TEST AND EVALUATION MASTER PLAN

FOR
SHORT RANGE ANTI TANK WEAPON
(SRAW)

Program Manager Ground Weapons Marine Corps Systems Command Quantico, Virginia

January XXXX

TEST AND EVALUATION MASTER PLAN

FOR

SHORT RANGE ANTI-TANK ASSAULT WEAPON (SRAW)

SUBMITTED BY

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Program Manager DATE Ground Weapons

CONCURRENCE

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Operational Test Agency DATE

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User's Representative DATE

COMPONENT APPROVAL

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Component Test and Evaluation Director DATE

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DoD Component Acquisition Executive (ACAT I) DATE

OSD APPROVAL

_____

Director, Operational Test DATE Director, Test Systems DATE and Evaluation Engineering and Evaluation OUSD (AT&L)

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PART I - SYSTEM INTRODUCTION

a. **Mission Description**. The SRAW mission is stated in the Systems Initial Capability Document dated 20 OCT 2003 and the Capability Development Document of 30 NOV 04. The ICD states that an operational requirement for a weapon to replace the AT4 and M72 by providing a system with a higher hit probability, greater lethality, longer effective range, and increased reliability. Key features of threat military doctrine are the mobility, firepower, and protection offered by tanks and armored infantry fighting vehicles. Enemy tanks, with their technological sophistication and numerical superiority, are a formidable threat against which the AT4, M72A2, and SMAW-HEAA are deficient. Successful development of an improved LAW as specified in the ICD would materially increase the combat effectiveness of Marine Corps units by supplementing the fires of

medium and heavy anti-tank weapons. This would provide the flexibility dictated by the continued and increasing emphasis on mechanized combat in future warfare. Furthermore, the ICD and CDD outline the increasing importance of built-up areas in both developed and developing nations. The ICD specifies that the SRAW needs to achieve its tactical goals not only on the conventional battlefield, but also in the urban environment.

b. **System Threat Assessment**. Potential enemy threats confronting the United States in the near to long-range period are fully explained in the Marine Corps Long-Range Plan (MLRP) and the Marine Air-Ground Task Force Master Plan (MMP) of June 2000. Marine Corps forces could face a variety of threats throughout the world and must be prepared to fight in all climates and terrain. The most probable areas are the Middle East/Southwest Asia, Europe, and Latin America.

While employed against threat forces in the areas mentioned in the previous paragraph, the SRAW will be subjected to various countermeasures used against antitank missiles. The missile itself can be classified as a guided munition by the Army Materiel Command - Smart Weapons Management Office's (AMC-SWMO) definition in its "Guide to How Countermeasures Affect Smart Weapons" published in January 1992. Since it is not a "smart weapon", it is not susceptible to most countermeasures (CM), such as chaff or flares, used against missiles found in the "smart weapon" category. However, the AMC-SWMO has determined that the sensor/fuze section of a guided munition may be vulnerable to CM.

Since the target acquisition function for the SRAW is performed optically by the Marine firing the weapon, and not by the missile or launcher, the system itself is not considered vulnerable to acquisition CM such as obscurants. However, CM may affect the Marine's ability to acquire a target and select an aim point. Any electrical component of the missile could be susceptible to electronic CM. The Target Detection Device (TDD) of the SRAW may be vulnerable to signature alteration of the target. Active jammers would have significantly less effect on the missile's guidance as those functions are performed

internally by the inertial guidance system. Directed Energy Weapons (DEW) and projectiles could be used to destroy the missile prior to impact on the target, but at present they are classified as only potential threats by the AMC-SWMO. The SRAW may also be vulnerable to high-powered microwave energy (HPM), which may be capable of a "hard kill", causing meltdown of electronic circuitry in the SRAW missile, or a "soft kill" in the form of redirected current in the missile's circuits, or failure of the circuitry in the guidance or TDD. This is known as "electronic upset". Further details of the threat to the SRAW are discussed in the System Threat Analysis Report (STAR) for the SRAW, which is classified. The contractor has also performed a classified System Countermeasures Analysis.

c. Key Performance Parameters and additional Attributes: The CDD defines the required Key Performance Parameters and additional attributes as detailed below:

Key Performance Parameters	Development Threshold	Development Objective
Minimum range	17 Meters	17 Meters
Maximum range	600 Meters	800 Meters
Probability of hit (stationary target)	.5 (400 meters)	.7 (400 Meters)
Probability of hit (crossing target)	.5 (200 Meters) .45 (250 Meters)	.6 (200 Meters) .55 (250 Meters)
Operational Availability	.95	.95
Reliability	.95	.95
Warhead Defeat capability	T-80 MBT w/ explosive reactive armor	T-80 MBT w/ explosive reactive armor

Additional Attributes	Development Threshold	Development Objective
Transition time: carry to fire	20 seconds	15 seconds

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d. **System Description**.

(1) Key Features. The SRAW will be used to track, engage, and defeat tanks and armored vehicles from all aspects.
(2) Interfaces. The SRAW system will be capable of interfacing with the current night vision sight or similar devices at the time of fielding in order to provide a night capability.
(3) Critical System Characteristics. No weapon system capable of performing the SRAW mission (defeating main battle tanks fitted with explosive reactive armor and/or supplemental armor at short ranges in a low-cost, man-portable system) currently exists in the US military. Thus the SRAW system will augment the presently weak infantry short-range firepower. The SRAW system is a fire-and-forget weapon which can be carried into combat by an individual Marine. The system weight limit of twenty pounds and the requirement to defeat advanced heavy armor initiatives mean that a very large performance-to-weight ratio of the warhead is necessary. The SRAW must also be usable for Military Operations in Urban Terrain (MOUT). It must be capable of being safely fired from enclosed positions such as masonry rooms that measure 15′ × 12′ × 7′ (4.57m × 3.66m × 2.1m) and possess 20ft² (1.86m²) of ventilation, and bunkers with front and rear vent area of 15ft² (1.4m²) each. Special tests of the sound pressure level and toxicity when the SRAW is fired from specified enclosures must be conducted during weapon system development. The SRAW is to have a minimum safe engagement range of 17 meters. Furthermore, the desired low cost of the SRAW system will require innovative accuracy enhancement techniques at the longer ranges. Conventional high-accuracy inertial sensors and missile seekers are precluded by the system cost requirements. Since the SRAW is to be fire-and-forget, the initial aiming performance of the gunner will have an enormous effect on the system accuracy. Presently, limited data exists as to gunner aiming performance. This performance will be measured during SRAW development.

e. **Critical Technical Parameters.** See Figure 1.

2. PART II - INTEGRATED TEST PROGRAM SUMMARY

a. **Integrated Test Program Schedule**. See Figure 2, for the time sequencing of the Test and Evaluation process. Included are the program milestones and the contractor testing plans. The decision to proceed beyond limited production will be made at the Full Rate Production decision meeting.

Several steps critical to the overall success of the SRAW development effort have already been completed. The warhead development process was completed during the Technology Development Phase.

The ICD has addressed a need for a multipurpose SRAW with the capability to defeat main battle tanks, assault fortified positions/obstacles, and mark or burn enemy positions while conducting close combat operations. This TEMP addresses only the antitank variant of the SRAW for this increment. Future variants will be addressed subsequent to this milestone, and will be included in an updated TEMP.

b. **Management**.

(1) Marine Corps Systems Command MARCORSYSCOM has overall responsibility for the SRAW program. Essential responsibilities of the PM CBG/SRAW Project Officer, MARCORSYSCOM, include:

- Prepare the Test and Evaluation Master Plan (TEMP)

- Staff for comments and approval through the Commanding General, Marine Corps Combat Development Center (MCCDC), the Director, Marine Corps Operational Test and Evaluation Activity (MCOTEA), and submit to the Commander, Marine Corps Systems Command for approval.

- Coordinate the Developmental Test (DT) Reports prepared by the hardware contractors, development activity, and any relevant test agencies.

- Publish a final Developmental Test and Evaluation (DT&E) report.

- Provide guidance and direction to the development activity, Naval Surface Warfare Center, Dahlgren Division (NSWC-DD), Dahlgren, VA.

- Certify, to the Director, MCOTEA, that the system is ready and safe for OT&E. This certification is based on a certification letter from the development activity.

(2) Naval Surface Warfare Center-Dahlgren Division (NSWC-DD), Dahlgren, VA. NSWC-DD will serve as the development activity and will provide the necessary technical, administrative, and contractual support for the successful completion of the program. NSWC-DD is responsible for coordinating, monitoring, and reviewing all contractual schedules/milestones, test plans, designs, documentation, testing, test results, training, reports, and costs. Specific responsibilities include:

- Provide engineering and technical support for test execution.

- Prepare the Detailed Test Plan (DTP) for developmental testing and submit to COMMARCORSYSCOM, (PM CBG) for staffing and promulgation.

- Incorporate failure definitions and scoring criteria prepared by MCOTEA for the test program, with input from MCCDC and MARCORSYSCOM.

- Prepare a final Government DT&E report for inclusion in the Marine Corps Program Decision Memorandum (MCPDM) package.

- Prepare a safety certification letter and submit it to the COMMARCORSYSCOM (PM CBG) stating whether the weapon system met/did not meet design criteria, is safe/not safe to proceed into OT&E, and is recommended/not recommended to enter production.

- Manage the provision of requisite test hardware and contractor engineering and

technical services required to support Developmental Test (DT) and Operational Test (OT).

- Administer the SRAW program, per COMMARCORSYSCOM (PM CBG) guidance.

(3) Marine Corps Operational Test and Evaluation Activity (MCOTEA). The Director, MCOTEA, is responsible for the field execution and coordination of operational testing and evaluation (OT&E). His representative shall arrange for MCOTEA's participation in developmental testing, as appropriate, to support OT&E objectives. MCOTEA responsibilities shall include the following:

- Ensure that operational testing is effectively planned, conducted, evaluated, and reported with emphasis on adequacy, quality, credibility, and validity.

- MCOTEA, with input from MCCDC and MARCORSYSCOM, will prepare failure definitions and scoring criteria for testing. Prepare the Test Planning Document (TPD), Detailed Test Plan (DTP) for IOT&E and the Operational Test & Evaluation Outline (Part IV) of the TEMP.

- Monitor developmental tests and review the DTP to ascertain which portions of DT&E will contribute to the accomplishment of OT&E objectives. Assess the readiness of the SRAW for operational tests.

- Present an independent evaluation of test results directly to the Commandant of the Marine Corps (CMC).

(4) CG, FMF Lant/CG, FMF Pac. Responsibilities include:

- Provide resources required to support operational testing per the approved TPD. Appoint a test coordinator who will serve as the on-site test director.

(5) Others. During all developmental testing, data will be recorded by Reliability, Availability and Maintainability (RAM) personnel. Data will be gathered from all tests and used in logistic and life-cycle cost analyses. For each test conducted, the contractor will provide test reports to the appropriate government official. All field incidents will be reviewed by a test team. If needed, a failure analysis report will be required from the contractor.

3. PART III - DEVELOPMENTAL TEST AND EVALUATION OUTLINE.

a. **Developmental Test and Evaluation Overview.** New initiatives in chemical energy warhead development sponsored by the Defense Advanced Research Projects Agency (DARPA), the US Army, and the USMC have the potential to significantly increase the lethality of small Chemical Energy (CE) anti-tank projectiles and missiles. These initiatives include the Javelin Weapon System Warhead Program, Javelin Alternate Warhead Program, DARPA Advanced CE Warhead Program, and warhead upgrades to the Tube-launched, Optically tracked, Wire-guided (TOW) Missile program. Progress has been made in both tandem shaped-charge warheads (primarily direct attack) and in explosively formed penetrators (top attack). Fuzing, guidance and control, sensor, and propulsion developments in programs such as Javelin, NLOS, AAWS-M, and TOW can be used by the SRAW program. These developments enable the required SRAW performance to be achieved in a relatively compact and inexpensive weapon system. Limited referencing and guidance and control technologies developed by the Strategic Defense Initiative (SDI), and other fluidics research developed by DARPA, the US Army, US Navy, and USAF may be useful to the SRAW program.

Figure 1 lists those critical technical parameters which have been successfully demonstrated to date. All test objectives for the Demonstration/Validation phase have been met.

b. **Future Developmental Test and Evaluation**. After a successful Technology Development and Milestone B decision, the SRAW program will transition into System

Development and Demonstration (SDD). Any deficiencies in the weapon system will be corrected. The system will become man-rated. Critical technical parameters not specifically demonstrated during the previous phase will be addressed during SDD. Failures will be reported in accordance with the Failure Reporting Analysis and Corrective Action System (FRACAS), and used for assessment of reliability. Detailed procedures will be provided in the DTP.

(1) Configuration Description. The size, weight, and materials of the components and systems tested during SRAW Technology Development phase will differ somewhat from the eventual production model. Initially, breadboard components will be tested in laboratory and field tests. Subsystems and modules will be tested before being assembled into actual flight-test missiles. Preliminary flight tests shall be conducted with accuracy-configured missiles equipped with a dummy warhead and ballistically matched to the tactical system. Once components have been successfully demonstrated both at the breadboard level and integrated into the flight test missiles, improvements in size, weight, design layout, and materials can be performed to produce a production-level component.

(2) Developmental Test and Evaluation Objectives. The objectives of SDD DT&E are to successfully develop and demonstrate a weapon that will meet the physical parameters set forth in the development specification, possess sufficient lethality to satisfy the Marine Corps' requirement, and can be manufactured at a low cost. Specific objectives include:

- Validating performance parameters, freezing the system design.

- Building qualification hardware, and evaluating the design through qualification testing.

- Verifying the lethality of the weapon system under realistic stand-off, velocity, angular velocity, and component packaging conditions.

- Verifying the accuracy and aerodynamic properties of the missile.

- Demonstrating compatibility of all interfacing components/systems/subsystems, especially the warhead, fuze and safe-and-arm device.

- Analyzing SRAW susceptibility to countermeasures, to include target signature alteration, active jammers, directed energy weapons and projectiles, high-powered microwaves, and target camouflage and deception measures; enemy-induced electromagnetic interference (EMI); hazards of electromagnetic radiation to ordnance (HERO). These tests should be conducted to realistically simulate the actual threat.

- Demonstrating MOUT capabilities.

- Verifying compliance with the development specifications.

- Providing data for more realistic cost estimates.

- Obtaining data on the gunner aiming performance and gunner compatibility with the launcher.

- Obtaining a safety certification and man-rating.

- Successfully demonstrating production-level components both individually and integrated into a full-up system (missile and launcher).

- Obtaining preliminary data for RAM, Human Factors and ILS assessments.

(c) **DT&E Events, Scope of Testing, and Basic Scenarios**. During the SDD Phase, the contractor will conduct sufficient testing to demonstrate the objectives of the previous section. The DT test program will be performed in two phases. The first phase consists of developing, fabricating, and testing nine engineering model missiles. When this phase is completed, the design will be frozen, and 125 more missiles will be fabricated, tested for quality assurance, and used for qualification testing. This period of testing will take approximately 24 months to complete. The following list represents major testing events:

Hardware/Software Integration testing, Hardware-In-The-Loop

(HWIL) testing with Government oversight, Environmental testing, HERO testing, Software stress testing Contractor, development testing Hardware verification testing, Fuze development testing, Contractor missile technical evaluation Qualification testing (e.g. countermeasures, transportability, etc.)

For certain key tests such as lethality or flight tests, the government shall send representatives to monitor the contractor tests. Human Factors Engineering will be of great importance during the SRAW development. The man-machine interface plays an important role in overall system performance and is thus an important part of the weapon system design. The requirements placed on the gunner must be realistic and must be interactively tested with real gunners and real system mockups during the SRAW development.

Detailed procedures will be provided in the Detailed Test Plan (DTP). Input to the DTP shall be provided by the contractor and any relevant government test agency.

The government shall approve contractor test plans prior to execution. Figure 3, details the type and quantity of components to be tested. Figures 4, 5, and 6, list the Developmental Testing scheduled during the program.

(d) Subassembly Developmental testing:

(1) Airframe. The prime contractor will design, document, and fabricate missiles for eject tests, warhead and rocket motor subcontractor safety qualification tests; conduct mechanical and thermal analyses of airframe components; perform loads tests on structural components and joints.

(2) Launcher. The prime contractor will design, document, and fabricate the launcher; conduct a mechanical analysis of the launcher; conduct drop tests with the launcher and composite airframe.

(3) Target Detection Device. The prime contractor will design, develop, and conduct subsystem tests on the Target Detection Device (TDD) and components. Because the TDD could be susceptible to potential CM and is important to mission success, it will be thoroughly tested in both natural and manmade environments (i.e. heat, cold, weather,

obscurants, etc.)

(4) Batteries/Power Supply. The prime contractor will develop, qualify, and conduct verification of the thermal battery and power distribution system.

(5) Electronics Development. The prime contractor will design, fabricate, breadboard, and test the guidance and control circuitry; design and develop the warhead electronic packaging; conduct electromagnetic interference testing; design, modify, integrate and test HWIL hardware and software.

(6) Telemetry. The prime contractor will design, develop, and fabricate telemetry circuitry to support developmental testing. The contractor will also evaluate and select the telemetry transmitter and receiver.

(7) Inertial Sensor Assembly (ISA). The prime contractor will monitor the design, fabrication, and testing of the prototype/breadboard ISA, produced by a subcontractor. The prime contractor will perform system integration and acceptance testing of Engineering Model ISAs.

(8) Warhead. Warhead development and testing will be conducted by the warhead subcontractor. The design has been defined at the end of the Demonstration and Validation phase; structural and electrical interfaces between warhead, safe & arm device and missile structure will be defined by the end of the risk reduction program. The lethality of the warhead has been successfully demonstrated both during static tests and during a full-up missile flight test. The prime contractor will monitor pre-production qualification testing (PPQT) testing by the subcontractor.

(9) Rocket Motor Development. The rocket motor subcontractor has developed and tested a heavy-wall design; flight-weight motors and casings have been fabricated and tested, and gas generator interface requirements established. The prime contractor will monitor subcontractor PPQT tests.

(10) Jet Reaction Control Assembly (JRCA). The JRCA design will have been validated and tested by the end of the technology development phase. Selection of materials and methods of fabrication will be complete; gas generator design configuration and interface has been established. Valve Body and Structural Base designs will be reviewed and updated; the aft closure release mechanism will be integrated. The prime contractor will conduct shock, vibration, temperature, and cold gas actuation testing. Any problems will

be evaluated and corrected and designs finalized by the Critical Design Review. Tactical JRCA components will be tested to include proof, acceptance, cold gas actuation, environmental (i.e. vibration, shock, temperature), and gas generator tests (3 low temperature, 2 high, 1 nominal).

(11) Gas Generator. The gas generator subcontractor will verify performance of the gas generator prior to delivery. The prime contractor will monitor these tests.

(12) System Development/Integration. The prime contractor will assemble and conduct acceptance and environmental tests on 9 Engineering Model missiles and conduct integration tests of the missiles with launchers.

(13) The prime contractor will conduct environmental qualifications, electromagnetic interference and HERO testing on the 125 missiles selected for Technical Evaluation (DT II); conduct safety certifications (man-rating); conduct technical flight tests, to include eject-only, accuracy, and full-up warhead flight testing.

4. PART IV - OPERATIONAL TEST AND EVALUATION OUTLINE (OT&E).

a. **Operational Test and Evaluation Overview.** The purpose of the Initial Operational Test and Evaluation (IOT&E) of the Short Range Antitank Weapon (SRAW) is to ensure that the system meets the mission needs and minimum operational performance requirements identified in the CPD. This testing will evaluate the SRAW when it is employed by the typical Marine user in a realistic environment. MCOTEA will plan, conduct, and report the results of all operational testing.

b. **Critical Operational Issues.** The following paragraphs describe the operational effectiveness and operational suitability issues that are critical to the evaluation of the SRAW's ability to perform its mission.

(1) <u>Operational Effectiveness Issues</u>

(a) Will a Marine wearing full combat equipment, cold weather clothing, and/or MOPP clothing, be able to carry the SRAW, and engage and destroy both stationary and

moving enemy armored vehicles with the SRAW?

(b) Will the SRAW enhance the chances of survivability of Marines firing it in comparison to the current LAW system?

(c) Will the SRAW be safe to Marines to fire, including employment during Military Operations in Urban Terrain (MOUT)?

(d) Will a Marine be able to satisfy the conditions set forth in (a) above with a SRAW at night, if equipped with the current night vision sight or goggles?

(2) Operational Suitability Issues

(a) Is the reliability, availability, and maintainability (RAM) of the SRAW suitable for operational employment?

(b) Is the SRAW logistically supportable?

(c) Are SRAW training and documentation adequate to allow the average Marine to employ this system in an operational environment?

(d) Does the SRAW function within current doctrine, tactics, and organization?

(e) Are the transportability and deployability of the SRAW suitable for operational employment?

(f) Does the design of the SRAW incorporate sound human engineering principles?

(g) Is the SRAW safe for Marines to employ?

(h) Does the embedded software function properly in an operational environment?

d. **Future Operational Test & Evaluation.** An IOT&E of the SRAW will be conducted by MCOTEA prior to the Full Rate Production Decision.

(1) Configuration Description. The IOT&E will be conducted with pre-production prototypes of the SRAW system. These prototypes must be representative of the production system.

(2) Operational Test and Evaluation Objectives. All critical operational issues listed in paragraph 4b will be addressed during the IOT&E. Operational effectiveness and operational suitability objectives for the SRAW will be examined by means of a thorough test and evaluation which addresses each of the system requirements, as stated in the

SRAW ROC/ORD. Operational effectiveness objectives include: mission performance, survivability and vulnerability, and cooperative systems. Operational suitability objectives include: RAM, deployability and transportability, personnel selection and training, organizational impact, concept of employment, logistics support, human factors and safety, and software.

(3) Operational Test and Evaluation Events, Scope of Testing, and Scenarios

(a) Operational testing of the SRAW will be conducted in four phases. During each of these phases, data will be collected on the system which will be used to evaluate the operational effectiveness and operational suitability of the SRAW. Throughout Phases I – IV, the SRAW will be employed by properly trained Marines, in an operational environment.

1) Phase I will be approximately two weeks long and will include training of the Marines, utilizing the contractor provided training program, and evaluation of that program. A pilot test to evaluate the test program and the data collection and evaluation system will also be conducted during this phase. An operational test readiness review (OTRR) will be held prior to advancing to Phase II.

2) Phase II will consist of a series of tactical scenarios using a rifle platoon-sized unit against representative threat targets. These scenarios will include day and night, and offensive and defensive scenarios. MOUT operations will also be conducted during this phase of the test. This phase of the test will be conducted at MCB Camp Pendleton, CA.

3) Phase III will integrate a platoon equipped with SRAW into a unit conducting a Combined Arms Exercise (CAX) at MCAGCC, 29 Palms, CA. This phase will provide data on the performance of the SRAW in a combined arms environment and will include comments from the unit leadership and the Tactical Exercise Evaluation Control Group (TEECG).

4) Phase IV will evaluate the portability and transportability of the SRAW on amphibious ships. This evaluation will be conducted by a squad-sized unit at the San Diego Naval Base and Landing Force Training Command, Pacific. Marines will embark, debark, and travel through various amphibious ships, as well as conduct dry net operations.

(b) Susceptibility to enemy countermeasures will be operationally tested to the degree that safety will allow. OT&E results will be adjusted to account for the effects of unverifiable countermeasures based on an assessment of the capabilities of current threat countermeasures. It is anticipated that DT data will be adequate to support the evaluation of the lethality of the SRAW.

(c) Separate environmental testing will be conducted to cover environmental conditions not encountered during the four phases listed above. It is anticipated that the extreme cold weather requirements will have to be tested at a site other those for phases I – IV.

(4) Test Limitations

(a) The effects of weather and terrain will be limited to those at MCB Camp Pendleton, CA; MCAGCC 29 Palms, CA; and Naval Base, San Diego, CA.
(b) Availability of amphibious ships will limit the extent of amphibious compatibility testing.
(c) Due to the high cost and limited availability of EMD tactical missiles for OT, missile RAM data collected during DT firings will be combined with OT data for the system evaluation. Only those missile firings conducted without contractor involvement and in a representative combat environment will be combined with OT firing data.

e. Live Fire Test and Evaluation**.** A formal Live Fire Test and Evaluation under Title 10 U.S. Code, Section 2366 "Major systems and munitions programs: survivability testing

and lethality testing required before full-scale production," with its associated independent report to Congress, is not required for SRAW. However, certain developmental tests are planned. Figures 4, 5, and 6, pages D-6, D-7, and D-8, list the full-up warhead test flights and lethality tests planned for both the nine Engineering Model test flights and the technical evaluations (Techeval/DT II).

5. PART V - TEST AND EVALUATION RESOURCE SUMMARY

a. **Special Support Requirements.** The SRAW targets are to be Government-Furnished Equipment (GFE). Other special requirements are to be determined by the contractor as necessary to meet the SRAW requirements. Figures 7 and 8 list the government facilities, equipment, and test support services required to successfully complete developmental testing.

b. **Deliverables.** The Engineering and Manufacturing Development Statement of Work requires that the contractor deliver the following items: 125 Technical Evaluation (DT II) systems 12 inert mock-ups six cut-away mock-ups one flight model guidance & control unit

Technical Data Package These items will be used for testing of the weapon system's lethality, accuracy, and performance. The contractor shall lend support and documentation to the Government for independent evaluation.

c. **IOT&E Support Requirements.** The following long-lead time, high cost items will be needed for the IOT&E:

a. 103 Operational Evaluation (IOT&E) systems,

b. training device(s) to be used as a low-cost alternative to actual IOT&E weapon systems to train Marines participating in IOT&E

c. five T-72 target tanks (two must be operational)

d. three BMP-2 target vehicles (two must be operational)

e. four armored vehicle remote control kits

The above items are based on testing of a single antiarmor warhead. Additional mission warheads (i.e. bunker buster and flame variants) will increase/change the above requirements.

APPENDIX A. BIBLIOGRAPHY

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C. JROC Initial Capabilities Document (ICD) for a Short Range Antitank Weapon (SRAW), 20 October, 2003.

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I. Statement of Work for the SRAW Technology Development Phase.

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K. MIL-STD-882, System Safety Program Requirements.

L. NAVORD OR-44942 Weapons System Safety Guidelines Handbook.

APPENDIX B. ACRONYMS

6-DOF	6-Degrees of Freedom
AMC-SWMO	Army Materiel Command — Smart Weapons Management Office
AAWS-M	Advanced Antiarmor Weapon System — Medium
CE	Chemical Energy
CG	Commanding General
CMC	Commandant of the Marine Corps
DARPA	Defense Advanced Research Projects Agency
DEW	Directed Energy Weapon
DT	Developmental Test
DTP	Detailed Test Plan
DT&E	Developmental Test and Evaluation
EM	Engineering Model
EMD	Engineering Manufacturing Development
EMI	Electromagnetic Interference
EOA	Early Operational Assessment
ESD	Electrostatic Discharge
FRACAS	Failure Reporting Analysis and Corrective Action System
FY	Fiscal Year
G&C	Guidance & Control
GFE	Government Furnished Equipment
HERO	Hazards of Electromagnetic Radiation to Ordnance
HPM	High-Powered Microwave
IER	Independent Evaluation Report
ILAW	Improved Light Anti-Tank Weapon
ILS	Integrated Logistics Support
ILSMT	Integrated Logistics Support Management Team
IOT&E	Initial Operational Test & Evaluation
IPR	In Progress Review
ISA	Inertial Sensor Assembly
JRCA	Jet Reaction Control System
LAPES	Low Altitude Parachute Extraction System
MCAGCC	Marine Corps Air-Ground Combat Center
MCCDC	Marine Corps Combat Development Command
MCO	Marine Corps Order
MCOTEA	Marine Corps Operational Test and Evaluation Activity
MCPDM	Marine Corps Program Decision Memorandum
MARCORSYSCOM	Marine Corps Systems Command
MOS	Military Occupational Specialty
MOUT	Military Operations in Urban Terrain
NAWC	Naval Air Warfare Center

NLOS	Non-Line-Of-Sight
NSWC	Naval Surface Warfare Center
OPEVAL	Operational Evaluation OT Operational Test
PDA	Principal Development Activity
PEO	Procurement Executive Officer
PPQT	Pre-Production Quality Testing
RAM	Reliability, Availability and Maintainability
RHA	Rolled Homogeneous Armor
ROC	Required Operational Capability
S&A	Safe & Arm
SDI	Strategic Defense Initiative
SRAW	Short Range Antitank Weapon
TDD	Target Detection Device
TECHEVAL	Technical Evaluation
TEECG	Tactical Exercise Evaluation Control Group
TEMP	Test and Evaluation Master Plan
TOW	Tube-launched, Optically tracked, Wire-guided Missile
TPD	Test Planning Document

APPENDIX C. POINTS OF CONTACT

TITLE NAME ORG COMM/AV PHONE

LIST INTENTIONALLY DELETED

APPENDIX D. FIGURES

Figure 7 — Government Test Services and Facilities

Figure 8 — Government Furnished Facilities, Equipment,

Critical technical Parameter	Total Events	Technical Objectives	Test Site/Facilities	Scheduled Test Time	Decision Supported
Accuracy/Range Stationary TGT	DT 1 DT 2	>.5Ph at 400 Meters >.5Ph at 600M (T) >.5Ph at 800M (O)	NAWC China Lake, CA NAWC China Lake	Q2 2005 Q3 2006	CDR MS C
Accuracy/Range Moving TGT	DT 1 DT 2	.5 Ph at 200 Meters .45 Ph at 250 Meters (crossing target)	NAWC China Lake, CA NAWC China Lake, CA	Q2 2005 Q3 2006	CDR MSC
Lethality	DT 1 DT 2	Classified Classified	Aerojet Test site, Soccoro AZ NAWC China Lake	Q3 2003 Q4 2007	PDR MSC
Minimum Arming/Distance	DT 2	17 Meters	NAWC China Lake CA	Q3 2006	MS C
Weight of system	DT1 DT2	23 lbs <20 lbs	NAWC China Lake, CA NSWC Dahlgren, VA	Q4 2003 Q4 2006	CDR MS C
Length of System	DT 1 DT 2	40 inches <40 inches	Factory Factory	Q4 2003 Q42006	CDR MS C

Figure 1: Critical Technical Parameters

Integrated Test Schedule

Fiscal year	03	04	05	06	07	08	09	10	11	12	13

Milestone		MSB		MSC
Phases	Technology Dev't	System Dev't and Integration	Production	Sustainment

Dev't Contract	x	x	x								
PDR				x							
CDR				x							
Contractor Testing (DT-1)	x	x	x	x	x						
Gov't DT testing (DT-2)				x	x	x					
Prod Readiness Review						x					
Operational Test Readiness Review							x				
LRIP							x				
IOT&E							x				
Full Rate Production Decision								x			
FOT&E									x	x	x

Figure 2: Integrated Test Schedule

Item	Quantity
Technical Evaluation Systems	125
IOT&E Systems	103
Inert launcher Mock ups	12
Cutaway Launcher/Missile mockups	6
Flight Model Guidance and Control units	1
Slug (eject only) Missiles	7
Composite Tube w/closures	1
Dummy Missiles w/ launch tube for subcontractor qualification tests	15
Breadboard models of: TDD components G&C components JRCA components Telemetry components Inertial sensor assembly (ISA)	
Safe and Arm Devices	157
JRCA	246
Engineering model missiles w/launcher	10
Batteries	262
Power supply units	241
Launch Tubes	290
Inertial Sensor Assemblies	246
Inert Warheads	32
Live Warheads	157
Inert Rocket Motors	18
Eject Only Rocket Motors	7
Rocket Motors for Testing	246
Launch Control Set	2
Missile Test Set	2
Qual Test Fixtures	11
Airframes	38
Shipping containers	80

Figure 3: DT Test Items

Subsystem test	Duration of test	Scope	Location
Full Qualification Tests: Vendors S&A Device ISA Propulsion Gas Generator Warhead	 12 Weeks 12 Weeks 12 Weeks 12 Weeks 12 Weeks	 Specified Env't	NAWC China Lake, Ca
Ordnance Induced Failure Tests: Propulsion Gas Generator	 4 weeks 4 weeks		NAWC China Lake, CA
Countermeasures testing	4 weeks	Specified Env't	Aberdeen, MD
Engineering Model Tests: Hardware in the loop tests Subsystem Integration and testing: 2 Missiles for prequel at Newport 7 flight test missiles for eject tests 5 flight test missiles w/telemetry 2 flight test missiles w/warhead	 13 weeks 4 weeks 4 weeks 8 weeks 4 weeks		Loral
Limited Missile Qual Test	8 weeks		Loral
Preliminary EMI & ESD Tests	4 weeks	W/o Ordnance	Loral
Preliminary HERO Tests	4 weeks		NSWC Dahlgren, VA
Launcher tests: Round retention w/slug Closure release test	 4 weeks 8 weeks	Immersion Drop tests closures	NAWC China Lake, CA
EM missile acceptance, vibration and temp tests	4 weeks	Pre-flight Testing	NAWC China Lake, CA
EM Missile eject tests	7 each	Remote launch	NAWC China Lake, CA
EM Missile flight test w/telemetry	5 each	Remote Launch	NAWC China Lake, CA
EM Missile flight test w/ warhead	2 each	Remote Launch	NAWC China Lake, CA

Figure 4: Subsystem Tests

Test	Number/Duration of tests	Scope	Location
Airframe load test	4 weeks	Launch force loads	Loral Newport Beach
JRC Bench Checkout	20 weeks	breadboard	Loral
Guidance and control bench checkout	20 weeks	breadboard	Loral
TDD Bench checkout	20 weeks	breadboard	Loral
Launcher checkout	20 weeks	functionality	Loral
Ordnance Dev't tests: Propulsion E&V Warhead E&V Gas Generator	 16 weeks 16 weeks 16 weeks	 Subcontractor Verification w/ Loral oversight	Loral
Subsystem Acceptance Tests: JRC Guidance & Cont'l Tgt detect device S&A device Inertial Sensor Telemetry	 4 weeks 4 weeks 4 weeks 4 weeks 4 weeks 4 weeks	Loral verification of final product	Loral
Subsystem Env't Tests JRC G&C TDD Airframe S&A device ISA Telemetry	 4 weeks 4 weeks 4 weeks 4 weeks 4 weeks 4 weeks	Loral verification of final product	Loral

Figure 5: EM Missile tests

DT II Tests	Number/Duration	Scope	Location
Weapons prequel flight test	8 each		NAWC
Weapon Env't qual tests Block 1 Block 2 Block 3	 11 each 11 each 11 each		NAWC
Fire through Brush test	2 each		NAWC
Weapon safety qual test	17 each		NAWC
Safety cert tests (man rating): Firing from enclosures	43 each 3 each		NAWC
Weapon performance Flight tests	32 weeks		NAWC
Final EMI & ESD tests			NAWC
Final HERO tests			NAWC

Figure: 6 DT II Tests

Gov't Service or facility	Time Frame	Test Period	Comments
NAWC China Lake Env't test facility Solar Radiation Temperature Altitude Water Immersion Vibration Acceleration Sensing, photo, tape Recording, timing Missile assembly and Integration area 3 Explosive safe rooms 25 lbs of class 1.1 exp 115VAC, 1 phase 20A 2 explosive storage bunkers	June 06-March 07 May 05-Nov 06	Continuous	
NSWC Dahlgren, VA HERO Tests Facilities and services	 Aug 05-Sep 05 Aug 06-Sep 06	 1 week 1 week	
Aberdeen Proving Ground, MD Countermeasure tests Test range and support CM devices, materials Targets Equipment storage facilities Office area 115 vac Van power 20kVA Storage for secret mat'l Facilities and support personnel	June 06-July 06	2 weeks	
Edgewood, MD CM tests Aerosols tests Facilities and support personnel			
Yuma Proving Ground Parachute test facility Aircraft	March 07-Apr 07	2 weeks	

Crew Rigging Pallet material Tower drop facilities			
Lapes Test Facility Aircraft Crew Rigging Pallet Material Loadmaster services	March 07-Apr 07	2 weeks	

Table 7: Gov't test services and facilities

Item	Time frame	Test period	Comments
Facilities			
NSWC Dahlgren, VA HERO Test facility	Aug 05-Sep 05	1 week	
NAWC Missile assy area	May 05-Nov 05	1 week	
Equipment			
Aircraft for LAPES and parachute test	Mar 07-Nov 07	1 week	
LAPES parachute test rigging and pallets	Mar 07-Nov 07	1 week	
Stationary and moving armor targets	July 05-Aug 05	Continuous	
Reactive Armor	June 05-May 07	Continuous	
Stationary Armor target	July 05-Aug 05	Continuous	
Enclosure test building	Jan 07	Continuous	
Instrumentation for enclosure test: Sound pressure level Toxic gas sensor	Jan 07	Continuous	
AN/PVS-4 night sight	TBD	TBD	
AN/PVS-7B night vision goggles	TBD	TBD	
NBC Gear	TBD	TBD	
Paratrooper Jump pack	TBD	TBD	
Services			
Aircraft flight crew for LAPES	March 07-Apr 07	2 weeks	

Enclosure test instrumentation support personnel	Jan 07	1 week	

Figure 8: Gov't Furnished Facilities, Equipment and Services