

STATEMENT OF WORK  
FOR  
LOCATION OF MISS AND HIT (LOMAH) RANGE MODIFICATION EFFORT



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STATEMENT OF WORK  
For  
LOCATION OF MISS AND HIT (LOMAH) RANGE MODIFICATION EFFORT

1 SCOPE

This Statement of Work (SOW) defines the effort required for the procurement of hardware (range devices/components), site preparation, hardware installation, integration/verification support, and documentation and new equipment training for range modification to the Location of Miss and Hit (LOMAH) system and ranges.

2 APPLICABLE DOCUMENTS

The following documents of issue shown on the Document Summary List (DSL) (Appendix A) form a part of this 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/Directives**

MIL-STD-130	Identification of Marking of U.S. Military Property
DOD 5220.22	National Industrial Security Program Operating Manual

**2.1.1 Availability of Department of Defense Standards**

Copies are available on the WWW at URL: <http://assist.daps.dla.mil/quicksearch/>

**2.2 Other Government Documents, Drawings, and Publications**

PRF-PT-00468	Performance Specification for the Future Army System of Integrated Targets (FASIT)
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Copies are available on the WWW at URL: <http://www.lt2portal.org>

CEHNC 1110-1-23	USACE Open Range Design Guide
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The above document is available at  
<http://www.hnd.usace.army.mil/rftp/DesignManuals.aspx>

**2.2.1 Availability of Other Government Documents and Publications**

Copies of the above documents are available at PEO STRI, ATTN: SFAE-STRI-KOL, 12350 Research Parkway, Orlando, FL 32826-3276

## 2.3 Non-Government Standards and Other Publications

ANSI/NFPA 70                      National Electric Code

Copies are available on the WWW at URL <http://www.osha.gov>

## 3 REQUIREMENTS

### 3.1 Overview

You shall procure and fabricate materials, perform range preparation, install hardware, integrate range devices/components, support test and verify performance, and document and provide training of the LOMAH system(s) devices/components in fulfillment of the requirements defined in Appendix B – Technical Requirements Document for LOMAH, Appendix C – Effort for LOMAH and PRF-PT-00468 Performance Specification for the Future Army System of Integrated Targets (FASIT).

#### 3.1.1 LOMAH Range Devices/ Components

You shall procure and/or fabricate materials for the following LOMAH Range Devices/Components. The Range Devices/Components shall be compliant to the FASIT Performance Specifications and Appendix B.

- a. Stationary Infantry Targets (SITs),
- b. LOMAH Bars (Engagement Scoring Device),
- c. Student Stations,
- d. Shot Sensors, and
- e. Silhouettes.

#### 3.1.2 Range Site Preparation

You shall perform all the tasks necessary to prepare each range site for the installation of LOMAH Range Devices/Components in accordance with USACE Open Range Design Guide – CEHNC 1110-1-23. These tasks shall include at a minimum:

- a. Procure and/or fabricate materials to perform the following:
  - Pulling CAT 5e/6 cables to each firing point.
  - Installing network connectors at each firing point and each target coffin.
  - Installing switches and media convertors.
- b. Report any damage or accidents to the on-site Government representative as soon as possible upon occurrence, but not later than the next business day.
- c. Ensure the installation team is equipped with all the standard tools required for the system

installation.

### 3.1.2.1 Range Site Protection

You shall perform the following:

- a. Surge Protection. You shall integrate and install appropriate surge protection devices at each of the individual firing point locations on the LOMAH range. The surge protection shall be sized and appropriate for all of the equipment at the firing point in accordance with USACE Open Range Design Guide – CEHNC 1110-1-23.
- b. Target Grounding. You shall evaluate the existing grounding systems employed at the target pit locations and other key assets of the LOMAH range. You shall design, integrate, and install appropriate grounding systems for each of the target pit locations and firing point locations. The components shall be grounded in accordance with ANSI/NFPA 70.
- c. Lightning Protection. You shall evaluate the entire range at each target coffin and firing point to ensure that lightning protections is in accordance with USACE Open Range Design Guide – CEHNC 1110-1-23. If the target coffin and firing point is not in compliance with USACE Open Range Design Guide – CEHNC 1110-1-23, you shall report to the contract officer as soon as possible upon occurrence, but not later than the next business day.

### 3.1.3 Range Installation

You shall provide the requisite engineering and technical expertise to perform the following:

- a. You shall install all target lifters, LOMAH Bars, silhouettes, and other items in the existing concrete coffins.
- b. You shall use the firing positions at the firing line for the installation of the Student Station and Shot Sensor. LOMAH firing point equipment (Student Stations and Shot Sensor) shall be connected to the existing power and data cable that you install.
- c. You shall align the target lifters, LOMAH Bars, silhouettes with the firing positions.

### 3.1.4 Site Acceptance Support

You shall provide the requisite engineering and technical support to the Government and LOMAH System Integrator ( LSI) in the requirements to successfully complete acceptance testing of the range. You shall provide a maximum of two (2) weeks on-site support for each range after installation. You shall support the site acceptance with the LSI to ensure the interoperability between Targetry Range Automated Control and Recording (TRACR) and your LOMAH devices/components.

### 3.1.5 Post Award Conference /Early Integration Meeting

A Post Award Conference/Early Integration Meeting shall be held at your facility ten (10) days after award of the Delivery Order. The conference shall introduce the key IPT participants, identify points of contact, and discuss both parties understanding of the scope of work and other contract issues. As part of the Post Award Conference/Early Integration Meeting, you shall provide the requisite engineering and technical support/expertise to the Government and LSI at this meeting to facilitate the interoperability between TRACR and the LOMAH devices/components. You shall support the interface integration with the LSI to ensure the interoperability between TRACR and your LOMAH devices/components and to finalize the interface and firmware of the LOMAH devices/components. This effort is required to support the development of the TRACR LOMAH Software by the LSI.

### 3.2 Program Oversight

You shall perform programmatic oversight and tasks.

#### 3.2.1 Program Management

You shall provide the overall management and administrative effort necessary to ensure that the requirements of this Delivery Order are accomplished. You shall plan, implement, and maintain a life cycle cost (LCC) management process to minimize the system cost and use LCC to evaluate design and select the resource support requirements. You shall track program progress utilizing metrics. You shall define and monitor metrics and Technical Performance Measures (TPM) to evaluate the performance of each critical technical and management process and conformance of the evolving products with Delivery Order requirements and objectives. You shall deliver monthly progress reports containing the following:

- a. Time-lines and schedules
- b. Invoices submitted to date
- c. Problems and solutions
- d. Minutes of all technical interchange meetings and/or program reviews
- e. Plan of next month activities

(DI-MGMT-80227) Contractor's Progress, Status and Management Report (A001)

#### 3.2.2 Installation/Range Access and Identification of Employees

You shall comply with all DOD, Service, and Installation specific access regulatory doctrine or directives. You shall provide and display ID Badges. If required by the Installation, you shall also arrange for the personnel to obtain the necessary local badges. Contractor personnel shall possess the required security level clearance (e.g., Confidential or Secret, depending upon the security requirements of the place of performance) prior to assignment to a specific task and work site in order to effectively perform assigned work. In order to obtain a security clearance, the following website is provided: Defense Security Service (DSS) Website ([www.dss.mil](http://www.dss.mil)) National Industrial Security Program Operating Manual (NISPOM) (DOD 5220.22-M).

### 3.3 LOMAH Performance Specification

You shall maintain a current and complete baseline description for each device/component that you deliver. You shall describe the interface boundaries between all hardware and software configuration items, and any interfaces available to outside systems. These descriptions shall include references to commercial standards, messages protocols, and security issues and precautions.

(DI-SDMP-81465) Performance Specification Document (A002)

### 3.4 Item Unique Identification (IUID) of Tangible Items

You shall implement an IUID of tangible items programs in accordance with MIL-STD-130, paragraph 5.2. Unique item identifier means a set of data marked on items that is globally unique, unambiguous, and robust enough to ensure data information quality throughout life and to support multi-faceted business applications and users. These requirements apply to developed and commercial items. You shall coordinate among the LOMAH IPT members and identify IUID type, the UID to be used, and items requiring IUID. You shall provide unique item identification, or a DoD recognized IUID equivalent, for all identified items delivered. IUID marking of items shall be both machine readable and human readable in accordance MIL-STD-130, paragraph 5.2.

(DI-MISC-80711) Scientific and Technical Reports (A003)

### 3.5 Maintenance Concept

You shall develop a maintenance concept that consists of one level of maintenance - Field. Field maintenance, also known as on-system maintenance, performs repairs and returns equipment to the operator or user. Field level maintenance includes on-system maintenance including preventative maintenance, daily readiness checks and services, adjustments to controls and other maintenance that can be accomplished without removing the affected major assembly from its deployed location for extensive repair. Field level mechanics will perform inspections, diagnose faults, and replace components on end items for return to the user. Field maintenance can be accomplished by the operator or trained technician with the aid of special tools, support equipment, additional training knowledge or skills, either on site or at a Life Cycle Contractor Support (LCCS) maintenance facility. Field Maintenance includes system activation, adjusting and aligning to specific parameters, troubleshooting, and removal and replacement of failed components.

#### 3.5.1 Initial Spare and Repair Parts

You shall recommend the range and quantity of spare and repair parts needed to initially support each fielded system. Your recommendations shall include consideration for the support concept for the system, essentiality of the component, price, lead times, and failure factors. You shall combine procurement/production of selected spares with identical items procured/produced for installation on the primary equipment when ordered by the Government. Configuration control shall be maintained for on-order spares, as well as for items to be installed on the primary system

to ensure that appropriate spares are delivered.

### 3.5.2 Tools and Test Equipment

You shall identify all tools and test equipment required for the repair and use of the system. This shall include any unique items required to inspect, test, calibrate, service, repair, or overhaul the system or its constituent components. You shall identify any deficiencies between the tools and test equipment required for support of the system and those available at the intended fielding sites.

### 3.6 Pocket Guide

You shall develop a maintenance pocket guide. The pocket guide shall describe each of the LOMAH Range Devices/ Components. The maintenance instructions shall accurately provide the technician with all the information needed to keep the equipment operational.

(DI-MISC-80711) Scientific and Technical Reports (A004)

### 3.7 New Equipment Training (NET).

After installation and acceptance of the system, you shall provide NET training to the receiving organizations. This training shall be a self-contained course and provide detailed maintenance knowledge of the LOMAH Range Devices/ Components. A Training Support Package shall be provided to assist in Train the Trainer activities. You shall develop and provide system operation and maintenance familiarization training through a combination of classroom, written instructions, and hands-on operation. You shall analyze, and prepare all training courseware including program of instruction lesson plans, practical exercises, and a train-the-trainer package to accommodate new equipment training. You shall design and develop this training support package using instructional systems design processes. For commercial and Nondevelopmental Items (NDI) courses, existing materials shall be utilized.

(DI-ILSS-80872) Training Materials (A005)

#### 3.7.1 Maintenance Training

You shall plan, develop, and conduct the initial maintainer course. The course shall provide comprehensive training for maintainers in the concepts, skills, and aptitude to efficiently operate the system. This course shall consist of instruction in troubleshooting and maintenance, diagnostics to fault isolation, calibration, adjustments, remove and replace procedures, use of built in test, and repair that is beyond operator level maintenance. After completion of the course all personnel shall be capable of maintaining and troubleshooting to the lowest replacement part level.

### 3.8 Equipment Repair (Warranty)

#### 3.8.1 Repair of Failed Equipment

You shall provide the facilities, parts, and materials to repair failed and damaged equipment for a period of three (3) years. You shall repair the equipment to an operational condition capable of

performing in accordance with the associated FASIT Performance Specifications and Appendix A. You shall pay for shipping both ways of repairs. You shall perform the following:

- a. Inventory and account for all equipment received.
- b. Inspect all equipment for damages and document the findings.
- c. Prepare failure and repair report for each of the items returned.
- d. Perform trouble shooting and fault isolation and make the necessary repairs.
- e. Perform functional tests at your facility.

### 3.8.2 Reporting

You shall identify the following in the monthly report:

- a. Inductions,
- b. Number of repair actions,
- c. Type of repair actions performed, and
- d. Equipment status.

### 3.8.3 Turn Around Time

You shall evaluate the failed and damaged items and make the necessary repairs and return the items within thirty (30) calendar days. The turnaround time shall begin the day the items are received at your facility and ends when the items have departed your facility.

### 3.9 Equipment Repair Support.

You shall provide a means of supporting the maintenance of equipment by making available to the maintenance facilities the ability to procure form, fit, and function (FFF) replacements and/or repair parts in accordance with paragraph 3.5.1 of this SOW.

### 3.10 Range and Training Assistance

You shall provide additional support for the LOMAH program to include training, logistics, engineering functions, support, maintenance services, and operations as requested by the Government and as specified in accordance with individual work order(s).

Appendix A  
 Document Summary List  
 For The  
 Location of Hit and Miss (LOMAH)  
 Effort

Definition of Categories (Cat):

Cat 0. The requirements contained in the directly cited document are not mandatory and are for guidance and information only. Unless otherwise specified in the solicitation, contract or contract modification, all requirements contained in the directly cited document and all referenced and subsequently referenced documents are not contractually applicable and are for guidance and information only.

Cat 1. The requirements contained in the directly cited document are contractually applicable to the extent specified. Unless otherwise specified in the solicitation, contract or contract modification, all requirements contained in referenced and subsequently.

	<b>Document Number</b>	<b>Document Title</b>	<b>Contract Reference</b>	<b>Date</b>	<b>Cat. Code</b>
1.	PRF-PT-00468 Version 1.0	Performance Specification for the Future Army System of Integrated Targets (FASIT)	SOW Para 3.1 and 3.1.1	15 Jan 08	Cat 1
2.	CEHNC 1110-1-23	USACE Open Range Design Guide	SOW Para 3.1.2, 3.1.2.1a, and 3.1.2.1c	1Dec04	Cat 1
3.	ANSI/NFPA 70	National Electric Code	SOW Para 3.1.2.1.b		Cat 1
4.	DI-MGMT-80227	Contractor's Progress, Status and Management Report	Seq. No. A001 SOW Para 3.2.1	Sep 86	Cat 1
5.	DOD 5220.22-M	National Industrial Security Program Operation Manual	SOW Para 3.2.2		Cat 0
6.	DI-SDMP-81465A	Performance Specification Documents	Seq. No. A002 SOW Para 3.3	1 Aug 03	Cat 1
7.	MIL-STD-130N	Identification Marking of US Military Property	SOW Para 3.4	17 Dec 07	Cat 1
8.	DI-MISC-80711A	Scientific & Technical Reports	Seq. No. A003 SOW Para 3.4	21Jan00	Cat 1
9.	DI-MISC-80711A	Scientific & Technical Reports	Seq. No. A004 SOW Para 3.6	21Jan00	Cat 1
10.	DI-ILSS-80872	Training Materials	Seq. No. A005 SOW Para 3.7	29Jun89	Cat 1

	<b>Document Number</b>	<b>Document Title</b>	<b>Contract Reference</b>	<b>Date</b>	<b>Cat. Code</b>
11.	CEHNC 1110-1-23	USACE Open Range Design Guide	TRD Para 3.1, 3.2.1a,3.2.2a, 3.2.3a	1Dec04	Cat 1
12.	RFC 791	Internet Protocol Specification	TDR Para 3.2a		Cat 1
13.	ICD. FASIT.SYS Rel. 2.1	FASIT System Devices Interface Control Document	TDR Para. 3.2b, 3.2.3b, 3.2.4a, 3.2.5a	25 May	Cat 1
14.	PRF-PT-00468 Version 1.0	Performance Specification for the Future Army System of Integrated Targets (FASIT)	TDR Para 3.2b and 3.1.1and 3.2.6	15 Jan 08	Cat 1
15.	RFC	Internet Protocol, Version 6 (IPv6) Specification	TDR Para 3.2a (Objective)		Cat 1
16.	ICD. FASIT.PD Rel. 1.0	FASIT Presentation Devices Interface Control Document	TRD 3.2.4b	1 Dec 06	Cat 1

## Appendix B

### Technical Requirements Document for the Location of Miss and Hit (LOMAH) System Devices and Interfaces

#### 1. Scope.

This document defines the technical and performance requirements and interfaces for the Location of Hit and Miss (LOMAH) devices to be incorporated into the FASIT architecture and Product Line. The intent of this document is to describe the technical performance expectations of the LOMAH devices, not to provide narrative requirements as to the physical description. It is expected that the contractor shall utilize existing and accepted hardware baselines as their technical solution.

#### 1.1. Background.

LOMAH is a computer controlled target system that provides immediate feedback of each shot fired by each individual shooter on a computerized display at the individual's position and the centralized tower computer system. This replaced the old "human method" of individual marking and scoring of Known Distance Live Fire Exercises. LOMAH enables the individual, coach, or trainer, to recognize and identify shooting errors and assists in correcting those errors in a more defined and accurate methodology while reducing ammunition expenditure and time required for training exercises. The LOMAH range also reduces the supporting manpower required to conduct training exercises on this range.

#### 1.2. Future Army System of Integrated Targets (FASIT).

The Future Army System of Integrated Targets (FASIT) supports the full scope of precision and qualification live fire, live training using instrumentation, and combined arms force-on-target (FOT) training exercises at the Brigade Combat Team (BCT) level and below in all Joint Capability Areas on home station ranges, Combat Training Center ranges, and deployed training environments. FASIT is a component of the Live Training Transformation Family of Training Systems (LT2-FTS) and provides common scenario development, exercise control, AAR collection and presentation, administrative support, communication infrastructure, target presentation/representation, weapons effect measurement, and battlefield/area weapon effects. FASIT supports LOS and NLOS, 2D, 3D, and multi-spectral targets as well as integration with UAS and UGS capabilities, and it stimulates Warfighting Battlefield Operating Systems (BOSS) in the live training environment.

#### 1.3. Targetry Range Automated Control and Recording (TRACR).

The Targetry Range Automated Control and Recording (TRACR) system is a software application and suite of applications which supports the planning, execution, and review of scenario based training at non-instrumented army training ranges. It allows users to develop automated target control scenarios via scenario development and range data editing tools that supports time and event based automated target control as well as triggering via manual control.

TRACR and TRACR Suite collect target engagement statistics and assist the user with the generation and presentation of after action review material. The TRACR and TRACR Suite systems are utilized on the small arms - lane based and maneuver live fire training ranges. TRACR implements the FASIT standards and protocols. TRACR is the singular Government owned common target control system for the Army.

#### 1.4. TRACR LOMAH.

The TRACR LOMAH is a continuation of the TRACR Suite approach by defining modular discrete extensions to the TRACR functionality. TRACR LOMAH represents the maturation of the TRACR product to include LOMAH based controls, commands, interfaces, graphic user interfaces, and support for the inclusion of a non-contact hit sensor data package into the TRACR command process.

#### 1.5. Definitions.

The following terminology is defined to form a common reference point for the association of performance to configuration item.

- a) LOMAH Bar – The device that senses the arrival of the bullet, and calculates the position of the bullet above the bar at the target location. In the FASIT specification, LOMAH is referred to as Engagement Scoring Device.
- b) Shot Sensor - The device located at the student's (shooter's) position that senses that the student has fired at the target.
- c) Student Station - The device located at the student's position that provides student input to the system and provides the shooting results to the student.
- d) Alignment Tool - The device used to anchor/attach the LOMAH Bar with respect to the target to assure the proper indexing of the sensed bullet position to the physical silhouette.

## 2. Applicable Documents.

### 2.1. Other Government Documents, Drawings, and Publications.

The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

CEHNC 1110-1-23	USACE Design Manual for Ranges - Revised Range Design/Construction Interface Standards Supplement
ICD.FASIT.SYS	FASIT System Devices Interface Control Document
ICD.FASIT.PD	FASIT Presentation Devices Interface Control Document
ICD.FASIT.NCHS	FASIT Non-Contact Hit Sensor Interface Control Document

PRF-PT-00468 Performance Specification for the Future Army System of  
Integrated Targets (FASIT)

Copies of the above document can be obtained at the Program Executive Office for Simulation Training and Instrumentation (PEO STRI), Attn: SFAE-STRI-K-L, 12350 Research Parkway, Orlando, FL 32826-3276.

## 2.2. Non-Government Publications.

The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

RFC 791 Internet Protocol Specification

RFC 2460 Internet Protocol, Version 6 (IPv6) Specification

## 2.3. Order of Precedence.

In the event of conflict between the text of this document and the references cited, the text of this performance specification takes precedence. Nothing in this document, however, supersedes applicable laws and regulations.

## 3. Requirements.

### 3.1. Constraints.

- a) The range infrastructure and all target emplacements shall be in accordance with (IAW) the Corps of Engineers (CoE) Range Design Guideline (RDG) and CEHNC 1110-1-23.
- b) All Stationary Infantry Target (SIT) lifters shall be FASIT-compliant IAW the FASIT Performance Specification and the FASIT ICDs.
- c) The LOMAH bar shall attach to, or be installed in front of, the SIT lifter and shall connect to available range power and signal connections.
- d) The LOMAH bars, shot sensors, and student stations shall be modular to support a deployment to a singular target application on lane based ranges and support a minimum of 1 lane and a maximum of 32 lanes with three LOMAH target distances per lane (75m, 175m, 300m), without interference or network addressing limitations.

### 3.2. Performance Requirements.

#### Threshold Requirements:

- a) All downrange devices, to include student station and shot sensor shall utilize TCP/IP in accordance with RFC 791 (IPv4) and other applicable documents.
- b) All downrange devices shall connect to the Universal Target Controller (UTC) of TRACR via the FASIT System Interface Control Document and specification.
- c) The standard range layout for LOMAH is an Automated Field Fire Range (AFF) which includes targets at 75m, 175m, and 300m distances only.

- d) When LOMAH is included on a Modified Record Fire (MRF) range which is a multi-purpose range consisting of an Automated Record Fire (ARF) range and an AFF range, LOMAH will only be installed on the AFF portion of the range.
- e) All targets on the range (MRF and AFF) shall score target hits for all target locations as in a normal small arms qualification range. The LOMAH equipment shall not interfere or degrade normal behaviors and operations.
- f) The Shot Sensor and Student station shall be able to operate mutually exclusive of each other, or in tandem. There may only be room for only one Ethernet output at the firing point, therefore the student station shall provide a means to connect the shot sensor to the range network.
- g) All downrange devices shall have a reliability of at least 99% (probability of mission success without interruption or failure) for a mission duration of 20 days.
- h) All repairable downrange devices shall have a mean time to repair of 30 minutes or less.

**Objective Requirements:**

- a) All devices shall be electronically upgradeable to RFC 2460 (IPv6).

**3.2.1. LOMAH Bar.**

**Threshold Requirements:**

- a) The LOMAH bar shall be designed to be mounted to or in front of the lifter and connect to range supplied power (120/240 VAC) and signal (TCP/IP) sources per the CoE RDG.
- b) The LOMAH bar shall communicate to the range control system IAW the FASIT Non-Contact Hit Sensor (NCHS) Interface Control Document (ICD) to be defined.
- c) The LOMAH bar shall provide projectile location (X, Y), for each projectile sensed, compared to a reference location to be specified by the vendor.
- d) The LOMAH bar shall have the ability to accurately define Miss and Hit location of each round within 10mm accuracy at the 75, 175 and 300m targets. The LOMAH bar shall report each shot location and time occurrence to the TRACR control system via the UTC.
- e) The LOMAH bar shall be independent of any mechanical or electrical target hit registration device.
- f) The LOMAH bar shall have built-in-test (BIT) capability; fail in the safe mode; and provide indication of BIT failure at the central control system.
- g) The LOMAH bar shall be capable of detecting up to 10 objects per second, with a probability of 97%
- h) The manufacturer shall supply procedures and special tools, as required, to allow calibrating/aligning the bar to the target silhouette. The bar design should allow addition to selected lifters on an existing range (e.g. adding to the 75, 175, and 300 meter lifters on a MRF range). The procedures and alignment tools shall address the corrections to align the bar's performance to the target distance.
- i) Ricochets, stones, rocks, dirt, debris, rain, hail, etc... shall not cause false or erroneous target hits, scores, or the system to malfunction.
- j) The LOMAH bar shall support M16 and M4; and all associated munitions

- k) The LOMAH bar shall be capable of recording all engagements (hit or miss) in an area that is 100% greater in width and height than the target silhouette profile.
- l) The LOMAH bar shall allow for ease of centering on the target silhouette profile and alignment of the bar with the profile. Errors introduced as part of alignment shall count against the total allowable accuracy.

Objective Requirements:

- a) The LOMAH bar shall have characteristic and capabilities commensurate with existing systems when presented with subsonic rounds.
- b) The LOMAH bar shall meet performance requirements over a defined area of interest, i.e. be capable of being scaled (connected with additional bars) for scoring of area weapons.

3.2.2. Shot Sensor.

Threshold Requirements:

- a) The shot sensor shall be designed to be placed on the ground (unimproved terrain) at the front of the firing position and connect to range supplied power (120/240 VAC) and signal (TCP/IP) sources per the CoE RDG.
- b) The shot sensor shall be capable of detecting a rate of fire up to 10 rounds per second
- c) Each lane shall include a shot sensor that detects that a round has been fired from that firing point thus signaling the system that a round is on the way in that lane.
- d) The shot sensor shall be able to detect shots fired in the prone-supported, prone-unsupported, and kneeling positions.
- e) The shot sensor shall detect shots with a reliability of 99.9% when properly placed at the firing position.

Objective Requirements:

- a) The shot sensor shall also support wireless (802.11g or n) connection to the control system.
- b) The shot sensor shall also support operations from a battery or alternate power (DC) source.

3.2.3. Student Station.

Threshold Requirements:

- a) The student station shall be designed to be placed on the ground (unimproved terrain) at the firing position and connect to range supplied power (120/240 VAC) and signal (TCP/IP) sources per the CoE RDG. The student station shall be designed to all movement and placement anywhere within a 10' radius of the network/power connection point.
- b) The student station should be durable to accommodate outside weather conditions and Army field environment, to include survivability if dropped from height of 2 meters on gravel/sand packed surface and IAW FASIT Specs.

- c) The student station shall be viewable in all light conditions and have reduced glare capability.
- d) The student station shall be Android 2.0 (or later) based.
- e) The student station shall have a viewable screen of at least 8 inches (800 by 600)

Objective Requirements:

- a) The student station shall also support wireless (802.11g or n) connection to the control system.
- b) The student station shall also support operations from a battery or alternate power (DC) source.
- c) The student station shall have a viewable screen of at least 10 inches (1280 by 800).
- d) The student station shall incorporate GPS positioning for use with lane identification/placement.

3.2.4. Stationary Infantry Target (SIT).

- a) All Stationary Infantry Targets (SITs) shall be fully compliant to paragraphs 3.3, 3.3.1 (and subsequent paragraphs), 3.10 (and subsequent paragraphs), 4.3, 4.3.1 (and subsequent paragraphs), and 4.10 (and subsequent paragraphs) of the FASIT Performance Specification.
- b) All SITs shall function and interoperate with TRACR via the FASIT PD ICD regardless of range mode (LOMAH or qualification).

3.2.5. LOMAH Messaging.

- a) Device ID and Capabilities (Device to UTC) – Each downrange device shall create a separate and unique identification (IP address) via DHCP service requests in accordance with the FASIT System ICD. Each device shall provide BIT status and any Fault Codes to the UTC.
- b) Projectile Location (Bar to UTC) – Sensed/Reported location of projectile.
- c) Display Image (UTC to Firing Point Display) – Each student station shall receive shot location and display information (MPI, BRM table, shot records, shot numbers, etc) from the UTC.
- d) Student Entries (Firing Point Display to UTC) – Each student station shall send data entered by the student (identification, BRM start/stop, etc) to the UTC/server.
- e) LOMAH Bar “On/Off” commands (UTC to Device) – The UTC shall send a command to the LOMAH bar (congruent with the SIT exposure command) to turn the LOMAH bar on (listening/shot detection). Same with conceal/off commands.

3.2.6. Environmental/EMI.

- a) All downrange devices shall be fully compliant to paragraphs 3.9 (and subsequent paragraphs), 3.11 (and subsequent paragraphs), 4.9 (and subsequent paragraphs), and 4.11 (and subsequent paragraphs) of the FASIT Performance Specification.

## Appendix C – Effort for LOMAH

This delineates the effort for LOMAH.

### Requirements:

#### 1) Fort Benning Range Oscar 7

You shall procure/produce:

- 144 Stationary Infantry Targets (SITs)
- 48 LOMAH Bars
- 16 Student Stations
- 16 Shot Sensors

#### 2) Fort Benning Range Oscar 9

You shall procure/produce:

- 144 Stationary Infantry Targets (SITs)
- 48 LOMAH Bars
- 16 Student Stations
- 16 Shot Sensors

#### 3) Fort Leonard Wood Range (Option)

You shall procure/produce:

- 96 Stationary Infantry Targets (SITs)
- 96 LOMAH Bars
- 16 Student Stations
- 16 Shot Sensors

#### 4) Fort Jackson Range (Option)

You shall procure/produce:

- 144 Stationary Infantry Targets (SITs)
- 48 LOMAH Bars
- 16 Student Stations
- 16 Shot Sensors