Performance Specification For the Miniature Day/Night Sight Development to the M4 SOPMOD Kit

24 March 2003

1. SCOPE

1.1 Purpose. This document establishes the performance requirements for the Miniature Day/Night Sight (MDNS) Development solicitation for the Special Operations Peculiar Modification (SOPMOD) Kit. The SOPMOD Kit Program is a United States Special Operations Command (USSOCOM)-sponsored program, which supports Army, Navy, and Air Force Special Operations Forces (SOF) Units. The SOPMOD Program Management Office (PMO) at NSWC Crane, IN, provides standardized, versatile weapons accessories to meet needs across SOF mission scenarios. These accessories increase operator survivability and lethality by enhanced weapon performance, target acquisition, signature suppression, and fire control. SOPMOD PMO provides these accessories when they are operationally suitable, affordable, sustainable, and funded.

1.2 Project Definition: MDNS Development project is not a specific single system or subsystem, rather MDNS is a developmental effort to improve on current SOF/SOPMOD capabilities for target acquisition, fire control, aiming, and aiming support subsystems. These improvements are sought through miniaturization, ruggedization, combination, or other enhancements. Improvement will be measured using the currently fielded systems as baselines. Current SOPMOD subsystems that may be phase-replaced, improved, or combined by the MDNS Development effort are:

SOPMOD BLOCK I Original Subsystems	**Stock Number**
Rail Interface System (RIS)	1005-01-416-1089
Backup Iron Sight	1005-01-449-6306
4x Day Optical Scope	1240-01-412-6608
Reflex Sight CQB*	1240-01-435-1916
AN/PEQ-2 Infrared Illuminator	5855-01-422-5253
Visible Light Illuminator (VLI)	5855-01-448-5464
AN/PVS-17A Mini Night Vision Sight	5855-01-474-8904
AN/PEQ-5 Carbine Visible Laser	5860-01-439-5409
SOPMOD BLOCK I Phased-Replacement Subsystems	
Visible Bright Light II (VBL II)	5855-LL-L99-7589
Enhanced Combat Optical Sight-Navy (ECOS-N)	1240-01-495-1385

*Integration Only
Note: This is not an all-inclusive table; consult below for full description.

Table 1 – MDNS Development Items

1.2.1 Applicable Weapons: The MDNS development effort is specifically to provide an improved MDNS capability for the M4A1 Carbine in use by SOF. The threshold Host Weapons of the MDNS development effort are (1) the M4A1 Carbine (alone) and (2) the M4A1 Carbine performing while mated with an M203-series Grenade Launcher. However, no sighting systems for the M203 series are sought in this solicitation. Other Objective Host Weapons (see

glossary, Para 6) that may coincidentally utilize MDNS products include any of the SOF suite of small arms. Objective Host Weapons may or may not be utilized in testing of MDNS subsystems, depending on that nature of proposals resulting from this solicitation and the availability of resources.

1.2.2 Ancillary Capabilities: This specification seeks to replace the capabilities represented by the items from Table 1, while reducing piece count of individual sub-systems. Proposals are sought only for the main subsystems, or additional systems that combine two or more of the functions represented in Table 1 (See CLINs).

This specification does not support items not strictly in the scope of these main subsystems. Specifically, MDNS Development specification below does not provide for the selection of ancillary or related items, such as ergonomic improvements to the M4A1 carbine, forward handgrips that are not part of combined systems, slings that are not part of combined systems, bipods, and mounting brackets for weapons other than the M4A1 Carbine.

Proposals for the development of ancillary items that do not specifically provide day or night aiming, but rather support the day/night aiming capability indirectly, or are otherwise relevant to MDNS development, but not within the scope of this MDNS specification, should be proposed under a separate solicitation**: N00164-01-R-0155, BROAD AGENCY ANNOUNCEMENT (BAA) RESEARCH AND DEVELOPMENT FOR ORDNANCE, ELECTRONICS, AND ELECTRONIC WARFARE.** This solicitation is also found on the NSWC Crane Acquisition Home Page. While N00164-01-R-0155 is open for a long period of time, proposals that are submitted under N00164-01-R-0155 citing relevancy to MDNS development should be received not later than the closing date and time of MDNS.

1.3 Maturity Of Technology: MDNS is a developmental effort; therefore, new and combined capabilities as well as improvements on existing capabilities are of interest. This solicitation, does not seek to conduct basic research, nor to develop the Technology Base, nor explore preliminary concepts that require long periods of research and development. Instead, the MDNS Development effort seeks to rapidly develop, test, and field subsystems in a timeframe relevant to current conflicts. MDNS Development seeks subsystems that require only Engineering and Manufacturing Development (EMD) to become technically qualified and operationally suitable to enter combat. For that reason, proposals that do not reflect either working prototypes or commercial items with minor modifications are not acceptable. Preference for schedule may be given to EMD proposals that are based on Commercial-Off-The-Shelf (COTS) and Non-Developmental Items (NDI) that require only minor EMD prior to fielding for combat. See also 3.8 and 3.9 below for schedule information.

1.4 Organization Of This Specification: This performance specification is organized into 6 Sections. Section 1 (this section) is the SCOPE, which contains generalized introductory information. Section 2 of this specification provides applicable documents and references.

1.4.1 Section 3 is the core of the performance specification. It provides detailed requirement definition. Section 3.1 provides general information regarding the distinct specifications and certain fundamental specifications. Section 3.2 outlines desired general improvements to current core capabilities. Section 3.3 of this specification identifies

desired improvements to specific technologies that cite improvements to the performance of current baseline subsystems. These are divided into two major technology groups, 3.3.1 Group A, Passive and 3.3.2 Group B, Active. In 3.3.3, other miscellaneous subsystems are addressed. Sections 3.4 – 3.8 of this specification identify requirements that apply to all systems that may be proposed under this solicitation.

1.4.2 Section 4 contains information on verification common to all MDNS subsystems. This section covers System and Sub-System Qualification and Verification, Developmental Testing (DT), and Operational Testing (OT). The overall plan for DT and OT is based on testing, verifying, and selecting basic systems first. Basic systems are the rail mounting systems, back-up iron sights, and other fundamental hardware that mounts or supports the use of more complex subsystems. The second and subsequent phases of OT/DT will select and integrate systems of increasing complexity into the MDNS array of subsystems. Section 4 also addresses Production Assurance Testing and Evaluation (PAT&E), which includes Quality Assurance Procedures, and Quality Control and Production Acceptance Plans, and Configuration Control Recording.

1.4.3 Section 5 covers Preparation for Delivery (Common to All MDNS Subsystems), Basic Issue Items, Storage/Transport Cases, and commercial packaging requirements.

1.4.4 Section 6 provides common notes to the specification, to include notes on Operator’s and Maintenance Manuals, batteries, lubrication, and markings. Section 6 also contains a glossary of Key Definitions and a list of acronyms and abbreviations.

2. APPLICABLE DOCUMENTS

2.1 Government Documents

2.1.1 Specifications and Standards: The following specifications and standards form a part of this Performance Specification and will be used for guidance or to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

Standards, Military:

MIL-STD-461E	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-A-8625F	Anodic Coatings for Aluminum and Aluminum Alloys
MIL-STD-130K	Identification Marking of U.S. Military Property
MIL-STD-882D	System Safety
MIL-STD-810F	Environmental Test Methods and Engineering Guidelines

MIL-STD-1425A	Safety Design Requirements for Military Lasers and Associated Support Equipment, 30 August 1991.
MIL-STD-1913	Dimensioning of Accessory Mounting Rail For Small Arms Weapons
MIL-STD-1916	DOD Preferred Methods for Acceptance of Product
MIL-M-7298	Manual, Technical: Commercial Equivalent
MIL-HDBK-61A	Configuration Management Guidance
MIL-HBK-454A	General Guidelines for Electronic Equipment
MIL-PRF-63016B	Manuals, Technical: Munitions Equipment
NAVSEA SWO10-AD-GTP-010	Small Arms and Special Warfare Ammunition

Other Documents:

Title 10	United States Code (10 U.S.C.)
DoDD 3200.11	Major Range and Test Facility Base
AR 70-1	Army Acquisition Policy
AR 70-25	Use of Volunteers as Subjects of Research
AR 73-1	Army Test and Evaluation Policy
AR 360-5	Army Public Affairs, Public Information
AR 380-5	Department of the Army Information Security
AR 380-10	Technology Transfer, Disclosure of Information
AR 385-16	System Safety Engineering and Management
DA Pam 73-1	Test and Evaluation in Support of System Acquisition
DA Pam 73-4	Developmental Test and Evaluation Guidelines
DA Pam 73-5	Operational Test and Evaluation Guidelines
DA Pam 73-6	Live Fire Test and Evaluation Guidelines
DoD Guidebook	INTERIM DEFENSE ACQUISITION GUIDEBOOK, October 30, 2002(Formerly the DoD 5000.2-R, dated April 5, 2002)
DA PAM 70-3	Army Acquisition Handbook
DA Pam 73-2	Test and Evaluation Master Plan (TEMP) Procedures and Guidelines

DA Pam 73-3	Critical Operational Issues and Criteria (COIC) Procedures and Guidelines
DA Pam 73-7	Software Test and Evaluation Guidelines
DOTE Policy Memorandum	Policy for Conducting Operational Test and Evaluation of System Interoperability dated 15 June 1999
DOTE Policy Memorandum	Policy on Operational Test and Evaluation of Electromagnetic Environmental Effects and Spectrum Management dated 25 October 1999
MOA	Multi Service Operational Test and Evaluation (MOT&E) and Joint Test and Evaluation (JT&E), April 1999
Joint Publication 1-02	DOD Dictionary of Military and Associated Terms
ATEC Pamp 73-1	System Test and Evaluation Procedures, 10 Dec 99
USSOCOM Dir 70-1	Research, Development, and Acquisition, 11 Apr 01
TEXCOM Memo 73-1	Test Officer’s Planning Manual, Oct 91
DA PAM 350-39	Standards in Weapons Training
TOP 3-2-609	Test Operating Procedure (TOP), Chemical Compatibility of Nonmetallic Materials
TOP 4-2-602	Rough Handling Tests
TOP 1-2-502	Durability, dated 19 Dec 1984
TOP 1-2-610	Human Factors Engineering, dated 15 May 1990
TOP-3-2-030	Grenade Launchers, dated 13 March 1987
TOP/MTP 3-1-002	Reliability
TOP 3-2-045	Automatic Weapons, Machine Guns, Hand and Shoulder Weapons
OPNAVINST 5100.27	Navy Laser Hazards Control Program
STRAC Manual Chapter 5	Infantry Weapons Systems
Code of Federal Regulations (CFR) Title 21, Part 1040.10	
ORD	United States Special Operations Command (USSOCOM) Operational Requirements Document (ORD) for the Special Operations Peculiar Modification (SOPMOD) Kit for the M4A1 Carbine, 29 October 1999
DODINST 4140.52	Department of Navy Physical Security Instruction for Conventional Arms, Ammunition, and Explosives

	(AA&E)(current version)
NAVSEA Instruction	8370.2 Small Arms and Weapons Management Policy and Guidance Manual
DOD Directive 5100.76	Physical Security Review Board (current version)
USSOCOM Special Text	"Special Operations Peculiar Modification (SOPMOD) Accessory Kit for the M4A1 Carbine", ST 23-31-1, 30 January 1999.
USSOCOM Directive 70-1	Research, Development, and Acquisition, 11 April 01

2.2 Non-Government Publications

AMERICAN NATIONAL STANDARDS INSTITUTE:

ANSI B46.1	Surface Texture (Surface Roughness, Waviness and Lay)
ANSI Y32.3	Welding and Brazing (Requests for copies of this document should be forwarded to the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10036 Telephone (212) 705-7722).
ANSI IPC J-STD-001A	Requirements for Soldered Electrical and Electronic Assemblies
ANSI Z136.1	American National Standard for the Safe Use of Lasers

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM):

ASTM E709	Standard Guide for Magnetic Particle Examination
ASTM E1444	Standard Practice for Magnetic Particle Inspection
ASTM E1417	Practice for Liquid Penetrant Examination

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

3. REQUIREMENTS

3.1 Product Definition and Configuration: MDNS Development includes the development of new items or the adaptation of NDI/COTS items to provide miniaturized day and night small arms sighting capabilities to SOF operators. MDNS sub-systems, when mounted on the M4A1 Carbine (and possibly other SOF small arms) will allow SOF operators to better and more rapidly acquire, identify, and accurately fire on enemy targets in combat at ranges from 2 to 800 meters. A secondary mission of these MDNS subsystems is to provide better target observation, illumination, and marking. Most of the developments and improvements described below are

based on current aiming devices in the SOF and SOPMOD inventories.

3.1.1 Thresholds/Objectives: Performance parameters and features in this specification are assigned numerical or verbal values. In some instances, desired or Objective (O) requirements that exceed the minimum requirements of this specification are listed in conjunction with the minimum or Threshold (T) requirements. In these instances, the threshold and objective parameters will be annotated as such. If no (T) or (O) is assigned, the value stated is (T).

3.1.2 Key Performance Parameters (KPPs): KPPs are must-pass testing events. Any offering failing the (T) value of any of the KPPs will be removed from further testing and will not be considered for contract award. Specific parameters that are to be designated herein as Key Performance Parameters shall be identified with the annotation "(KPP)". KPPs appear throughout this specification, however a partial list of KPPs that apply to all MDNS subsystems or major groups of MNDS subsystems are as follows:

3.1.2.1 Interfaces. All MDNS subsystems shall interface with the M4A1 Carbine utilizing the MIL-STD-1913 dimensioning system. Offerors may propose or utilize other supplemental interface surfaces or mechanisms, provided that they also propose a reasonable means for the Government to acquire the intellectual property rights required to maintain an open architecture for the SOPMOD system (KPP).

3.1.2.2 Zeroing. All MDNS subsystems shall be adjustable for windage and elevation unless otherwise stated (KPP).

3.1.2.3 Laser Safety. All MDNS subsystems containing lasers shall conform to the requirements of OPNAVINST 5100.27. Any proposal containing laser devices shall include proposed laser hazard classification and appropriate safety parameters (KPP).

3.1.2.4 Waterproofing. No MDNS subsystem prototype will exhibit design features that preclude waterproofing to a depth of 66 feet. All MDNS subsystems shall be waterproof to a depth of 66 feet for a minimum of two hours prior to award of Full Rate Production (FRP) Delivery Orders (KPP).

3.1.2.5 Power Supplies: In the case of offers that propose subsystems that utilize batteries, the batteries must be common and commercially available. The battery(s) shall be able to be replaced by the operator with one hand, without using tools, and without removing the MDNS subsystem from the host weapon. The battery lid shall have a lanyard or other loss-prevention mechanism connected to the body of the sight. MNDS subsystems shall able to operate, without a change of batteries, full continuous "on" for a minimum of 3 hours (T) 24 hours or more (O) unless otherwise stated. (KPP). The batteries common and commercially available, shall be:

Battery, Non-rechargeable, NSN 6135-01-351-1131, or a commercially available battery equivalent to it, such as the DL 123-series.

BA-3058/U 1.5 volt, AA size (NSN 6135-00-985-7845), or a commercially available battery equivalent to it.

DL 1/3 N3 Volt Battery (NSN 6135-01-398-5922), or a commercially available battery equivalent to it.

AA Lithium 3.9 volt size (Part Number 205129-006), or a commercially available battery equivalent to it.

3.1.2.6 Interoperability: MDNS subsystem designs shall not cause unsafe conditions or interfere with the functioning of the M4A1 Carbine (T). MDNS subsystems will interoperate with existing SOPMOD subsystems, or substitute them singly or in combination (O).

3.1.2.7 Other KPPs. Other KPPs, or other modified versions of the common KPPs, may be specified under separate MDNS subsystems in 3.3 below, and elsewhere in this specification (KPP).

3.1.3 Additional Performance Parameters (APPs): APPs are scored testing events. APPs are tradable parameters that are used to measure effectiveness and performance. Failure to meet either (T) or (O) requirement values specified in an APP does not remove a submission from further testing or from consideration for contract award. APPs are evaluated to provide information leading to a best value award determination. Specific parameters that are to be designated as Additional Performance Parameters shall be identified with the annotation “(APP)”.

3.1.4 KPPs are Go (Pass)/ No-Go (Fail) test events, however both KPPs and APPs may be evaluated to provide “Best Value” source selection information. KPP (O) values and APP (T) and (O) values are the equivalent of research and development goals. The government will test all submissions for KPP threshold compliance. However, the government may or may not test APPs or KPP objectives based upon availability of resources.

3.2 General Improvements to Core Capabilities. MDNS Development should enhance existing day and night sighting/aiming operational capabilities by demonstrating the following improvements to capabilities that are currently fielded. The below parameters, if not numerical, will be tested and compared to the numerical values provided by current sub-system baselines:

3.2.1. Improved Operational Test Results. Compatibility. SOF operators while wearing various uniforms, equipment, and possibly eyeglasses appropriate for each individual mission shall achieve proper cheekweld, sight picture, and eye relief. The shooting positions shall be the same as used for current fielded M4A1 Carbines and other SOF Small Arms. MDNS subsystems will exhibit improved Operation Suitability and Operational Effectiveness. This includes improved performance / hit scores in semi-automatic and full automatic fire, improved performance at both shorter and longer ranges, and improved performance under low-illumination and other adverse conditions. The overall objective (O) is increased hit scores at all ranges from 2 meters to 800 meters by SOF operators during day, night, rain, mist, smoke, vegetation, fog, dust, and extreme low light conditions (APP).

3.2.2 Portability. MDNS subsystems will exhibit miniaturization, to include reductions in both size and weight, with an objective of increased weapon portability and better weapon balance during the integrated act of firing (APP).

3.2.3 Ease of Maintenance. MDNS subsystems will exhibit improved corrosion resistance, and ease of cleaning and field maintenance (APP).

3.2.4 Endurance. MDNS subsystems will exhibit recoil shock endurance sufficient to allow use on all SOF small arms. See also 3.4 below. The MDNS subsystems should be fully functional for a minimum of:

10,000 rounds (T), 30,000 rounds (O) of 5.56mm ball on the M4A1 Carbine (APP).

5,000 rounds (T), 10,000 rounds (O) of 40mm HEDP on the M4A1 Carbine equipped with an M203E1 Grenade Launcher (APP).

1,000 rounds (T), 30,000 rounds (O) of various munitions while mounted on other corresponding “Host Weapons” (APP).

3.2.5 Reliability. MDNS subsystems will exhibit functional reliability exceeding that of the present subsystems at high and low temperature extremes as well as other hostile (sand/dust/dirt/mud/surf/temperature shock) environmental conditions (APP).

3.2.6 Safety. MDNS subsystems will exhibit improved safety features. See also 3.6 below (APP).

3.2.7 Counter-Detection. MDNS subsystems will exhibit low or no susceptibility to optical retro-reflection augmentation. MDNS optical subsystems should incorporate anti-reflective lens coatings, anti-reflective devices, or other technologies to minimize the chance of detection by enemy observers. No light emissions emitting forward from MNVS subsystems will be detectable at 5 meters forward of the operator with the night-adapted eye (T), or Night Vision Devices (O). Light emissions to the rear (toward operator) may require both visible and IR components or modes in order for the visual information to be usable to the operator. However, light emission to the rear (toward the operator) shall not be detectable 5 meters in front of the operator by the night-adapted eye (T), or Night Vision Devices (O). MDNS subsystems shall not emit noise that is detectable by the unaided human ear at a distance beyond five meters in any direction. (APP)

3.2.8 Lens Resistance to Obscuration. MDNS subsystems incorporating exposed lenses or transparent elements will exhibit improved lens performance in rain, fog, snow, dust, and other atmospheric conditions, e.g. moisture-resistant lens coatings, transparent lens covers, self-clearing lenses, etc. (APP).

3.2.9 Lens Protection. MDNS subsystems incorporating exposed lenses will exhibit improved lens protection, e.g. scratch-resistant lens coatings, transparent sacrificial lens covers. MDNS subsystems shall have corrosion resistant and scratch resistant coatings on all exposed optics, which permit operation in salt sprays and blowing sand. (APP)

3.2.10 Optical Performance. MDNS optic or electro-optic systems will exhibit improved eye relief, greater field of view, decreased obscuration of the visual field, improved range-finding/estimation, and/or other provisions for optimum human aiming and firing performance in SOF combat scenarios (APP).

3.2.11 Life Cycle Costs. MDNS subsystems will exhibit decreased life-cycle support costs, e.g. low or no maintenance designs, modular maintenance

concepts, and simplified maintenance procedures. See also warrantee clause herein (APP).

3.2.12 Power Consumption. MDNS subsystems will exhibit reduced rates of power consumption and extended battery life. MDNS subsystems shall have reverse polarity protection (T), or prevention of reverse battery installation (T), or should operate inconsequential of installed battery orientation (O). The maximum DC current of MDNS subsystems shall be minimized for extended battery life (APP).

3.2.13 Laser Protection. MDNS subsystems incorporating features that allow external entrance of light from a location forward of the operator will provide improved protection from external lasers (APP).

3.2.15 Bore-sight Retention. All MDNS optical systems should retain a zero position within 0.5 milliradians after being subjected to the shock of 500 rounds fired through the host weapon and shock testing. See also 3.4 below. (APP).

3.2.16 Mode Switching. MDNS subsystems utilizing switches will exhibit improvements that provide enhanced human performance (intuitive, fast, and human error-free) in switch selection and activation. Controls should be ambidextrous. The controls should exhibit ease of use and the prevention of inadvertent operation. Any switches on MDNS subsystems should be recessed and protected from inadvertent operations and damage. All switches should be usable with ungloved hands (threshold) gloved hands (objective). Gloves include flight gloves, Nomex, and MIL-G-81188. Switches shall be of tactile design so that the operator can feel whether the switch is activated. Water immersion to a depth of 66 feet shall not activate any switches, nor render them inoperable. (APP)

3.2.17 Snag Hazards. MDNS subsystems will be designed to deflect or minimize battlefield snag hazards, such as vines, branches, and barbed wire (APP).

3.2.18 Tools. No special tools shall be required to install, remove, or adjust MDNS subsystems unless the concepts of use/maintenance reasonably benefit from anti-tamper features . (APP)

3.2.19 Emergency/Rain Sights. Proposed MDNS optical/electro-optical subsystems which mount in the 12:00 position, or otherwise obscure the line of sight when lenses are fogged or degraded, should have low profile non-powered (T) or tritium powered (O) external iron sights. These sights must be capable of being effectively used instantaneously in the event the more complex main MDNS subsystem fails. The emergency/rain sights shall be self-protecting and reduce snag hazard. The emergency/rain sights should be adjustable for windage and elevation. NOTE: Emergency/rain sights should not be confused with the Back-up Iron Sight (BIS, see below). The BIS is a separate subsystem used as either a stand-alone iron sight capability, or, in conjunction with Reflex sights, a see-through aiming witness capability. Emergency/Rain sights, however, are integral, low profile sights that are designed into MDNS subsystem housings, mounts, or other external surfaces. Emergency/Rain sights do not require that the MDNS subsystem be removed from the weapon for use, as do the BIS. The SOF Operator would typically use Emergency/Rain sights for short-range/survival applications involving instantaneous response during a firefight to a

failure of one of his high-technology aiming subsystems, in situations where he had no time to remove the malfunctioning MDNS subsystem and then deploy the BIS. (APP)

3.2.20 Back-up Night Aiming Capability. MDNS subsystems will exhibit incorporation of back-up night aiming capability where it currently does not exist, e.g., back-up iron sights / emergency/rain sights with tritium or other illumination. However, back-up night aiming subsystems should minimize probability of detection by enemy observers at night (APP).

3.2.21 Reliability. MDNS subsystems shall have a 90% probability of operating 36 hours on a 3-day mission without failure (T). MDNS subsystems shall have a 90% probability of operating 48 hours on a 4-day mission (O).

3.2.22 Exterior Finish. MDNS subsystems shall have a dull, non-reflective dark exterior finish, dark gray desired. Surfaces: External surfaces (except for light transmitting elements) shall be finished in a flat dark gray color that is non-reflective and corrosion resistant. The external lens and eyepiece, if any, shall not be obscured by condensation. All internal surfaces (except light transmitting elements) that are exposed to light from external and internal sources shall be finished to achieve the lowest feasible light reflectance. (APP)

3.2.23 Certain MDNS subsystems may prove increased performance and reduced cost due to consolidation of current capabilities into multi-use systems, or the integration of capabilities through modular interface. This includes the integration of technologies currently fielded as separate subsystems (such as those referenced in Section 3.3) into single multi-use subsystems and utilization of modular technology, where such combinations are suitable for SOF combat. Consolidated or multi-module subsystems, however, are not preferred at the expense of current levels of performance (APP).

3.2.24 The Government seeks a ”Best Value” acquisition. The Government may therefore consider innovative technical capabilities related to, but not envisioned or specifically called out by this specification. Therefore, offerors may include other closely related combat capabilities in the systems that they offer. If a proposal contains such ancillary or alternative capabilities, the Government may conduct exploratory testing of the capabilities. Exploratory test results may be used for source selection information (APP).

3.2.25 Hardware identified in this specification is intended for mounting on the M4 series carbines and M4A1 carbines mated to grenade launchers. However, experience indicates that SOF combatants may utilize MDNS items on a wide variety of weapons identified in section 6.5. Although it may not be practical to test MDNS items on all weapon platforms, proposals should clearly identify which weapons are applicable for MDNS usage. While the M4A1 Carbine is the core weapon for MDNS benefit, interoperability with all “Host Weapons” is desired (APP), but not at the expense of performance of the proposed MDNS subsystem(s) on the M4A1 Carbine.

3.3 SOPMOD Subsystem Requirements. In this specification, SOPMOD subsystems are broken down into two categories, Group A Passive and Group B Active. In the paragraphs that follow, each cited existing baseline

subsystem will contain desired performance improvements.

3.3.1 Group A, Passive Miniature Day/Night Sight Subsystems

3.3.1.1 Day Optical Scope (DOS) / Enhanced Combat Optical Sight – Carbine, (ECOS-C); BASELINE SYSTEM: NSN 1240-01-412-6608

3.3.1.1.1 SUPPLEMENTAL SPECIFICATIONS FOR THE FUTURE DOS. The future DOS is named the Enhanced Combat Optical Sight – Carbine, or ECOS-C, in order to distinguish it from previous DOS systems. In addition to the requirements and desired improvements listed in 3.1 and 3.2 above, the ECOS-C shall demonstrate the following minimum performance characteristics (Threshold):

3.3.1.1.1.1 Additional ECOS-C KPPs:

3.3.1.1.1.1.1 Weight (with battery and mounting hardware, if required): Weight should be nominally equal to or less than 19 ounces (threshold), 8 ounces (objective), excluding accessories, if any. (KPP)

3.3.1.1.1.2 Additional ECOS-C APPs:

3.3.1.1.1.2.1 Magnification: The technological objective of the ECOS-C is to provide not only a long-range deliberate aiming capability (as in the current DOS), but also a short range, positive, rapid aiming capability (as in current Red-Dot Reflex Sights) for Close Quarters Battle. This dual capability is desired in a single ECOS-C subsystem, eliminating the need for two different optical sights by providing a single sight capable of both types of aiming. See also 3.3.1.4 below. The power should be fixed 4X (T) or variable power (O). If variable power, the lower power setting should be between 1X (O) and 1.5X (T). The higher power settings on a variable offering should reach 4X (T) or greater (O). Optimally, at a magnification of 1X, the view will exhibit clear, unobstructed view through the ECOS-N, with the iron sights clearly visible in the field of view, and the iron sights witness to the zero of the ECOS-N. Conversely, the image of the front iron sight should disappear from the FOV at higher power, and the rear Back-up Iron sight should fold down, to allow unobstructed long-range deliberate aiming. (APP)

3.3.1.1.1.2.2 Reticle: The future ECOS-C shall have a ballistic compensating reticle calibrated for M855 5.56x45 mm ammunition fired from the M4A1 Carbine with a 14.5 inch barrel. The ballistic compensation will allow for rapid and accurate use both day and night. The reticle shall be illuminated by tritium, ambient light, and/or an internal source. If the ECOS-C is variable power, the reticle will be in the first focal plane, or will otherwise provide for corrected stadiametric range estimation and aiming at all power settings. The future scope should incorporate a feature to allow for reticle illumination adjustment. The reticle should be designed to consistently provide optimal brightness in all lighting situations without compromising light emissions. The future ECOS-C should incorporate a reticle with a simplified pattern for ease of use. As an objective, the future ECOS-C may incorporate the capability for selectable reticles. (APP)

3.3.1.1.1.2.3 Objective Lens Diameter. The light gathering portion of the objective lens shall be a minimum of 28 mm in diameter. (APP)

3.3.1.1.1.2.4 Eye Relief. Eye relief shall be non-critical (having a large tolerance for eye protection from which a full field of view is seen). The optimal eye relief should be variable from 1.4 inches to 24 inches from the eye to the ocular lens. The reticle should be visible to the operator when the sight is positioned at any location within the designated eye relief on the URG or RIS. (APP)

3.3.1.1.1.2.5 Field of View. The minimal field of view shall be 7 degrees or 37 ft at 100 meters. (APP)

3.3.1.1.1.2.6 Windage and Elevation Adjustments. Adjustments shall maintain settings until reset by the operator. Adjustments shall be tactile, uniform, and repeatable. Windage and elevation adjustments shall be, as a minimum, in increments of ½ Minute of Angle (MOA) with smaller increments preferred. (APP)

3.3.1.1.1.2.7 Parallax. The ECOS-C shall demonstrate no discernable parallax at all ranges (O). If this cannot be achieved due to other performance tradeoffs, the parallax free distance of the scope shall be set at not less than 100 meters and not more than 200 meters (T). (APP)

3.3.1.1.1.2.8 Optical Quality. ECOS-Cs shall be constructed to provide a clear, sharp image. The scopes shall be free of glare and non-optical surface reflections. (APP)

3.3.1.1.1.2.9 The future ECOS-Cs should be ergonomically designed to allow for ease of use of back-up iron sights. (APP)

3.3.1.1.1.2.10 The future ECOS-C should provide night vision capability and/or improved interoperability with night vision goggles. (APP)

3.3.1.2 Miniature Night Vision Sight (MNVS); BASELINE SYSTEM: AN/PVS-17A, NSN 5855-01-474-8904

NOTE: SOPMOD subsystem plans are to supplement currently fielded MNVS with a future Clip-on Night Vision Device (CNVD). This supplementation will eventually lead to full phase-replacement of the MNVS with the CNVD. Offerors may submit proposals for consideration on the future MNVS (or equal-to/better-than equivalent), however current planning contemplates a possible requirement for only limited numbers of MNVS systems for specialized applications and for possible economic repair of existing MNVS systems.

3.3.1.2.1 SUPPLEMENTAL SPECIFICATIONS FOR THE NIGHT VISION SCOPE. In addition to the requirements and desired improvements listed in 3.1 and 3.2 above, the miniature night vision sight capabilities shall demonstrate the following minimum performance (Threshold):

3.3.1.2.1.1 Additional MNVS KPPs:

3.3.1.2.1.1.1 Magnification. The standard magnification shall be 2.25X +/- .15X. (KPP)

3.3.1.2.1.1.2 Weight (with battery and mounting hardware, if required): Weight should be nominally equal to or less than 32 ounces (threshold), 24 ounces (objective), excluding accessories, if any. (KPP)

3.3.1.2.1.2 Additional MNVS APPs:

3.3.1.2.1.2.1 The night vision capability shall meet or exceed performance of a Gen III OMNI V auto-gated image intensification tube. (APP)

3.3.1.2.1.2.2 Field of View (FOV). The Sight shall have a minimum FOV of 17 degrees (Threshold) 30 degrees (Objective) or more. FOV is determined by positioning the Sight on a fixture that provides an azimuth readout accurate to the nearest minute of angle (MOA). The angular measure is obtained by rotating the sight from the position where the objective appears on the right until it disappears on the left. Eye placement will be at the maximum stated eye relief of paragraph 3.3.1.2.2.4. (APP)

3.3.1.2.1.2.3 Eye Relief. The eye relief should be a minimum of 22mm (Threshold) 30mm (Objective) or more. The eye relief shall be considered to be the distance to the viewer’s eye from the nearest hard surface, housing included, at the maximum eye relief where full FOV is maintained. (APP)

3.3.1.2.1.2.4 Performance Capability. The night vision scope shall meet the performance criteria of Table 2: (APP)

	STARLIGHT	¼ MOON
IDENTIFICATION	80 m (T)/150 m (O)	150 m (T)/200 m (O)
RECOGNITION	120 m (T)/200 m (O)	200 m (T)/250 m (O)
DETECTION	165 m (T)/300 m (O)	250 m (T)/325 m (O)

Table 2 – Night Vision Scope Performance Criteria

3.3.1.2.1.2.5 Special tools shall not be required to install, remove, or adjust the MNVS. (APP)

3.3.1.2.1.2.6 The future night vision sight should utilize a reticle design which provides optimized combat suitability. (APP)

3.3.1.2.1.2.7 The future night vision sight should demonstrate a reduction in size and weight when compared to currently available systems. Current Miniature Night Vision Sight specifications require stand-alone weight (including weapon mount, daylight/lens cover, and eyeguard) without batteries to be a maximum 2 pounds (Threshold)/1.5 pounds (Objective). (APP)

3.3.1.2.1.2.8 The future night vision sight should provide the capability to provide multiple magnification levels ranging from 2.5X to 6X, when required by the operator. (APP)

3.3.1.2.1.2.9 The future night vision sight should incorporate a mechanism to allow for the prediction of remaining usable life (eg. shot counter, operational hours meter, etc.) (APP)

3.3.1.3 Clip-On Night Vision Device (CNVD) (NOT CURRENTLY BASELINED)

NOTE: A current CNVD-type system is beginning acquisition and fielding under Solicitation Number N00164-02-R-8512 (24 May 02), however this system

is optimized for sniper rifle (vice M4A1 Carbine) applications. If available during the OT/DT phase of this acquisition, it may be used as a baseline for comparison.

3.3.1.3.1 SUPPLEMENTAL SPECIFICATIONS FOR THE FUTURE CNVD. In addition to the requirements and desired improvements listed in 3.1 and 3.2 above, the miniature night vision sight capabilities shall demonstrate the following minimum performance (Threshold):

3.3.1.3.1.1 Additional CNVD KPPs:

3.3.1.3.1.1.1 The CNVD shall interface with the host weapon Upper Receiver Group (URG) mounting rail via MIL-STD-1913 Rail Interface, mounting in front, or feeding into the objective lens of existing and future optical sights. The CNVD also encompasses clip-on devices that enhance operational effectiveness by supplementing day aiming capability with nighttime aiming capability. Offerors may propose or utilize other supplemental interface surfaces or mechanisms, provided that they also propose a reasonable means for the Government to acquire the intellecgual property rights required to maintain an open architecture for the SOPMOD system. (KPP)

3.3.1.3.1.1.2 Scope Compatibility. The CNVD will function with the following optical sights:

Nomenclature	Stock Number	(KPP)/(APP)
Future ECOS-C	TBD	(KPP)
4x Day Optical Scope	1240-01-412-6608	(KPP)
Reflex Sight CQB	1240-01-435-1916	(APP)
Close Combat Optic, M68	1240-01-411-1265	(APP)
Enhanced Combat Optical Sight-Navy (ECOS-N)	1240-01-495-1385	(APP)

Note: Compatibility with future ECOS-C sight should be evidenced by open architecture design of the CNVD output interface. CNVD is envisioned as a spiral development after selection of the ECOS-C.

Table 3 – CNVD Interoperability

3.3.1.3.1.1.3 Weight (with battery and mounting hardware, if required): Weight should be nominally equal to or less than 28 ounces (threshold), 18 ounces (objective), excluding accessories, if any. (KPP)

3.3.1.3.1.2 Additional CNVD CNVD APPs: The following Clip-on Night Vision capability performance objectives are desired:

NOTES ON CNVD APPs: (1) TECHNOLOGIES. The CNVD requires no specific night vision technology. The CNVD can make use of all or any combination of the following technologies: A) image intensification, (I^2 2) B) thermal imagery (TI), C) image fusion, D) other unknown visual augmentation technology. (2) Rather than specifying technology, performance will be measured. (3) CURRENT STATE OF THE ART. Currently, I^2 is primarily used to identify targets and is the most likely technology to be used by the SOF operator to aim and shoot at night if the mission dictates. Currently, TI is normally used both day and night for detection of targets at long ranges, and to a lesser extent, to aim and shoot. Image Fusion is not yet proliferated on the tactical battlefield, but will most likely be used to optimize both or any combination of I^2, TI, or day or video imagery.

3.3.1.3.1.2.1 I^2 capability should meet or exceed performance of a Gen III OMNI V auto-gated image intensification tube. (APP)

3.3.1.3.1.2.2 I^2 Target Ranges. The I2 capability should meet the performance criteria of Table 4: (APP)

CAPABILITY	STARLIGHT	¼ MOON
IDENTIFICATION	80 m (T)/150 m (O)	150 m (T)/200 m (O)
RECOGNITION	120 m (T)/200 m (O)	200 m (T)/250 m (O)
DETECTION	165 m (T)/300 m (O)	250 m (T)/325 m (O)

Notes: Targets shall be man-sized E-type or F-type.

Table 4 – CNVD I^2 Performance Criteria

3.3.1.3.1.2.3 TI capability will likely be utilized primarily for detection. Therefore, the resolution of the system will be weighed against cost in determining suitability. (APP)

NOTE: Since TI technology will likely be the primary technology used by the operators when detection is necessary, operators will normally use TI technology to detect and track. However, TI may also be used for reconnaissance purposes.

3.3.1.3.1.2.4 TI Target Ranges. The TI capability should meet the performance criteria of Table 5: (APP)

CAPABILITY	HUMAN TEMPERATURE	ENGINE TEMPERATURE
IDENTIFICATION	40 m (T)/100 m (O)	90 m (T)/150 m (O)
RECOGNITION	150 m (T)/200 m (O)	250 m (T)/350 m (O)
DETECTION	300 m (T)/450 m (O)	350 m (T)/500 m (O)

Notes: Targets shall be man-sized E-type or F-type. Engine temperature equivalent to a Humvee running for a minimum of 30 minutes.

Table 5 - CNVD TI Performance Criteria

3.3.1.3.1.2.5 Image Fusion. Image fusion technology is an integration of I^2 and TI technology. As an objective, this technology will be used to enhance the strong points of I^2 and TI in adverse conditions. (APP)

3.3.1.3.1.2.6 The CNVD should be designed to optimize mating requirements with the sights listed in paragraph 3.3.1.3.1.1.2. The CNVD shall be designed to minimize active emissions.

3.3.1.3.1.2.7 Size. As an objective, the size of the CNVD should be nominally equal to or less than 5 inches by 3 inches by 2 inches, excluding accessories, if any. (APP)

3.3.1.3.1.2.8 The future CNVD should incorporate a mechanism to allow for the prediction of remaining usable life (eg. shot counter, operational hours meter, etc.) (APP)

3.3.1.3.1.2.9 The CNVD should not require adjustment for windage and elevation to adapt to the host optical sight. (APP)

3.3.1.4 Back-up Iron Sight (BIS II); BASELINE SYSTEM: NSN 1005-01-449-6306

3.3.1.4.1 SUPPLEMENTAL SPECIFICATIONS FOR THE FUTURE BIS II. In addition to the requirements and desired improvements listed in 3.1 and 3.2 above, the ECOS-C shall demonstrate the following minimum performance characteristics (Threshold):

3.3.1.4.2 Additional BIS II KPPs:

3.3.1.4.2.1 The BIS II is a rear sight. It shall interface with the host weapon Upper Receiver Group (URG) mounting rail via MIL-STD-1913 Rail Interface. (KPP)

3.3.1.4.2.2 Zeroing. The BIS II shall have not less than 26 minutes of angle (MOA). Windage adjustments shall be between 0.5 MOA and 1.0 MOA per uniform increment. Elevation adjustments are optional, however the BIS II elevation must be matched to the centered elevation adjustment point of the current front iron sight, if the BIS offering has no elevation adjustment. Adjustments should provide tactile feedback . (KPP)

3.3.1.4.2.3 Weight: The BIS II shall weigh less than 3.5 oz (T)/2.0 oz (O). (KPP)

3.3.1.4.3 Additional BIS II APPs:

3.3.1.4.3.1 Configuration. The BIS II aperture assembly shall fold to the rear for storage when not in use. The BIS in both folded and up positions shall not interfere with the mounting of other SOPMOD kit accessories. (APP)

3.3.1.4.3.2 Dimensions. The BIS II shall have a maximum length of 2.60 inches (T)/2.30 inches (O) in the folded position. The maximum width of the BIS shall be 2.00 inches (T)/1.80 inches (O). The maximum height of the folded BIS above the rail surface shall be 0.610 inches (T)/ 0.45 inches (O). (APP)

3.3.1.4.3.3 Physical Characteristics. The BIS II, in the up position, shall provide for aperture alignment with the host weapon front sight post for 300 meter battlefield zero. (APP)

3.3.1.4.3.4 Aperture. The BIS II shall exhibit backup sighting capabilities for both short-range rapid shooting and for long range deliberate shooting, e.g., an aperture size of 5mm +/- 0.13 mm for short range shooting and an alternate aperture size of 1.85mm +/- 0.07mm for long range shooting. The future backup iron sight should provide an integrated short and long range capability with improved durability / availability over existing/baseline long-range peep-sight inserts (APP)

3.3.1.4.3.5 The future backup iron sight should exhibit day and night sighting capabilities, but also visual signature control to avoid enemy detection. (APP)

3.3.1.4.3.6 The future backup iron sight should demonstrate an improved capability to maintain the set position (folded or upright) in a simulated combat environment. (APP)

3.3.1.4.3.7 Offerors may also propose a front backup iron sight if their MDNS system operational concept includes a removable front sight. However, the desired MDNS concept would minimize changes to the basic M4A1 URG. (APP)

3.3.1.5 Rail Interface System (RIS II); BASELINE SYSTEM: NSN 1005-01-416-1087 (Baseline)

3.3.1.5.1 SUPPLEMENTAL SPECIFICATIONS FOR THE RAIL INTERFACE SYSTEM, M4A1 CARBINE AND OTHER WEAPONS. NOTES: The SOPMOD program is not seeking alternate sources for systems that duplicate the currently fielded RIS/RAS. The SOPMOD Program instead is seeking alternative mounting subsystems with improved operational performance characteristics. The core requirements for the future RIS are rigidity (no loss of zero due to rough handling), independence of the M4A1 Barrel (no interference with the natural harmonic vibrations of the barrel during firing, and provision for mounting future 6:00 subsystems more closely to the gun barrel (decrease in offset between the 6:00 subsystems and the axis of the bore).

The SOPMOD ORD contains validated requirements for several future subsystems that require placement in the 6:00 forearm rail position. Future required subsystems are:

Future Subsystem	**ORD Paragraph**
Enhanced Grenade Launcher Module (EGLM)	4.b. (1)-(5) Annotated
Integrated Pointer Illuminator Module (IPIM)	4.0
Breaching Shotgun	8.a, Table 1, Item 16

Notes: EGLM is covered under separate Solicitation Number N00164-01-R-0103 and N00164-03-Q-0007. The solicitation for IPIM is embodied herein the MDNS Solicitation. Breaching Shotgun is not a project currently active in SOPMOD, awaiting the development of a viable COTS/NDI system.

Table 6 – Future SOPMOD 6:00 systems

The current and future systems that mount in the 6:00 position will require improved or alternative versions of Rail Interface System (RIS) or Rail Attachment System (RAS) forearm rails. This is required in order to mount the EGLM and the other 6:00 systems to the M4A1 Carbine without interfering with the natural vibrations of the carbine barrel, as well as allowing use of current SOPMOD aiming accessories. Sought are improved/alternative versions the RIS/RAS that will allow the operator to mount and remove the future EGLM and other 6:00 systems in a field environment. A rigid or monolithic interface system is desired that will allow a free-floating carbine barrel, withstand the shock of firing all currently fielded 40mm rounds, and maintain zero repeatability when removed and remounted. While MILSPEC 1913 rails are still required in the 12:00, 3:00, 6:00, and 9:00 positions on the rifle/carbine forearm, alternative intermediate or supplemental interfaces will be considered to allow the EGLM and other 6:00 subsystems to be mounted as closely to the carbine barrel as possible without touching it. Vendors offering such intermediate interfaces must offer to give or sell the interface surfaces (male and female) technical drawings to the government, to allow for open-system architecture.

In addition to the requirements and desired improvements listed in 3.1 and 3.2 above, the RIS shall demonstrate the following minimum performance characteristics (Threshold):

3.3.1.5.1.1 Additional RIS KPPs:

No supplemental KPPs are required over and above those in 3.1 above.

3.3.1.5.1.2 Additional RIS APPs:

3.3.1.5.1.2.1 The future RIS should incorporate design features which improve overall system performance. This may include a rigid, floating barrel design concept. (APP)

3.3.1.5.1.2.2 The future RIS should provide a method to attach future 6:00 systems as close as possible to the carbine barrel without touching it or interfering with the natural barrel vibrations during firing. This attachment method should provide repeatability of the zero of 6:00 systems when attached and detached. The future RIS should contain design features which facilitate cleaning /maintenance of the area between the carbine barrel and the body of the future RIS. (APP)

3.3.1.5.1.2.3 Proposals for the Future RIS should either allow for the attachment of the M203/M203E1 with existing SOPMOD Grenade Launcher Mount, NSN: 1005-01-416-1090 (T) or provide a simple modification plan/mechanism for the of mounting the M203 free of the carbine barrel (T), or both (O). (APP)

3.3.1.5.1.2.4 Design features to improve the durability of the Rail Interface System should be incorporated. (APP)

3.3.1.5.1.2.5 Production cost reduction should be incorporated into the design of the future Rail Interface System. (APP)

3.3.1.5.1.2.6 Windage and elevation adjustments are not applicable to the RIS. (APP)

3.3.1.5.1.2.7 Regarding rail-mounting systems for other weapons, the SOPMOD program is focused on, and will test to, the requirements of the M4A1 Carbine and M4A1 Carbine mated with the M203/EGLM as the central host weapon requirement for MDNS. Nevertheless, a secondary objective of MDNS development is to standardize and acquire MDNS subsystems that are suitable and survivable when in use on as many SOF small arms as possible (see “Host Weapon” in para 6 glossary). Therefore, vendors may propose, and the government may consider, new rail mounting systems for weapons other than the M4A1 carbine under this solicitation.

3.3.2 Group B, Active Miniature Day/Night Sight Subsystems

3.3.2.1 Visible Bright Light III (VBL III); TWO BASELINE SYSTEMS: Visible Light Illuminator (VLI), NSN: 5855-01-448-5464, and Visible Bright Light II (VBL II, LSN: 5855-LL-L99-7589)

3.3.2.1.1 SUPPLEMENTAL SPECIFICATIONS FOR THE VISIBLE BRIGHT LIGHT III. In addition to the requirements and desired improvements listed in 3.1 and

3.2 above, the VBL III shall demonstrate the following minimum performance characteristics (Threshold):

3.3.2.1.1.1 Additional VBL III KPPs:

3.3.2.1.1.1.1 The VBL III shall interface with the host weapon Upper Receiver Group (URG) mounting rail via MIL-STD-1913 Rail Interface System (RIS). (KPP)

3.3.2.1.1.1.2 Switching Devices. The light shall include an integral constant on/off switch that shall also have a momentary pressure switch capability. The on/off switch shall be replaceable with or complemented by a remote pressure switch. The pad shall be of tactile design so that the operator can feel when the pad is activated. Water immersion to a depth of 66 feet shall not activate any switches. (KPP)

3.3.2.1.1.1.3 Weight (with battery and mounting hardware, if required): Weight should be nominally equal to or less than 14 ounces (threshold), 10 ounces (objective), excluding accessories, if any. (KPP)

3.3.2.1.1.2 Additional VBL III APPs:

3.3.2.1.1.2.1 Light Source. The light source shall be replaceable under field conditions. The light source shall provide white light, be shock mounted, and exhibit a Mean Time to Failure of 10 hours (T)/300 hours (O). (APP)

3.3.2.1.1.2.2 Filters. The light shall include an IR filter compatible with Gen III night vision, red filter, and an opaque cover. All filters shall be interchangeably mounted to the light bezel. Each filter shall be quickly removable. The IR filter should minimize visible light emission. The red filter should cast a beam allowing maintenance of night adapted eyesight and reduced reflection off airborne particulates. The opaque cover should block all emissions. (APP)

3.3.2.1.1.2.3 Brightness. The light output shall be 60 lumens or greater (T)/100 lumens or greater (O). The VBL III shall emit a wide-angle background beam with an operationally suitable overall beam size, brightness, and tightly focused central beam with uniform beam quality. The light shall be capable of determining friend/foe at 50 meters range (T) to 100 meters range (O). (APP)

3.3.2.1.1.2.4 The VBL III does not need to be adjustable for windage and elevation. (APP)

3.3.2.1.1.2.5 The VBL III should have a maximum body/bezel diameter of 1.3 inches and a maximum length of 6.5 inches. (APP)

3.3.2.1.1.2.6 The VBL III shall able to operate, without a change of batteries, full continuous “on” for a minimum of 1 hour (T) / 3 hours or more (O).

3.3.2.2. Infrared Target Pointer/Illuminator/Aiming Laser (ITPIAL II); BASELINE SYSTEM: AN/PEQ-2, NSN 5855-01-422-5253

3.3.2.2.1 The future infrared pointing, illuminating, and aiming Laser may

be achieved either through a supplement and eventual phase-replacement of the current ITPIAL AN/PEQ-2, or through the incorporation of the ITPIAL capability into an Integrated Pointer Illuminator Module (IPIM) that combines other active capabilities, or both. The supplemental specifications below will apply to the ITPIAL II /IPIM. In addition to the requirements and desired improvements listed in 3.1 and 3.2 above, the ITPIAL II / IPIM shall demonstrate the following minimum performance characteristics (Threshold):

3.3.2.2.1.2 Additional ITPIAL II / IPIM KPPs:

3.3.2.2.1.2.1 Markings. Any incorporated laser shall have a positive "off" position. All adjustments shall be labeled. The laser shall be clearly marked to show muzzle direction when installed. The laser shall have identification/power level markings in accordance with U.S. regulatory agency requirements. (KPP)

3.3.2.2.1.2.2 Eye Safe. The ITPIAL II /IPIM shall have the capability to switch into an eye safe training mode. The switch should be fail-safe and be clearly identifiable at all times, including use at low light conditions and with night vision goggles. (KPP)

3.3.2.2.1.2.3 Adjusters. Each infrared laser source shall be independently adjustable with the following characteristics. All controls and adjustments shall operate smoothly and be adjustable without the use of tools or accessories. Azimuth and Elevation adjusters shall move the beams at a rate of 0.4 milliradians/click. Each adjuster shall be marked to display "point of impact" movement used in the zeroing procedure. (KPP)

3.3.2.2.1.2.4 Weight of ITPIAL II /IPIM (with battery and mounting hardware, if required): Weight should be nominally equal to or less than 24 ounces if in IPIM configuration, 6 ounces if in ITPIAL II configuration, excluding accessories, if any. (APP)

3.3.2.2.1.3 Additional ITPIAL II /IPIM APPs:

3.3.2.2.1.3.1 Aiming Laser. The ITPIAL II /IPIM shall contain a narrow beam laser utilized for aiming and/or pointing when used for weapon mounted and/or handheld applications. (APP)

3.3.2.2.1.3.1.1 Aiming Laser Output Power. The output power of the infrared aiming laser of the ITPIAL II /IPIM shall be switch selectable for two levels of operation. The low power level shall be 600 microwatts (+/- 100 microwatts) continuous. The high power level shall be 25 milliwatts (+10/-2.5 milliwatts) continuous. (APP)

3.3.2.2.1.3.1.2 Aiming Laser Beam Divergence. The beam divergence of the aiming laser shall be 0.5 +/- 0.3 milliradians (T) / 0.5 +/- 0.1 milliradians (O). (APP)

3.3.2.2.1.3.2 Illumination Laser. The illumination laser shall be a variable divergence assembly utilized for infrared illumination of targets. (APP)

3.3.2.2.1.3.2.1 Illumination Laser Output Power. The output power of the illuminating laser shall be 30 +15/-6 milliwatts continuous. (APP)

3.3.2.2.1.3.2.2 Illumination Laser Beam Divergence. The beam divergence of the illuminating laser shall be variable from a minimum of no more than one milliradian to a maximum of no less than 105 milliradians. The infrared system shall have markings indicating the minimum and maximum illumination angle settings. The total range of beam divergence shall be adjustable through a maximum of two 360 degree rotations. The laser illumination field shall be circular in shape. No hot spots or secondary beams shall be detectable with night vision goggles under any conditions. (APP)

3.3.2.2.1.3.3 Output Peak Wavelength. The infrared system shall have an output peak wavelength of 830 +20/-10 nanometers at ambient temperature. (APP)

3.3.2.2.1.3.4 Battery Life. ITPIAL II /IPIM shall maintain output power requirements while in dual high mode operation on a single set of batteries for a minimum of one hour (T) / four hours (O) at ambient temperature. (APP)

3.3.2.2.1.3.5 Mode Switch. The infrared system shall have a single mode selector switch which will allow the operator to select one of six modes to include off, aiming laser low power, aiming laser high power, illuminating laser, dual aiming/illuminating laser low power, and dual aiming/illuminating laser high power. The switch position must be detectable in “zero” light conditions. (APP)

3.3.2.2.1.3.6 Exit Port Covers. An exit port cover which is permanently attached to the infrared system at two or more points shall be provided for each laser port and prevent access by any part of the body to any laser radiation in excess of the ANSI Z136.1 exposure. The exit port cover for the illuminator shall include a diffuser for wide angle (>45 degree) illumination. Exit port covers shall be designed to prevent any degradation of performance or interference with laser or weapon operation while in an open position. (APP)

3.3.2.2.1.3.7 The ITPIAL II /IPIM should have a at least one mode that provides pointing range at night to 5 kilometers (O). (APP)

3.3.2.2.1.3.8 The ITPIAL II /IPIM should provide interchangeable pattern generators and variable pulsing characteristics. (APP)

3.3.2.3 Visible Laser, Carbine Visible Laser II (CVL II); BASELINE SYSTEM: AN/PEQ-5, NSN 5860-01-439-5409

NOTE: The future visible laser aiming capability may be achieved either through a supplement and eventual phase-replacement of the current CVL AN/PEQ-5, or through the incorporation of the CVL II capability into an Integrated Pointer Illuminator Module (IPIM) that combines other active capabilities, or both. The supplemental specifications below will apply to the CVL II/IPIM. Supplemental specifications for the CVL II/IPIM:

3.3.2.3.1 SUPPLEMENTAL SPECIFICATIONS FOR THE CVL II In addition to the requirements and desired improvements listed in 3.1 and 3.2 above, the ITPIAL II / IPIM shall demonstrate the following minimum performance characteristics (Threshold):

3.3.2.3.1 Additional CVL II KPPs:

3.3.2.3.1.1 The CVL II shall have a positive “off” position. All adjustments shall be labeled. The laser shall be clearly marked to show muzzle direction when installed. The laser shall have identification/power level markings in accordance with U.S. regulatory agency requirement. (KPP)

3.3.2.3.1.2 Weight (with battery and mounting hardware, if required): Weight should be nominally equal to or less than 24 ounces if in IPIM configuration, 9 ounces (threshold) / 4 ounces (objective) if in CVL II configuration, excluding accessories, if any. (KPP)

3.3.2.3.2 Additional CVL II APPs

3.3.2.3.2.1 Laser Beam. The CVL II beam shall contain 90% of total energy within a beam divergence not more than 0.5 milliradians +/- 0.3 milliradians (T) / 0.5 milliradians +/- 0.1 milliradians (O). The CVL II shall exhibit uniform beam quality. The laser shall exhibit minimal off-axis visible light emissions. (APP)

3.3.2.3.2.2 The CVL II should demonstrate the capability to use out to ranges up to 500 meters. (APP)

3.3.2.3.2.3 The CVL II should provide improved power consumption over currently available items. (APP)

3.3.2.3.2.4 The CVL II should provide improved performance/reflectivity of visible lasers against green and black targets as compared to currently available items. (APP)

3.3.2.3.2.5 The CVL II should provide improved compatibility with laser eye protection over currently available items. (APP)

3.3.2.3.2.6 The CVL II should have the capability to switch into an “eye safe” training mode. (APP)

3.3.3 Notes on Other Subsystems and Configurations:

This specification is focused on the supplement or phase-replacement of the existing core baseline systems described in 3.3.1 and 3.3.2 above, however this is not meant to discourage offerors from proposing new subsystems, accessories, parts and components that could provide or contribute to the overall capability of miniature day / night sighting of the M4A1 carbine and other SOF Small Arms.

3.4 Environmental Performance Requirements (Common to All MDNS Subsystems) [APP]

NOTE: Environmental Performance Requirements may or may not be verified through testing based upon availability of resources.

3.4.1 Electromagnetic Performance Parameters (Applicable to CNVD, MNVS II, ITPIAL II, and CVL II only) (APP)

3.4.1.1 Radiated Emissions. While operating, radiated electric field emissions emanating from the EGLM shall not exceed the limits of Figure RE102-4 of MIL-STD-461E (Navy Mobile and Army) when tested in accordance with test method RE102 of MIL-STD-461E. (APP)

3.4.1.2 Conducted Emissions. When connected to external power sources, the EGLM system shall not exceed the limits of Figure CE102-1 of MIL-STD-461E when tested in accordance with test method CE102 of MIL-STD-461E. If the unit is not connected to external power sources, then this requirement is inapplicable. (APP)

3.4.2 Radiated Susceptibility. The EGLM system shall not exhibit signs of susceptibility when subjected to the electric fields outlined in tables 4 and 5, when tested in accordance with test method RS103 of MIL-STD-461E. (APP)

Frequency Range (MHz)	RMS Field Strength (V/m)	Amplitude Modulated (AM) Field Strength (V/m) 1/	Polarity
1 – 20	100	200	Vertical
20 – 100	200	200	Horizontal and Vertical
100 – 1000	200	400	Horizontal and Vertical

NOTES:

1. Either the RMS Field or the AM Field shall be used, but only one is required. The RMS field is defined as non-AM, and the AM is as defined in test method RS103 of MIL-STD-461E.

Table 7 – Electromagnetic Radiation Hazard

3.4.2 Environmental Performance Parameters: The MDNS shall meet the performance requirements specified in tables 8 and 9 below: [APP]

Environmental Factor	*Recommended test Severity*	*Reference*
Low pressure	35,000 ft ASL equivalent at -57°C	MIL-STD-810F Method 500.1, Procedure I
Low Temperature	-46°C -30°C, ≥ 12 h or until temperature is stable	MIL-STD-810F Method 502.3, Procedure I
High Temperature	+71°C storage +49°operational	MIL-STD-810F Method 501.3, Procedure I
Temperature Shock	+71°C/-51°C, 3 cycles á 24 h	MIL-STD-810F Method 503.3
Solar radiation	1120 W/m^2 at +42°C during 3 h	MIL-STD-810 F Method 505.3, Procedure I

Table 8 - Environmental Requirements List #1

Environmental Factor	Recommended test Severity	Reference	Remarks
Humidity	+30°C/+60°C, 85-95 % RH, 10 days	MIL-STD-810F Method 507.3, Procedure II	
Rain	100 mm/h during 20 min plus wind 20 m/s	MIL-STD-810F Method 506.3, Procedure I	
Immersion	66 feet of salt water for 2 hours		
Ice	Ice 20 mm (6+13) thickness	MIL-STD-810F Method 521.1	Ice removal is permitted.
Salt fog	5 % NaCl, +35°C for 48 h	MIL-STD-810F Method 509.3	

Table 9 – Environmental Requirement List #2

3.4.3 The MDNS components shall meet the shock and vibration requirements listed in Table 10 below [APP]:

Environmental Factor	Reference
Vibration	MIL-STD-810F Method 514.5, Category 10, Procedure I
Rough Handling	MIL-STD-810F Method 514.5, Category 5, Procedure II
Drop Test Un-packaged	1 meter drop onto polyethylene foam backed by ¾ inch plywood and concrete.

Table 10 - Shock and Vibration Requirements Listing

3.4.4 Firing Schedules. As a minimum, all optics shall be capable of meeting the following firing schedules:

3.4.4.2 Endurance Firing Schedule for the M4A1. Firing shall be accomplished in 50 cycles using 30 round magazines. One (1) firing cycle shall be as specified in Table 11. Cooling of the barrel shall be to the point that it is capable of being held by the bare hand. Supplemental cooling is permissible in the hand guard area.

30 ROUND MAGAZINE	REMARKS
30 Rounds	Automatic - bursts of approximately 5 rounds each.
30 Rounds	Automatic - one continuous burst.
30 Rounds	Semi-Automatic - rate of 10 to 30 rounds per minute.
30 Rounds	Semi-Automatic - rate of 10 to 30 rounds per minute

120 Rounds Total per Firing Cycle

Table 11 Firing Schedule

3.4.4.3 Endurance Firing Schedules for other SOF Host Weapons may also be applied at the discretion of the Operational Evaluation Team (OET), and Technical Evaluation Team (TET), and data thus obtained may be used for "Best Value" source selection information.

3.5 External Interface Requirements (Common to All MDNS Subsystems):

3.5.1 MDNS subsystems shall be mounted for use on the host weapon using MIL-STD-1913 interfaces (O). No MDNS subsystem will be accepted that contains interfaces that are not reasonably available to the Government, or contain other impediments to maintaining the open architecture of the SOPMOD System (T). MDNS subsystems shall be detached and reattached at least five times and maintain bore-sight within 0.5 MOA of accuracy (O). [KPP]

3.5.2 Host Weapon Interface: When mounted to any host weapon, will not interfere with the normal function of the host weapon. [APP]

3.6 Operating Safety and Complexity (Common to All MDNS Subsystems)

3.6.1 Safety: The MDNS shall not pose a safety hazard to the operator during handling, transportation, storage and use. [KPP]. The MDNS system shall conform to the following TECOM safety guidelines:

3.6.1.1 Safety System Requirements: The MDNS shall comply with the requirements specified in MIL-STD-882D and TOP 3-2-045. (KPP)

3.6.1.3 Laser Safety: All lasers shall conform to the requirements of OPNAVINST 5100.27. Any proposal containing laser devices shall include proposed laser hazard classification and appropriate safety parameters. [KPP]

3.7 Design and Construction (Common to All MDNS Subsystems)

3.7.1 Rough Handling: The MDNS design shall withstand rough handling with no physical damage, degradation in accuracy or physical damage other than normal scratches to the protective coating. [APP]

3.7.2 Labeling: Each item shall have an individual serial number and warranty expiration date applied in accordance with MIL-STD-130K. Lasers shall contain appropriate warning/caution labels. [APP]

3.7.3 Workmanship: The MDNS shall conform to requirements of ANSI IPC J-STD-001A. [APP] Manufacturers and assemblers of the MDNS shall ensure:

3.7.3.1 Surfaces are continuous and free from pits, scratches, and gouges

3.7.3.2 Threaded fasteners are torqued in accordance with industry standards or as specified in the maintenance manual.

3.7.3.3 Seals are tight and will preclude leaks

3.7.4 Interchangeability: The MDNS design and ILS programs shall conform to the guideline 7 of MIL-HDBK-454A. The system design and ILS program shall ensure that the device assemblies, sub-assemblies and replacement parts physically and functionally interchange at the LRU level without modification of the fielded equipment. [KPP]

3.7.5 Oil, Solvent, and Other Chemical Compatibility: MDNS subsystems and shall not deteriorate due to exposure to solvents used in weapon cleaning, weapons lubricants, insect repellent, camouflage stick, common commercial camouflage paints, or any other chemicals or compositions that are common in combat environments (O). The MDNS maintenance manuals shall define compatible oils, solvents, and chemicals, and clearly define any restrictions (T). [APP]

3.7.6 MDNS internal and external components shall use coatings to protect the base materials from corrosion. [APP]

3.7.7 Ozone Depleting Chemicals (ODCS): ODCs shall be avoided whenever possible. [APP]

3.8 Schedule (Common to All MDNS Subsystems)

3.8.1 Schedule will be evaluated based on the vendor’s ability to deliver first article and production hardware in accordance with established schedule guidelines. Vendors who can demonstrate an ability to deliver hardware at the objective schedule deadlines will receive a more favorable rating than those who can only meet the threshold schedule deadline. Schedule deadlines will be based on number of days after issuance of contract delivery orders.

3.9 Spiral Development. Spiral Development is an acquisition and design concept whereby a core capability can be tested and fielded rapidly, with later refinements or supplemental developments instituted later as they mature. Favorable consideration will be given to those vendors who can demonstrate the ability to meet performance objectives or provide other applicable improvement to core capabilities through the process of spiral development. Cost, Schedule, and Performance will be key evaluation criteria for spiral development proposals.

4. VERIFICATION (Common to All MDNS Subsystems)

4.1 System and Sub-System Qualification and Verification: During design, test and manufacture of the MDNS, the MDNS supplier shall develop a sub-system verification test matrix. The MDNS supplier shall validate sub-system key performance parameters of during assembly/ disassembly and

maintenance during DT, OT and Production Assurance Testing and Evaluation (PAT&E).

4.2 Developmental Testing (DT): The technical performance of selected MDNS subsystems will be validated during developmental testing in accordance the requirements listed in this specification. The material developer may validate other requirements through analysis. If necessary, DT will incorporate "fix-to-shoot" methodology to complete each round of testing. The fix-to-shoot approach allows test technicians to perform rapid corrections or repairs to broken or malfunctioning test articles to allow the articles to complete testing. The degree of correction/repair will be dependent upon the test site's capability and vendor interaction. The Government seeks a "Best Value" acquisition. The Government may therefore consider innovative technical capabilities related to, but not envisioned or specifically called out by this specification. Therefore, offerors may include other closely related combat capabilities in the systems that they offer for DT. DT may implement exploratory testing on ancillary or alternative capabilities offered over and above this specification's requirements. Exploratory DT results may be used for source selection information.

4.3 Operational Testing (OT): The results of actual special operations scenarios during OT&E shall be included in both KPP and APP evaluation. An independent Operational Test and Evaluation (OT&E) activity will develop a test plan containing measurable operational criteria. Test Plans will utilize STRAC Manual Chapter 5, Infantry Weapons Systems, and will comply with U.S. Code Title 10 and applicable supplemental regulations and documents (see references). Effectiveness and Ease of Use Test samples will undergo OT in accordance with approved Operational Test Plans. As in DT (above), the fix-to-shoot approach allows operational test technicians to perform rapid corrections or repairs to broken or malfunctioning test articles to allow the articles to complete testing. The degree of correction/repair will be dependent upon the test site's capability and vendor interaction. The Government seeks a "Best Value" acquisition. The Government may therefore consider innovative technical capabilities related to, but not envisioned or specifically called out by this specification. Therefore, offerors may include other closely related combat capabilities in the systems that they offer for OT. OT may implement exploratory testing on ancillary or alternative capabilities offered over and above this specification's requirements. Exploratory OT results may be used for source selection information.

4.4 Production Assurance Testing and Evaluation (PAT&E)

4.4.1 Quality Assurance Procedures: MDNS contractors selected for Low-Rate Initial Production (LRIP) and Full Rate Production (FRP) Delivery Orders shall develop Quality Assurance Provisions for the respective MDNS subsystem and for any component elements integrated into the total subsystem. These Quality Assurance Provisions shall include at least, but not only, manufacturing and assembly controls as well as procedures for factory acceptance tests which includes actual function fire and structural integrity inspection, such as Magnetic Particle, Dye Penetrant, etc. Each sub-system supplier will conduct and document factory acceptance testing prior to shipment of the product.

4.4.2 Quality Control and Production Acceptance Plans: The MDNS prime contractors shall develop the Quality Control and Acceptance Plans on serial production lots. The Quality Control and acceptance plans will conform to standardized sampling plans that include functional testing to confirm (1) the correct assembly of the system (2) the function of subsystem components and (3) transmission of all interface signals between sub-system. Manufacturing and assembly controls shall include the establishment of capable processes with attention to continuous process improvement. The quality system shall contain a method for monitoring and controlling critical processes and product variation, including provisions for effective root-cause analysis and corrective action.

4.4.3 Quality Consistency and Configuration Control Records: The MDNS prime contractors will maintain a listing of all subsystems produced, by serial number, if applicable, or by lot number if items are not serialized. This includes initial prototypes, LRIP subsystems, and FRP subsystems. Initial prototype listings will contain a basic prototype description, and any deviations from the description that may apply to individual prototypes. The configuration control record will describe, by individual serial number (or lot number, for un-serialized items) any changes from the prototype baseline configuration to establish the LRIP baseline configuration, any additional further changes to establish the FRP baseline, and any changes cut into production at any point that materially deviate from the established baseline(s).

5. Preparation for Delivery (Common to All MDNS Subsystems)

5.1 Basic Issue Items: The contractor shall provide a cleaning kit and operator’s manuals with each unit. Subsystems with exposed optical surfaces will be issued with a lens cleaning kit. The lens cleaning kit shall consist of a 1 ounce plastic bottle of anti-fog solution, lens brush, and lens cleaning paper booklet and fit within the soft carrying case (O). Basic Issue Items should be proposed as separate CLIN’s. (APP)

5.3 Storage and Transport Cases: MDNS subsystems must survive military methods of transport/infiltration to include HMMWV, cargo aircraft, helicopters, static line airborne operations, Fast Boats, and Submersible Diving Vehicles (SDVs). The contractor shall provide a rugged storage case to store/transport each subsystem. Subsystems with a production unit cost of $400.00 or more will also be issued with a soft carrying case. The padded soft carrying case provides space for all components of the proposed MDNS subsystem. The case shall be made of nylon with closed cell foam padding. It shall also have two ALICE clips on its rear surface for web belt mounting, a zipper closure, and a FASTEX style clip (O) (APP). Storage and Transport Cases should be proposed as separate CLIN’s. (APP)

5.4 Commercial Packaging: Commercial Packaging shall insure that the product does not degrade during transport and storage for a period of up to 9 months. Commercial packaging shall preclude degradation encountered in outdoor storage for up to 6 months. The commercial packaging must preclude oxidation of metals.

6. Notes (Common to All MDNS Subsystems)

6.1 Operator's Manual: Each MDNS subsystem shall include an operator's manual conforming to the requirements of MIL-PRF-63016B(TM), Type 10. In addition to a hard copy manual to be provided with each delivery item, an electronic version of the manual in Microsoft Word™, complete with line drawings, shall be supplied. The Operator's Manual shall be no larger than 4 ½ X 6 inches.

6.2 Lubrication/Cleaning: The MDNS shall not require excessive oil or non-standard or unsafe lubricants or cleansers on any parts.

6.3 Marking: The system shall conform to the requirements of MIL-STD-130K (Identification Marking of U.S. Military Property).

6.4 Key Definitions: The following terms are defined below:

Engagement Hit: A engagement hit is defined as a round striking within 5 meters of the E sized silhouette target where fragmentation of a 5 foot burst radius would strike the E sized silhouette target.

Weapon Stoppage: Any event that stops the soldier from successfully chambering or firing the weapon. Stoppages must be cleared by the operator within 10 seconds in an operational environment. Any stoppage that is deemed munitions-related shall not count as a stoppage.

Weapon Failure: Where the operator is unable to clear a stoppage within 10 seconds or any circumstances that requires the operator to replace parts prior to firing. Any failure to fire, which is deemed munition related, shall not count as a failure.

Failure (electronic): The failure of the fire control to provide for an electronic aim-point.

Zero/Trim: The process of adjusting the actual fall of shot to the sight solution.

Accuracy: Accuracy is defined as the miss distance between the aim-point of the MDNS-system and the center of a population of hit points.

Dispersion: The fall of population within a specified limit.

1σ Dispersion: 68.26% of a population shall fall within a 1σ limit

2σ Dispersion: 95.44% of a population shall fall within a 2σ limit

Lot-to-Lot Dispersion: Is the miss distance between a population of hits and the model solution for a type of ammunition.

Host Weapon: Threshold Host Weapons are the M4A1 Carbine and the M4A1 Carbine, performing while mated with an M203-series Grenade Launcher. No sighting systems for the M203 series are sought in this solicitation. Objective Host Weapons may include any of the following weapons M3 MAAWS, M14 Rifle, M16 series rifles, M40, M240 MG, AK47 & AK74 Series Assault Rifles, AT4, M249 MG, M60 MG, Mk11 Rifle, Mk12 Rifle, Mk43 MG, Mk19 MG, Mk43 MG, Mk46 LMG, Mk48 LMG, M72 LAW, Remington 870 Series Shotguns,

Mossburg 500 Series Shotgun, .300WinMag Sniper Rifle, M2 .50 Caliber MG, and M88 PIP .50 Caliber Sniper Rifle. Objective Host Weapons may or may not be utilized in testing of MDNS subsystems, depending on that nature of proposals and the availability of resources.

Time-to-Kill: The average time required to hit multiple targets, at varying ranges.

Reference Lot: A lot of know dispersion error from the ballistic table.

Fix-to-Shoot: A test methodology wherein the test activity may, at their discretion, perform simple mechanical repairs to hardware in the event of unforeseen failures in order to complete a test sequence.

Identification: Discrimination between recognizable objects as being friendly or enemy, or the name that belongs to the object as a member of a class. Also called ID.

Recognition: The determination that an object is similar within a category of something already known; e.g., tank, truck, man.

Detection: The perception of an object of possible military interest but unconfirmed by recognition.

6.5 Abbreviations

AC	Alternating Current
ACOG	Advanced Combat Optical Gunsight
AM	Amplitude Modulated
ANSI	American National Standards Institute
AOS	Angle of Sight
APP	Additional Performance Parameter
ARDEC	Armament Research Development and Engineering Center
ASTM	American Society for Testing and Materials
BIS	Backup Iron Sight
BII	Basic Issue Items
BIT	Built In Test
CAIV	Cost As an Independent Variable
CCOS	Lose Combat Optical Sight
CFR	Code of Federal Regulations
CLIN	Contract Line Item Number
CNVD	Clip-On Night Vision Device
COIC	Critical Operational Issues and Criteria
COTS	Commercial Off-The-Shelf
CQB	Close Quarters Battle
CVL	Carbine Visible Laser
DC	Direct Current
DODIC	Department of Defense Identification Code
DOS	Day Optical Scope
DT	Developmental Testing
DODISS	Department of Defense Index of Specifications and Standards
ECOS	Enhanced Combat Optical Sight
EMD	Engineering and Manufacturing Development
EMP	Electromagnetic Pulse
EMRH	Electromagnetic Radiation Hazard
EMRO	Electromagnetic Radiation Operational

ETS	Engineering Test Sample
FOV	Field of View
FRP	Full Rate Production
GFE	Government Furnished Equipment
HE	High Explosive (Anti Personnel)
HEDP	High Explosive Dual Purpose
I2	Image Intensification (or Image Intensifier)
ICD	Interface Control Document
ID	Identification
ILS	Integrated Logistics Support
INOD	Improved Night Observation Device
IPIM	Integrated Pointer/Illuminator Module
IR	Infrared
ITPIAL	Infrared Target Pointer/Illuminator/Aiming Laser
KPP	Key Performance Parameter
LORA	Level of Repair Analysis
LOS	Line Of Sight
LRF	Laser Range Finder
LRIP	Low Rate Initial Production
LRU	Line Replaceable Unit
MAIS	Major Automated Information System
MDAPS	Major Defense Acquisition Program
MDNS	Miniature Day/Night Sight
MHz	Megahertz
MICH	Modular Integrated Communications Helmet
MILES	Military Engagement Simulator
MNVS	Miniature Night Vision Sight
MOA	Minute of Angle
MOPI	Manual of Proof and Inspection procedures
MRBF	Mean Rounds Between Failure
MRBS	Mean Rounds Between Stoppage
MTBF	Mean Time Between Failure
MTTR	Mean Time To Repair
N/A	Not Applicable
NBC	Nuclear Biological Chemical
NDI	Non Developmental Item
NVD	Night Vision Devices
O	Objective
ODC	Ozone Depleting Chemical
OET	Operational Evaluation Team
ORD	Operational Requirements Document
OT	Operational Testing
OT&E	Operational Testing and Evaluation
OTB	Over The Beach
PAT&E	Production Assurance Testing and Evaluation
PASGT	Personnel Armor System Ground Troops
PMO	Program Management Office
RIS	Rail Interface System
RMS	Root Mean Square
SDVS	Submersible Diving Vehicle
STANAG	NATO Standardization Agreement
STRAC	Standards in Training Commission
SOF	Special Operations Forces
SOPMOD	Special Operations Peculiar Modification
T	Threshold
TBD	To Be Defined

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TECOM	Test and Evaluation Command
TET	Technical Evaluation Team
TI	Thermal Imagery
URG	Upper Receiver Group
USAF	United States Air Force
USC	United States Code
VBL	Visible Bright Light
VLI	Visible Light Illuminator