d. Determine the availability of required services.
- e. Review and confirm arrangements for hours of work, access to work areas, supporting workshops facilities, and on-site personnel participation.
- f. Discuss and resolve any outstanding issues pertaining to the installation program.
- g. Confirm all required arrangements for DoD 8500.2 controls identified as being inherited by the system are in existence.

SCIENTIFIC AND TECHNICAL REPORT (SITE SURVEY REPORT) (DI-MISC-80711A)

3.4.2 Site Activation.

The Government is responsible for modifications to infrastructure (power, network, mechanical).

3.4.3 Installation Tools and Test Equipment.

The Contractor's installation team shall be equipped with all tools required for system installation. Any special tools and test equipment required for operation and maintenance of the system shall be delivered with the system at time of installation.

3.4.4 Installation Spares.

The Contractor's installation team shall be equipped with an installation spares package of common items as required to perform Site Acceptance Testing (SAT). The installation spares packages shall remain at the site and become property of the Government.

3.5 Integrated Testing Requirements.

The Contractor shall plan, coordinate, establish and implement a Government approved test and evaluation program to verify that the LFSS meets the requirements in PRF-PT-

691. The Contractor shall be responsible for developing a test plan; performing all test procedures; conducting test readiness reviews; tracking and closing test discrepancies; and verification of the system.

3.5.1 Test Plan.

The Contractor shall develop a Test Plan that outlines the plans and performance objectives at every level of testing on systems or equipment to include Factory Acceptance Test (FAT) and SAT. The Test Plan shall describe the test concept, objectives and requirements to be satisfied, test methods, elements, responsible activities associated with the testing, coordination of test assets and resources, measures required, and recording procedures to be used.

(DI-NDTI-80566A) Test Plan

3.5.2 Test Procedures.

The Contractor shall develop written test procedures for FAT the SAT that define step-by-step testing operations to be performed. The Contractor shall identify items to be tested, the test equipment and support required, the test conditions to be imposed, the parameters to be measured, and the pass and fail criteria against which the test results will be measured. The test procedures shall be assigned a unique document reference identifier. The test procedures shall be written so that the test steps can be traced to all the system requirements in PRF-PT- 691 and will indicate pass/fail results. Test procedures to support FAT and SAT shall be submitted to the Government for approval prior to testing.

3.5.3 Test Readiness Reviews (TRR).

The Contractor shall conduct TRRs for FAT and SAT. The TRRs shall be conducted by telecon 7 days prior to the start of FAT and SAT. Entry into each TRR requires that the FAT and SAT Test Procedures have been approved by the Government. Entry into SAT requires that the Contractor provide evidence that test discrepancies from FAT were resolved to Government satisfaction, and that resources are ready for the start of SAT.

3.5.4 Factory Acceptance Test (FAT).

The Contractor shall plan, conduct, and support Government witnessed FAT to verify that the LFSS complies with Performance Specification requirements that can be tested at the factory or at a test lab/facility. The Contractor shall ensure that systems and test

equipment are operational, and calibrated and tuned prior to start of test. The Contractor shall record and analyze the results of each test. Contractor shall document the test results in Test Reports.

(DI-NDTI-80603A) Test Procedure

(DI-NDTI-80809B) Test/Inspection Report

3.5.5 Site Acceptance Test (SAT).

Government approval of FAT is required prior to shipping the LFSS for SAT at WSMR. The Contractor shall plan, conduct, and support Government-witnessed SAT at WSMR to verify that the LFSS complies with Performance Specification requirements. The Contractor shall ensure that unique facilities, equipment, and instrumentation required to perform tests will be available at WSMR and that sufficient test articles (including support items) are available. The Contractor shall ensure that systems and test equipment are operational and calibrated and tuned prior to start of test. The Contractor shall provide technical support for SAT to include troubleshooting; spare parts; repair and replacement of failed systems and subsystems; components; and preventive maintenance. Contractor shall record and analyze the test results. Contractor shall document the test results in a Test Report.

(DI-NDTI-80603A) Test Procedure

(DI-NDTI-80809B) Test/Inspection Report

3.5.6 Test Discrepancies.

The Contractor shall document all test discrepancies for FAT and SAT and track the failure analysis and corrective action for each test discrepancy until correction and regression tests are successfully completed.

3.5.6.1 Discrepancy Processing.

The Contractor shall document a detailed description defining the changes made to the equipment to correct each discrepancy. Each discrepancy correction that modifies or changes any baseline shall be documented.

3.5.6.2 Test Discrepancy Report (TDR).

The Contractor shall assign a unique reference number for each discrepancy and will be tracked as a TDR. The Contractor shall establish a suspense system to ensure timeliness of analysis and corrective action of each test discrepancy. Upon correction of the test discrepancies, the Contractor shall test the system to ensure that the

correction of the test discrepancies did not interfere with or alter the functionality of the system. The TDR will only be closed with Government approval.

3.5.7 System Verification Review (SVR).

The SVR is a multi-disciplined assessment to ensure the system has met performance, cost, and schedule requirements prior to formal acceptance by the Government. Final FAT and SAT test reports will be reviewed. The system will not be accepted until the system requirements have been met and verified.

3.5.7.1 SVR Entry Criteria.

- a. Completed and approved FAT results.
- b. Completed and approved SAT results.

3.5.7.2 SVR Completion/Exit Criteria.

- a. Traceability Matrix showing that all requirements have been met.

3.5.7.3 SVR Products.

- a. Final Detailed drawings and specifications packages of final LFSS configuration and all support systems
- b. Final Logistic documentation and product Operations and Maintenance (O&M) manuals
- c. Completed and approved SAT results

3.6 System Life Cycle Support.

The Contractor shall support safety and health hazard analysis, provide operator and maintenance training and training materials and provide system documentation.

3.6.1 Safety Hazard Assessment.

The Contractor shall identify safety hazards to personnel and ensure that all hazards are assessed and that each hazard is tracked until final resolution. The Contractor shall obtain Government approval for final resolution. Safety features of the system shall be demonstrated during performance as well as the safety impacts due to inadvertent functioning or functional failure. Subsystems that the system will interface with shall be evaluated to ensure hazards and risks are avoided.

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

3.6.2 Health Hazard Assessment.

The Contractor shall identify potential health hazards and ensure all health hazards are assessed and each health hazard is tracked until final resolution. Health hazards shall be demonstrated during performance as well as the health hazard impacts due to inadvertent functioning or functional failure. Subsystems that the system will interface with shall be evaluated to ensure health hazards and risks are avoided. The Contractor shall obtain Government approval of the final health hazard resolution, recommend engineering controls, clothing, equipment, and protective procedures to reduce the associated risk to an acceptable level. The Contractor shall assess system, facility, and personnel protective equipment design requirements to allow safe operation and maintenance. The Contractor shall identify the cleaning agents used for the system and ensure they are non-hazardous.

(DI-SAFT-80106C) Health Hazard Assessment Report (HHAR)

3.6.3 Training Materials.

The Contractor shall make provisions to conduct operation and maintenance familiarization training through a combination of classroom, written instruction, and/or hands-on training on the LFSS. The Contractor shall provide all courseware, to include the program of instruction to accommodate new equipment training, sustainment training, and training of testers and evaluators. The Contractor shall conduct the training courses on location at WSMR where the system is to be installed.

TRAINING MATERIALS (DI-ILSS-80872)

3.6.4 Spare Parts List.

The Contractor shall provide Government approved spare parts list for each system.
LOGISTICS PRODUCT DATA (DI-SESS-81758A), LOGISTICS PRODUCT DATA SUMMARIES (DI-SESS-81759A)

3.6.5 O&M Manuals.

The O&M instructions shall accurately provide the technician with all the information needed to keep the equipment operational. It shall provide system and subsystem-oriented instructions for installation, operation, maintenance, and testing. All tools, test equipment, and consumable items required to accomplish any maintenance or installation shall be identified. All publications shall reflect the configuration of fielded hardware. The Operator's Manual shall also include operator maintenance tasks such as preventive maintenance checks and services, inspection, lubrication, adjustment,

and other operator-level repair and replacement tasks. The Contractor shall identify all required spare parts, consumables, tools, and test/support equipment associated with each maintenance task.

Preparation of Digital Technical Information for Page-Based Technical Manuals (TMs) (MIL-STD-40051-2C)

3.6.6 Commercial Off-The-Shelf (COTS) Manuals.

The Contractor shall deliver COTS technical publications for all commercial equipment delivered with the training system or modification. The COTS documentation shall be obtained in electronic media or scanned into indexed electronic media (i.e., portable document format) for delivery to the Government and be sufficient to support the operation and maintenance of all COTS components. The Contractor shall review the COTS documentation and identify deficiencies or deviations in the manuals. If the COTS document is not sufficient to support the operation and maintenance and the Contractor is unable to retrieve the required data from the vendor, the Contractor shall provide supplementary data COTS item.

COMMERCIAL OFF THE SHELF MANUALS & ASSOCIATED SUPPLEMENTAL DATA (DI-TMSS-80527C)

3.6.7 Commercial Drawings/Models/Software and Associated List.

The Contractor shall provide the physical size of completed Test equipment as well as clearances required for installation, operation and maintenance. The Contractor shall provide the instrumentation that will be used to control the test environment and document test conditions and briefly describe the capabilities and limitations of the instrumentation. The Contractor shall provide all the technical documents needed to maintain and sustain the system (equipment drawings, specifications).

**PRODUCT DRAWINGS/MODELS AND ASSOCIATED LISTS (DI-SESS-81000E),
COMMERCIAL DRAWINGS/MODELS AND ASSOCIATED LISTS (DI-SESS-81003E)**

3.6.8 Materiel Identification Requirements.

The Contractor shall implement an Item Unique Identification (IUID) of tangible items in accordance with MIL-STD-130N w/Change 1. IUID means a set of data marked on items that is globally unique, unambiguous, and robust enough to ensure data information quality throughout the system's life. These requirements apply to fabricated and commercial items. The Contractor shall coordinate with the Government and identify the IUID to be used, and items requiring unique identification including embedded subassemblies, components, and parts. The Contractor shall provide IUID,

or a DoD-recognized unique identification equivalent, for all identified items delivered. The Contractor shall submit this data to the DoD IUID central registry. UID marking of items shall be both machine-readable and human-readable.

ITEM UNIQUE IDENTIFICATION (IUID) MARKING ACTIVITY, VALIDATION AND VERIFICATION REPORT (DI-MGMT-81804A)

3.7 Disposition of Existing Legacy Shock Testing Equipment.

WSMR is responsible for removal of the existing legacy Shaker equipment.

4. Warranties.

The Contractor shall ensure all original equipment manufacturer warranties are transferred to the Government upon system acceptance. The Contractor shall provide a one year commercial warranty and technical support.