N63199-00-R-0006
AMSTI-00-W008
3 February 2000

STATEMENT OF WORK

FOR

MILITARY OPERATIONS ON URBANIZED TERRAIN (MOUT)/ RESTRICTIVE TERRAIN (RT) INDEFINITE DELIVERY/INDEFINITE QUANTITY (ID/IQ) CONTRACT

Prepared by:
Simulation, Instrumentation, and Training Command (STRICOM)
Orlando, Florida

STATEMENT OF WORK

Military Operations on Urbanized Terrain (MOUT)/Restrictive Terrain (RT)

1.0. SCOPE: The MOUT/RT contracts will provide the basic engineering studies, designs, construction, and integration services for the Department of Defense, and other Government agencies including state/local government entities for the development and fielding of MOUT/RT instrumentation systems/infrastructures. The document is broken down into several key conceptual areas:

(1) Studies and Analyses: These allow for the various technical and design studies necessary to plan and produce instrumentation systems for the MOUT/RT environment. These will range from White Papers to detailed Analyses.

(2) Prototype, Design and Planning: These allow for the early prototyping of conceptual designs, the documentation of infrastructure requirements to support total system, and the design and layout of a yet to be built facility.

(3) Construction: These allow for the construction/modification of buildings to support the requirements of the training activity.

(4) System Engineering, Integration, and Installation: These efforts will result in the fielding of instrumentation equipment to enhance the operational effectiveness of training. These efforts range from the installation of advanced simulation and instrumentation equipment to experimentation support.

(5) Interactive Engagement System: These allow for the integration and fielding of advanced interactive and instrumented engagement systems for the evaluation of Force-on-Force, Live Fire, and non-lethal training events.

(6) Battlefield Special Effects: These allow for the integration and fielding of specialized effects systems to enhance training and environment realism.

(7) Logistics and Support: These efforts include all aspect of product support, from new equipment training to mission support.

The general concept for the MOUT ID/IQ is to employ, maintain, and field urban and restrictive terrain instrumentation that allows interoperability between training sites and tactical equipment, and is modular in design to allow flexible deployment of assets to meet the particular training needs. The vision is that a backbone architecture can be established that will allow customers to buy their instrumentation suite in a piece meal fashion and have the confidence that additional portions can be procured and integrated in a plug and play approach. The intent is that all systems fielded through this effort either have or can have an HLA gateway.

1.1. Background: In general, U.S. and allied forces do not possess the overwhelming high technology advantages in Military Operations on Urbanized Terrain (MOUT) and the Restrictive Terrain (RT) environment that they do in virtually all other environments. The majority of current U.S. military capabilities is a legacy of the Cold War, designed for large-scale, high intensity mechanized operations, rather than for the current broad ranges of threats our forces now face. Many of the systems, which performed so well in open terrain, will be degraded in the dense urban environment. To correct this deficiency, there is a need to modernize the forces with better equipment, tactics and MOUT/RT training.

The fundamental objective of MOUT/RT training is to improve the operational effectiveness of soldiers operating in urban or built up areas.

Some specific missions of this training are as follows:

- Achieve dominance in MOUT/RT go to war operations utilizing advanced technologies and new operational concepts.
- Improve the operational capabilities of units in a MOUT/RT environment with the associated Tactics, Techniques and Procedures (TTPs).

As a general rule, customers attempting to implement training to achieve the above objectives do so by using locally conceived ideas and plans without reference to the wide range of existing solutions that may have already been developed by industry or military labs. When it comes to providing material solutions to existing or emerging TTPs, STRICOM, on the other hand, has knowledge of, and access to, a wide range of existing analysis services, technology, and ongoing developmental and production programs. Therefore, STRICOM is in a unique position to act as a facilitator to ensure a Service-wide coordination effort is in place with access to the technology required to implement effective MOUT/RT training and to provide an Indefinite Delivery/ Indefinite Quantity (ID/IQ) contract vehicle to obtain that technology.

1.2. Goals: STRICOM goals under this ID/IQ contracting effort are to:

- Assist customers in obtaining operations or supporting their MOUT/RT training objectives
- To create common MOUT/RT architecture that allows cross integration (both with respect to logistic support and commonality and compatibility between fielded systems)
- To produce common products that are supportable in the long term
- To produce common products that are supported through a common source

2.0. APPLICABLE DOCUMENTS

2.1. Government Documents.

2.1.1. Specification, Standards, and Handbooks.

No applicable specifications, standards, or handbooks are cited in this SOW.

2.1.2. Other Government Documents, Drawings, and Publications.

JTA-A	Joint Technical Architecture – Army
OMB Circular A-130	Management of Federal Information Resources
DoDD 5200.28	Security Requirements for Automated Information Systems
DoDD 5220.22	DoD Industrial Security Program

2.2. Non-Government Publications.
No applicable specifications, standards, or handbooks are cited in this SOW.

2.3. Order of Precedence.
In the event of a conflict between the text of this SOW and the references cited herein, the text of the SOW takes precedence. Nothing in this SOW, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3.0. Requirements.

3.1. Technical and Conceptual Studies.
This section describes the various technical and conceptual studies and analyses that will be performed under this ID/IQ contract.

3.1.1. Training
Studies shall be completed of the existing training requirements and the impacts based on future training needs and new training concepts. The training capabilities can be defined based on current and future MOUT facilities. These studies include identifying and documenting existing MOUT/RT capabilities, and the development of concepts of operation for a given site given the operational needs. These studies could also include the establishment of a starting point for the development and planning of an urban environment (costs, documents, etc). Finally, these studies could establish a checklist of activities, decisions, plans, and documents, which are required for the development of urban and restrictive terrain environments.

3.1.2. Environment
Studies shall be completed of the existing facilities to determine what upgrades are required or what requirement for additional construction is needed to fulfill the facilities operational requirement, such as the requirements necessary to make a site live fire ready. The analysis of the training requirements will determine location of any new facilities. These studies include producing geographical representation of various village types and terrain features to match the requirements/needs.

3.1.3. Supportability
System and equipment supportability analyses shall be conducted to ensure a high level of system availability with minimal cost impact for a given design/concept. These studies will include comprehensive logistic analyses with focus on life cycle support and costs (total life-cycle owner costs, supportability issues, etc.).

3.1.4. Technical Studies/Analyses

Studies shall be performed to determine new training requirements based on the impact of changes in the design/changes of military equipment and tactics, impact of new technologies, and linkages of Live, Virtual, and Constructive Simulations. These studies may include, but not be limited to, RF analyses, communication network modeling, and HLA interfaces.

3.1.5. Safety and Health Hazard Studies/Analyses

Studies shall be performed to assess the safety and environmental concerns and impacts associated with the development of a MOUT/RT training area. These studies include environmental impact studies (compliance issues with EPA, state, and local regulations), as well as safety assessments and Human Factors Engineering analyses.

3.1.6. Feasibility and Cost Benefit Analyses

Studies shall be performed to determine the technical feasibility of proposed solution to fulfill training requirements; to perform trade-off analyses and determinations; and to perform cost benefit analyses (efficiency and effectiveness). These studies will include, but not limited to, the examination of dual use capabilities, both in the tactical and training environments.

3.2. Site Planning and Design

This section describes the various design analysis services for planned and existing MOUT/RT sites/facilities. The design analysis will serve to identify deficiencies that might exist in current site designs and any future enhancements/improvements required to support planned training. If applicable, the design will determine all required modifications and additions to existing hardware components and software in order to allow for required technology refreshments.

3.2.1. Planned MOUT/RT Site Facilities/Structures

3.2.1.1. Site Design.

Perform evaluations of particular MOUT/RT sites to determine their full capabilities to support envisioned training requirements. The areas that will be subject to analysis would include area of the world to be replicated, type of building construction, road network, subterranean operations, etc. This design analysis will serve to identify deficiencies that might exist in proposed site design to support planned training and any future enhancements. The site design will take into consideration the usage profile (e.g., live fire) and the unique considerations resulting from this usage (e.g., range safety, engagement systems, and ammunition requirements/limitations), and the operational requirements of the user community (i.e., mission rehearsal).

3.2.1.2. Building Design.

Conduct analyses of building construction to evaluate and determine the types of training that can be conducted. Suitability/potential of buildings for Live Fire and/or Force-on-Force use will be determined. This design analysis will serve to identify deficiencies that might exist in planned building design to support planned training and any future enhancements/improvements.

3.2.2. Existing MOUT/RT Site Facilities/Structures

3.2.2.1. Site Redesign/Modification.
Perform analysis to determine all required modifications and additions to an MOUT/RT site in order to enhance current training capabilities. This design analysis can serve to identify deficiencies that might exist in the current site to support planned training and any future enhancements/improvements.

3.2.2.2. Building Redesign/Modification Analysis.
Conduct analyses to determine all required modifications and additions to existing buildings to enhance training capabilities. Suitability/Potential of buildings for Live Fire or Force-on-Force use also can be determined. These analyses should include provisions for the examination of process and building improvements (less expensive solutions and increased building durability).

3.3. Instrumentation Planning, Infrastructure Design, and System Design
This section describes the various infrastructure and system designs and instrumentation planning analyses that will be performed under this ID/IQ contract.

3.3.1. Communication Network System
Conduct analyses to evaluate planned or existing network systems to verify their planned/current operational capabilities. This evaluation will determine if the network system can support all devices that are currently attached to it, or planned to be connected. Upgradability of the communication network system will also be evaluated. An analysis can be conducted to design a communication network system to support planned and future training requirements. The analysis must include such areas of concern as HLA gateways, network loadings, digital video transport, and data security features (if usage profiles includes classified data).

3.3.2. Audio-Visual System Design
Conduct analyses to design an Audio-Visual system to support planned and future training requirements. System design can be undertaken to provide recording, editing, storage, and distribution of video, audio, or both with the flexibility for upgrade. System design should consider the capture/logging, recording and editing processes, and the final usage profile of the data.

3.3.3. Entity Instrumentation and Data Collection

3.3.3.1. Entity Instrumentation
Conduct analyses to design an Entity Instrumentation and Data Collection system. System design should allow the operators of the system to track the position and status of any key element of interest during a training event (human, objects, buildings, etc).

3.3.3.2. Casualty Assessment System Design
Conduct analyses to design a Casualty Assessment System to enhance Force-On-Forces training requirements (such as Shootback and Shoot-Through-Walls devices) to support planned and

future training requirements. System design will incorporate components that will have the flexibility for future upgrade.

3.3.4. Command and Control Capabilities

Conduct an analysis to design an effective Command and Control facility that allows the planning, monitoring, exercise control, and instrumentation control for a given training location. Key to the analysis will be interoperability and communication to other systems, scenario planning, constant control functions over all system components, and control of training events.

3.3.5. After Action Review (AAR)

Conduct analyses to design an effective AAR facility that will provide all resources required for the development and presentation of an AAR in an integrated multimedia format, including but not limited to, video, audio, and computer-generated graphics.

3.3.6. Engagement Systems

Conduct analyses to design an infrastructure and capabilities to encompass all potential uses of an instrumented and interactive engagement system. Analysis will focus on commonality of all infrastructure items.

3.3.7. Battlefield Effects.

Conduct analyses to design an effective, safe, and integrated Battlefield Effects system, to include placement, controls, interlocks, and systems integration

3.3.8. Automated Information System Security

Conduct analyses to design an effective Automated Information System (AIS) security system and approach that includes controls that are part of the day-to-day operations, in accordance with the guidance and recommendations of OBM Circular A-130, DoD Directive 5220.22, and DoD Directive 5200.28. The analyses must consider the type of data being processed and level of security needed. The design must provide a security approach commensurate with the risk and magnitude of harm resulting from the loss, misuse, or unauthorized access to or modification of information.

3.4. Rapid Prototyping/Research and Development

Prototyping facilities may be constructed and/or relocated depending on program requirements. New products and technologies can be developed, integrated, and demonstrated under this function. This function can include such efforts as replication of non-lethal weapons in a Force-on-Force environment, or the utilization and replication of breaching tools in the real training environment.

3.5. Construction/Modifications

This section describes the various new construction and modifications that will be performed under this ID/IQ contract.

3.5.1. New Construction.

Design and construct additional habitable and non-habitable buildings to supplement an existing

MOUT/RT site. Types of buildings that can be designed include both training and exercise control. Items that could be part of the building design include such infrastructure items as equipment rooms, communication network, cable trays, engagement system and special effects control outlets, mounting space, kits and housings for cameras, sensors and smoke generators, electrical power system, etc. This includes all necessary activities to design and build an active AAR facility.

3.5.2. Modifications.
Design and modify existing buildings to support the training and mission needs. Buildings can be modified to accommodate current and anticipated training requirements and can be provided with equipment that interfaces with existing data collection systems. All installed items and modifications will be as unobtrusive as design permits. This includes the necessary efforts to redesign and/or modify the interior of buildings to accommodate AAR theaters (sound soaks, lighting, tiered seating, etc.).

3.5.3. Non-permanent Training Mock-ups
Design and Fabricate additional temporary/non-permanent training facilities designed to supplement the existing capabilities. These facilities include unique training venues to enhance/focus the training received. These facilities may include such items as train cars, airplanes, ships, or huts. The design/fabrication can be provided with equipment that interfaces with existing data collection systems. All installed items and modifications will be as unobtrusive as design permits.

3.6. System Engineering/Integration and Installation
This section describes the various System Engineering and integration activities necessary to develop and deploy a complete and functional system. Systems Engineering includes all planning, organizing, and control to ensure that the operational needs and requirements are delineated as functional requirements. Systems integration includes the integration of technical components, organizational components, and verification (acceptance testing). The area of system integration may make use of technical laboratories, prototype systems, and pilot systems. Types of equipment and supplies listed in this section have been selected based on their suitability and performance in a MOUT/RT type environment. The design and development of these systems will include all necessary Safety, MANPRINT, pollution prevention, and Human Factors (person in the loop) considerations.

Wherever possible, the design of the instrumentation equipment will be flexible enough to allow the instrumentation to be either permanently installed, or modularly fielded. The modular design will focus on the ease and flexibility of deployment (plug-n-play), as well as allow the same data gather capabilities.

The MOUT/RT instrumentation architecture has three mutually supporting objectives. First, to provide a foundation for the seamless flow of information and interoperability among all training, instrumentation, tactical, or strategic systems that produce, use or exchange information electronically. Second, to mandate standards and guidelines for system development to reduce costs and improve systems. Lastly, to consider the usage of open systems products and

implementations.

Therefore, the design, component selection, and integration of installed components shall comply with the requirements and direction of the Joint Technical Architecture - Army (JTA-A) for Operational, Systems, and Technical Architectures.

3.6.1. Communication Network System

Design, install, or upgrade a communication network system (backbone) that provides the ability to attach all required instrumentation equipment (to include, but not limited to: video, audio, instrumentation control, and HLA data) into a seamless controllable network. The network must fully support all devices attached to it, without degrading the data throughput or the performance of any individual device. Network must allow for legacy equipment, multiple protocols, overhead, flexibility of growth, and an open system architecture.

3.6.2. Video/Audio/Digital Data Capabilities

3.6.2.1. Video (interior and exterior)

Design and install video systems to provide the capability to monitor player activities under the following conditions: day or night operations, inside or outside, clear or obscured conditions, and in sub-zero or desert environments.

3.6.2.2. Audio (interior and exterior)

Design and install audio systems to provide one-way or two-way communication for building interiors and within a limited range on the exterior of the buildings. These systems have the capability of providing audio to selected areas within the MOUT/RT facility. Quantities and types of audio equipment can be investigated and designed to support the environment and the type of training required.

3.6.2.3. Recording Systems

Design and install video/audio capturing, recording and storage capability to allow for the real-time multi-channel, simultaneous storage and retrieval of data collected. Redundant storage system should be used; this can include redundant arrays of independent disks (RAID) or other appropriate means. Systems should include both automated and manual modes of operation. Access to data should be available to all portions of the integrated system, in near real-time. An offline archiving storage capability can be provided for long-term storage of audio/video data.

3.6.2.4. Editing Systems

Design and install equipment, software, and accessories to support the editing, copying, and/or duplication of analog and digital video/audio sources. Equipment profile will be based on mission needs.

3.6.3. Entity Instrumentation and Data Collection

3.6.3.1. Entity Instrumentation

Design, develop, and integrate entity (includes people and objects) instrumentation systems to

either enhance existing systems or as new systems to meet training requirements. These systems will provide varying degrees of position accuracy, reporting rates, data collection, weapons engagement results, and operation within and exterior to buildings with a seamless transition from outdoors to indoor environments and back. These systems will be designed to be interoperable with the current training systems force-on-force TADDS employed (if applicable) at the training facility.

3.6.3.2. Casualty Assessment System
Design, develop, and integrate an effective Casualty Assessment System to enhance Force-On-Force and Live Fire training into existing designs or into new designs. System design will incorporate components that will have the flexibility for future upgrade. These systems will be designed to be interoperable with the current and planned future training systems force-on-force TADDS employed (if applicable) at the training facility.

3.6.3.3. Observer Controller Data Collection
Design, develop, and integrate an Observer Controller Data Collection set of tools with the Command and Control System that supports easier and better data collection from the training monitors in the field.

3.6.4. Command and Control Capabilities
This section describes the various Command and Control capabilities. Command and control consists of two separate, but inter-related functions; 1) control of the scenario and all functions within the training environment and 2) control of the forces being trained. Command and control systems within a MOUT/RT environment must address both of these areas in order to provide effective training.

3.6.4.1. Exercise Command & Control
Design, develop, and integrate an exercise command and control system to include the following areas: Indirect Fire Support/Control, Aviation, Intel, Combat Support Services (CSS), Special Operations Forces (SOF), Engineering and Air Defense. The command and control system must allow the analyst to: monitor all instrumented entities' position, location, and status in near-real time; prepare reports, slides and maps with overlays and/or unit locations (and strengths as required); analyze weapon pairing/engagements in the battlefield; present a replay of significant events of the battle; and create other graphic training aids for preparation and conduct of the AAR/THP.

3.6.4.2. Instrumentation Control
Design, develop, and integrate an instrumentation control system to include the following capabilities: room instrumentation, camera controls, lighting controls, motion/Infrared sensors, engagement system controls, microphones, speakers, recording controls and shoot-through-wall solutions.

3.6.4.3. Instrumentation Data Collection
Design, develop, and integrate a data collection and analysis system to support the AAR generation and presentation process. Design efforts will consider collection of data for video,

digital and analog data, audio, tactical voice, exercise (live), audio cues, battle damage assessment (BDA) (direct & collateral), casualty assessment (direct & collateral), position and tactical platforms (player or interactive engagement systems).

3.6.4.4. Battlefield Interfaces
Design, develop, and integrate interfaces to utilize the existing tactical system used by the Units under training. Such interfaces include FBCB2, HLA Translators and ATACS consisting of MCS, MSE, CSSCS, AFATDS and AMDWS.

3.6.4.5. Exercise Emergency/Safety Controls
Design, develop, and integrate safety device instrumentation such as: panic buttons, emergency lighting, public address systems, and system override controls can be located in live fire areas and other areas deemed necessary. System design must provide audio and visual cues to the control center and soldiers in the immediate area that an emergency has occurred and that training has been halted.

3.6.4.6. Physical Security Mode/Linkage
Design, develop, and integrate a security system/approach to provide a means to protect, secure, and monitor the equipment installed. The solution will be based on the equipment installed, the expected need/threat, and the current site/facility capabilities existing. To the maximum extent possible, the solutions will utilize the installed equipment, and allow for a security mode of operation to be contained within the Data Collection System.

3.6.4.7. Automated Information System Security
Design, develop, and integrate a holistic approach to AIS and data security that protects against unauthorized (accidental or intentional) disclosure, modification, or destruction. The AIS security must consider all hardware and/or software functions, characteristics, and/or features; operational procedures, accountability procedures, and access controls, remote computers, and terminal facilities; management constraints; physical structures and devices; and personnel and communication controls. The security system must provide an adequate level of protection for the AIS and data contained in the AIS. An adequate system ensures a security approach commensurate with the risk and magnitude of harm resulting from the loss, misuse, or unauthorized access to or modification of information.

The AIS security system and approach must include controls that are part of the day-to-day operations of the system, and are compliant with the guidance, definitions, and recommendations of OBM Circular A-130, DoD Directive 5220.22, and DoD Directive 5200.28.

3.6.5. After Action Review (AAR)
Design, develop, and integrate an integrated AAR system to prepare, present, record, and archive all facets of an After Action Review session. The AAR system shall provide a seamlessly integrated multimedia presentation of video, audio, computer graphics, and any other appropriate AAR materials. This system will have the capability to record the AAR session, and generate a polished and finished Take-Home-Package (THP) in any common multimedia format. The THP will include all AAR products. AAR archiving is an option available to this system. Some

features include AAR generation, non-linear video editing/post-production, audio editing, map and chart plotting, slide creation, presentation, 3-D visualization/models, AAR Theater recording of live video and audio, control of theater lighting, and the take home package (THP).

3.6.6. Visual Recognition Skills

Design, develop, and integrate a visual recognition training skill system to support, monitor, test and evaluate visual recognition skills and capabilities vice electronic Identify Friend-Foe (IFF).

3.6.7. Experimentation Support

Provide the required mission operation support labor, engineering services, interface controls and modifications, hardware/software systems, data collection units, system configuration changes, and any required additional training to support identified experimentation requests planned for a developed MOUT/RT environment. It is expected that the experimentation goals and data requirements will be provided, and this effort will entail ensuring that given the instrumentation on site, that the system/people will be capable of conducting a successful testing event.

3.6.8. Scenario Generation

Design, develop, and integrate a Scenario Generation tool set to support Mission Planning & Rehearsal, and Exercise Planning.

3.6.8.1. Mission Planning & Description

Design, develop, and integrate a Mission Planning & Description tool to support or use the following types of products: Map/NIMA products, Graphic Overlays, Aerial photos/maps, Word Processing/Office suite, Tactical Message Generation (Intel, Unit Orders, etc.), and Archive/Retrieval Scenario Database systems. These tools will also allow for the generation of exercise control products, such as: Role Play/Civilians on the battlefield scripts, Props to support the exercise, and Plans for the installation of props within the buildings. These tools will be designed to consider the ease of operation and ease of program dynamics as key features.

3.6.8.2. Exercise Planning

Design, develop, and integrate an Exercise Planning tool to support the Instrumentation Layout to include: Graphical Configuration, Configuration Verification, Configuration Scripting, and Cause (Case) Statement Lists. Exercise Planning tools will also be capable of supporting Battlefield Effects Scripting to include: Automated Effects, Engagement System Responses, and Cause (Case) Statement Lists.

3.6.9. Computer Based Simulation

3.6.9.1. Mission Rehearsal

An important function dealing with MOUT/RT training is the use of Mission Rehearsal to enhance the training and operational capabilities of a unit. Mission Rehearsal systems shall be designed and developed for use in classroom environments or as deployable systems.

3.6.9.2. Terrain Database Generation

Design, develop, and integrate terrain database generation capabilities. The systems will import

various types of terrain and map information to generate 2 and 3 dimensional terrain visualization databases within a limited period of time. The systems will be capable of displaying "line of sight" aspects from any location in the database and will have virtual "fly through" capability to allow commanders to scout the terrain. The system will be able to display proposed avenues of advance and troop positions for use by all echelons of command.

3.6.9.2.1. Scenario Rehearsal

Design, develop, and integrate a Mission Rehearsal system to allow the users to execute multiple iterations of the same mission to determine the best courses of action based on a given situation and various inputs from the users. These inputs shall include the placement of computer-generated forces in the scenario, the preplanned movements of these forces, the threat to be engaged and the varying levels of response. The Mission Rehearsal system will be able to execute the scenario in an autonomous mode or with real time input from the user. The system will be capable of determining the outcome of each mission and storing the scenario for later examination.

3.6.9.3. Constructive/Virtual Simulation

Design, develop, and integrate a Constructive and Virtual Simulation system to allow the users to be immersed into the training mission. These systems should be capable of being used in a laboratory environment, home station areas, or as deployed systems. When connected to a network of simulators, the Constructive and Virtual Simulation systems will be able to see and interact with each other in real time.

3.6.9.3.1. Computer Generated Forces

Design, develop, and integrate a system to provide computer-generated forces (CGF) into other MOUT/RT systems. The CGF can be inserted in a scenario, either inside or outside of buildings and in varying terrain and environmental conditions. The CGF can include OPFOR and BLUFOR: personnel, vehicles, aircraft, and weapon systems. The CGF can also include non-combatants and civilian vehicles and aircraft. The CGF can have some level of artificial intelligence (AI) built in to meet the training requirements. The level of AI can range from simple movements based on direct real time user control and input through autonomous doctrinally correct actions. The system will be able to have additional weapon systems, vehicles, and behaviors inserted into the AI.

3.6.9.3.2. Immersive Simulation

Design, develop, and integrate an Immersive Simulation system to allow the users to be placed in a virtual computer generated environment. The level of immersion (from complete sensory feedback to simply operating a computer system) can be driven by the training requirements. These systems can be designed with an open architecture to support prototype hardware and software development of new weapon systems or new tactics. The immersive simulation systems will be capable of being networked with similar systems or with other training systems through a HLA link.

3.7. Engagement Systems

Design, fabricate, and integrate advanced instrumented and interactive engagement systems for

the evaluation of Live Fire, Force-on-Force, and non-lethal training events. The Engagement systems will incorporate the following attributes: engagement system controls, movement, raise/lower, two-way audio communication, thermal signature controls, animation controls (swivel engagement system), shoot-back capability (e.g., Laser), direction controls (pre-programmable) and hit detection (mortal/non-mortal). Hit placement recording will allow for the gathering of mortal hit data, as well as, non-mortal. The Engagement Systems must be programmable to respond to pre-programmed limits (i.e., respond/react to an applied stimulus).

3.8. Battlefield Special Effects/Sound Effects

Design, fabricate, and integrate battlefield effects and systems to enhance training realism. The design must ensure that all safety requirements are met. The fielded systems must have all required safety documentation available prior to installation.

3.8.1. Battlefield Special Effects

Design, fabricate, and integrate battlefield special effects to be incorporated in buildings and the surrounding areas. These battlefield effects will include, but are not limited to, the following functions and capabilities: ability to be manually controlled or pre-programmed, bullet strikes (outside and inside areas), mines (with MILES kill capability), roof-top explosions, incoming rounds, AT4 rockets, concussion gun, MILES Grenade, AK-47 gas gun, direct/indirect fire cue (DIFCUE), link to interior MILES transmitter (shoot-through-wall solution) and smoke generators.

3.8.2. Advanced Battlefield Special Effects

Design, fabricate, and integrate Advance Battlefield Special Effects to replicate scenario specific special effects. These effects are unique type events, and not associated with the normal expected operation of an exercise. These effects include, but are not limited to: Weapons of Mass Destruction/Accident simulation, Simulation of disease exposure, and Simulation of smell and other “horrors of war.”

3.8.3. Sound effects

Design, fabricate, and integrate realistic studio created and recorded sound effects to enhance training environments. Categories of sound effects include, but are not limited to: small arms, artillery, explosions, tanks, trucks, planes, helicopters, voices, and animal noises.

3.8.4. Advanced Sound Effects

Design, fabricate, and integrate advanced realistic multichannel sound effects, novel effects synthesis, and audio processing system to replicate such effects as city noises, elevated trains, city traffic, construction, aircraft sounds (fly-over). Note that these sound effects are not suited for every environment, and an analysis will be provided to determine the cost effectiveness and viability of a proposed solution.

3.9. Life Cycle Sustainment

3.9.1. Logistics Engineering

3.9.1.1. New Equipment Training (NET)

Provide training on newly installed or updated equipment. This includes requesting new equipment training for: any service or product procured through this contract, for existing systems, or to support special training operations or experiments.

3.9.1.2. System, Operator and Maintenance Studies

Conduct a level of repair analysis. Perform trade studies and optimize the total operation and maintenance concept and procedures for each system. Develop diagnostic, preventative maintenance and repair procedures and identify repair parts and special tools required to perform tasks. Use commercial-off-the-shelf manuals when feasible. Make all manuals in the interactive electronic format.

3.9.1.3. Spares and Expendables

Provide initial spares, expendables, repair of repairables, and tools and test equipment as required. Follow-on spares can be provided as part of this contract. Detailed analysis of the spares and expendables must be provided based on the usage profiles, to include expected funding profiles.

3.9.1.4. Follow-on Maintenance

Provide required follow-on service, repair or maintenance action to any product or capability procured through this contract.

3.9.1.5. Mission Support

Provide the required mission operation support labor and other resources as required, to cover the day-to-day operations of the systems.

3.9.1.6. Sustainment Training

Provide sustainment training for any service or product procured through this contract, for existing systems, or for the support of special training operations or experiments.