# PERFORMANCE SPECIFICATION
# FOR
# Enhanced Combat Optical Sight – Optimized (ECOS-O)

## 1. SCOPE
**Address**

### 1.1. Scope of Specification.

This specification establishes the performance requirements of the Enhanced Combat Optical Sight-Optimized (ECOS-O). This performance specification will be the basis of a new solicitation. The system mission of the ECOS-O is to provide optical targeting from 0-300 meters and optically enhanced targeting from 300 to 1000 meters.

#### 1.1.1. Applicable Weapons.

The role of the ECOS-O is specifically to provide an improved targeting capability for small arms. The threshold Host Weapons are the M4A1 Carbine, and the M4A1 Carbine performing while mated with the M203, M203A1 or M320, M320A1 Grenade Launcher. The MK16 and MK17 Combat Assault Rifles (CAR), and the MK16 and MK17 CARs performing while mated with MK13 Enhanced Grenade Launcher Module. Objective Host Weapons that may coincidentally utilize the ECOS-O and include any of the small arms, such as the M14 Rifle, M16 series rifles, M40, M240 MG, AK47 & AK74 Series Assault Rifles, M249 MG, M60 MG, Mk11 Rifle, Mk12 Rifle, Mk43 MG, Mk19, Mk46 LMG, Mk48 LMG, 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 the ECOS-O, depending on that nature of proposals resulting from this solicitation and the availability of resources.

#### 1.1.2. Baseline System

The SU-230/PVS Articulated Telescope NSN 1240-01-533-0939 and the SU-230A/PVS Articulated Telescope NSN 1240-01-545-5813 are the baseline systems that the ECOS-Owill be compared against. The ECOS-O will improve upon the current baseline system in terms of cost, schedule, and performance.

### 1.2. Basic Terminology.

Because operational testing will assess the ability of the system(s) to meet the production threshold values as defined by the Thresholds/Objectives requirements.

#### 1.2.1. 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)**.

### 1.3. 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. Section 3 is the core of the performance specification. It provides detailed requirement definitions. Section 3 will be separated into three separate requirements consisting of the System requirement, Scope requirement, and Sight Requirement. Section 4 is the verification section, which contains information of all inspections to be performed to determine that the item to be offered for acceptance conforms to the requirements in Section 3. Section 5 is the packaging section, which contains information on preparation for delivery (Common to All MDNS Subsystems), Basic Issue

Items, Storage/Transport Cases, and commercial packaging requirements. how the items shall be packaged. Section 6 is the notes section, which contains 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. General.

The documents listed in this section are listed in this specification. This section does not include documents recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in section 3, 4, or 5 of this specification whether or not they are listed herein.

### 2.2. Government Documents

#### 2.2.1. Specifications and standards.

The following specifications and standards form a part of this document 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:**

| | |
|---|---|
| FED-STD-595C | Colors Used In Government Procurement, 16 JAN 2008 |
| MIL-HDBK-454B | General Guidelines for Electronic Equipment, 15 APR 2007 |
| MIL-STD-130N | Identification Marking of U.S. Military Property, 17 DEC 2007 |
| MIL-STD-1913 | Dimensioning of Accessory Mounting Rail for Small Arms Weapons, 3 FEB 1995 |
| MIL-STD-40051-2 | DOD Standard Practice Technical Manuals, 21 MAR 2008 |
| MIL-STD-464 | Electromagnetic Environmental Effects Requirements for Systems, 18 MAR 1997 |
| MIL-STD-810G | Environmental Engineering Considerations and Laboratory Tests, 31 OCT 2008 |
| MIL-STD-882D | System Safety, 10 FEB 2000 |
| TOP 3-2-045 | Automatic Weapons, Machineguns, and Hand and Shoulder Fired Weapons, 17 SEP 2007 |

### 2.3. Order of precedence.

In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained. Copies of military specifications and standards are available from: Standardization Document Order Desk, 700 Robbins Ave., Bldg #4, Section D, Philadelphia, PA 19111-5094.

## 3. Requirements

Product Definition: MDNS development includes new items or the adaptation of NDI/COTS items to provide miniaturized day and night small arms sighting capabilities to operators. The technological objective of the ECOS-O is to provide not only a rapid, short to mid-range deliberate aiming capability (as in the current Red-Dot Reflex, Day Optic Sight (DOS), and Articulated Telescopes respectively), but also an extended long range, positive, rapid aiming capability out to the maximum effective range of the ammunition and weapon platform. This expanded engagement zone capability is desired in a single tactically compact ECOS-O subsystem, eliminating the need for two different optical sights by providing a single sight capable of both types of aiming.

### 3.1 ECOS-O System Requirements

The ECOS-O System consists of both the ECOS-O Combat Scope and an ECOS-O CQB Sight. As such, the ECOS-O system requirements are applicable to the individual ECOS-O Scope and ECOS-O Sight, in addition to the overall ECOS-O System.

#### 3.1.1 Configuration

The ECOS-O shall consist of two subsystems: an optimized Combat Scope and an optimized CQB Sight which can be integrated onto the host weapon system to satisfy the requirements identified in this document (T). The ECOS-O system shall consist of a single integrated system which satisfies the requirements for an optimized Combat Scope and an optimized CQB Sight identified in this document (O).

#### 3.1.2 Endurance

The ECOS-O shall exhibit recoil shock endurance sufficient to allow use on all small arms. See also 3.4 below. The ECOS-O shall be fully functional for a minimum of:

10,000 rounds (**T**), 30,000 rounds (**O**) 7.62mm ball on the MK17 rifles.

5,000 rounds (**T**), 10,000 rounds (**O**) of 40mm HEDP on the MK17 equipped with an MK13 Enhanced Grenade Launcher Module.

#### 3.1.3 Bore-Sight Retention

The ECOS-O shall retain a zero position within 0.5 m milliradians after being subjected to a cumulative shock of 500 rounds fired through the host weapon system and shock testing (T).

#### 3.1.4 Accuracy

When installed on the host weapon system, the ECOS-O shall not degrade the operator's accuracy.

#### 3.1.5 Reliability

The ECOS-O shall have a 90% probability of operating 36 hours on a 3-day mission without failure (T). The ECOS-O shall have a 90% probability of operating 48 hours on a 3-day mission without failure (O).

#### 3.1.6 Combat Scope/CQB Sight Interoperability

DRAFT

When ECOS-O is installed on the host weapon system, the operator's scene as viewed through the CQB sight shall not be more than ¼ obscured by any part of the Combat Scope and may only be obscured in the bottom ¼ of the sight picture (T).

### 3.1.7 Combat Helmet and NVG Interoperability

When ECOS-O is installed on the host weapon, the operator shall be able to target objects through the Combat Scope with no interference issues with the Combat Helmet and ECOS-O system and target objects through the CQB Sight while wearing NVGs with no interference between the NVG and ECOS-O system (T).

### 3.1.8 Switches and Controls

The ECOS-O switches shall be protected from inadvertent operations and damage. Controls shall exhibit tactile geometries that allow the operator to feel and discriminate between different switches in the dark. All controls and adjustments shall provide repeatable results and operate smoothly (T).

### 3.1.9 Capped Adjustment Knobs

The Sight shall include capped windage and elevation adjustments. The Scope shall only include capped windage adjustments (T).

### 3.1.10 Surfaces

The ECOS-O's external surfaces (except for light transmitting elements) shall be non-reflective and corrosion resistant and finished in Flat Dark Earth color. All the exposed optics shall have corrosion and scratch resistant coatings, which permit operation in salt sprays and blowing sand and reduce operator eye fatigue during extending viewing. All markings, coatings, finishes, and exposed o-rings shall be resistant to paints solvents, chemical, biological, radiological and nuclear (CBRN) contaminants, and bleach. All small external parts, switches, and fasteners should be of the same color, but may be mid-level grey if the objective color is impractical.When evaluating the appearance of the item the following characteristics will be evaluated in order of importance: 1) Matte or non-reflective finish, 2) Color, and 3) Consistency (T).

### 3.1.11 Interface

The ECOS-O Sight shall mount at the 12 o'clock position of the ECOS-O Scope (T).

### 3.1.12 Optical Centerline

The ECOS-O Sight shall have an optical centerline no more than 2 inches above the optical centerline of the ECOS-O Scope (T).

### 3.1.13 Tools

The ECOS-O shall utilize standard issued tools for attachment or adjustment (T). The ECOS-O shall not require the use of any tools for attachment or adjustment (O).

### 3.1.14 Electromagnetic Performance Requirements

The ECOS-O performance shall not be affected by electromagnetic emissions from battlefield electronic devices operating in the immediate vicinity, zero meters (O) 5 meters (T) of the system.

**3.1.15 Radiated Emissions**

While operating, radiated electric emissions emanating from the ECOS-O shall not exceed the limits of Figure RE104-2 of MIL-STD-461E (Navy Mobile and Army) when tested in accordance with test method RE102 of MIL-STD-461E.

**3.1.16 Radiated Susceptibility**

The ECOS-O system shall not exhibit signs of susceptibility when subjected to the electric fields outlined in Table 1, when tested in accordance with test method RS103 of MIL-STD-461F

Table 1 - Electromagnetic Radiation Hazard

| Frequency Range (MHz) | RMS Field Strength (V/M) | AM Field Strength (V/M)1 | Polarity |
|---|---|---|---|
| 1 - 20 | 100 | 200 | Vertical |
| 20 - 100 | 200 | 200 | Vertical + Horizontal |
| 100 - 1000 | 200 | 400 | Vertical+ Horizontal |

Note 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. AM is defined in test method RS103 of MIL-STD-461E.

**3.1.17 Low Pressure**

The ECOS-O shall be tested to 35,000 feet ASL equivalent per Method 500.5, Procedure I of MILSTD-810G (T).

**3.1.18 Low Storage Temperature**

The ECOS-O shall withstand storage at -40 Degrees Celsius for a period of 12 hours per MIL-STD-810G, Method 502.5, Procedure I (T).

**3.1.19 High Storage Temperature**

The ECOS-O shall be designed to withstand storage at +71 Degrees Celsius for a period of 12 hours as verified by MIL-STD-810G Method.501.5, Procedure I (T).

**3.1.20 Low Operating Temperature**

The subsystems should be fully operational when tested at -40 Degrees Celsius per MIL-STDF-810G, method 502.5, and Procedure II (T).

**3.1.21 High Operating Temperature**

The ECOS-O shall be capable of operation to +49 Degrees Celsius without failure when tested to MIL-STD-810G, Method 501.5, and Procedure II (T).

**3.1.22 Temperature Shock**

The ECOS-O shall be capable of withstanding three cycles of temperature shock from +71 Degrees Celsius to - 40 Degrees Celsius applied over a 24 hour time period per MIL-STD-810G, Method 503.5 (T).

**3.1.23 Solar Radiation**

The ECOS-O shall be designed to withstand 1120 W/M2 of solar radiation at + 42 Degrees Celsius for a period of 3 hours as verified per MIL-STD-810G, Method 505.5 (T).

**3.1.24 Humidity**

The ECOS-O shall be subjected to 85% to 95% relative humidity for a period of 96 hours over the temperature range of +30 Degrees Celsius and +60 Degrees Celsius per MIL-STD-810G, Method 507.5, Procedure I (T).

**3.1.25 Ice**

The ECOS-O shall be tested with an ice coating of 20 mm per MIL-STD-810G, Method 521.3. Ice removal is permitted to verify operation (T).

**3.1.26 Salt Fog**

The ECOS-O shall be tested in a 5% NaCl fog environment at +35 Degrees Celsius for a period of 48 (T), 240 (O) hours per MIL-STD-810G, Method 509.5 (T).

**3.1.27 Vibration**

The ECOS-O shall undergo vibration testing per MIL-STD-810G, Method 514.6, Category 10, Procedure I (T).

**3.1.28 Rough Handling**

The ECOS-O shall undergo rough handling testing per MIL-STD-810G, Method 514.6, Category 5, and Procedure II (T).

**3.1.29 Improved Operational Test Results**

The ECOS-O shall exhibit Operational Suitability and Operational Effectiveness. operators, while wearing various uniforms, equipment, and possibly eyeglasses appropriate for each individual mission, shall achieve the same (T) or improved (O) performance/hit scores over the SU-230 and SU-230A Articulated Telescopes baselines, and the same (T) or improved (O) performance under low illumination and other adverse conditions.

**3.1.30 Improved Operational Low illumination Test Results**

The ECOS-O shall exhibit Operational Suitability and Operational Effectiveness. Operators, while wearing various uniforms, equipment, and possibly eyeglasses appropriate for each individual mission, shall achieve the same (T) or improved (O) performance/hit scores over the SU-230 and SU-230A Articulated Telescopes baselines, and the same (T) or improved (O) performance under low illumination.

**3.1.31 Improved Operational Adverse Conditions Test Results**

The ECOS-O shall exhibit Operational Suitability and Operational Effectiveness. Operators, while wearing various uniforms, equipment, and possibly eyeglasses appropriate for each individual mission, shall achieve the same (T) or improved (O) performance/hit scores over the

SU-230 and SU-230A Articulated Telescopes baselines, and the same (T) or improved (O) performance under adverse conditions.

**3.1.32 Labeling**

To be determined prior to production.

**3.1.33 Workmanship**

The workmanship requirements of MIL-HDBK-454A Guidelines 5 and 9 shall apply. Additionally, all optics shall be free of foreign matter such as dirt, fingerprints, dust, loose material, and moisture. All moving parts shall move freely and not bind, creep, or stick. The images viewed through the ECOS-O shall be in focus and adjustable to parallax free at all magnifications levels.

**3.1.34 Fasteners**

Threaded fasteners should be torqued in accordance with industry standards.

**3.1.35 Depleting Chemicals (ODC)**

ODC shall be avoided in the manufacture process whenever possible.

**3.1.36 Life Cycle Support Cost**

The system will exhibit decreased life cycle support costs, e.g., low or no maintenance designs, modular maintenance concepts, and simplified maintenance concepts.

**3.1.37 Spiral Development**

Spiral development is an acquisition and design concept whereby a core capability can be tested and fielded rapidly, with later requirements or supplemental developments implemented later as they mature. Favorable consideration will be given to those vendors who can meet the performance objectives or provide other applicable improvements to core capabilities through the process of spiral development. Cost, schedule, and performance will be key evaluation criteria for spiral developments.

**3.1.38 Innovative Capabilities**

The Government is seeking a best value acquisition. Therefore, the Government may chose to consider and test innovative technical capabilities related to, but not envisioned or specifically called out by this specification.

## 3.2 ECOS-O Scope Requirements

**3.2.1 Length**

The ECOS-O Scope Shall be no greter than 12.5 inches (T) 9 inches or less (O).

**3.2.2 Magnification – Low Power**

The ECOS-O Scope shall have a low power magnification setting no less than 3x and no greater than 6x with a tolerance of +/-0.5x.

**3.2.3 Magnificaiton – High Power**

The ECOS-O Scope shall have a high power magnification setting no less than 15x (T) and no greater than 20x (O) with a tolerance of +/-0.5x.

**3.2.4 Optical Center Line**
When mounted on the host weapon, the optical centerline of the ECOS-O Scope shall be 1.535 +/- 0.05 inches above the flat surface of the MIL-STD-1913 rail (T).

**3.2.5 Elevation Turret Height**
The ECOS-O Scope turret height shall be no taller than 0.75 inch above the scope tube (T).

**3.2.6 Elevation Turret Position**
The ECOS-O Scope turret height shall be positioned at the 12 o'clock position (T) or at the 3 o'clock or 6 o'clock (O).

**3.2.7 Elevation Turret Adjustment**
The ECOS-O Scope shall have a ZERO Stop (T) ZERO Stop with locking turret (O).

**3.2.8 Parrallax**
The ECOS-O Scope shall provide a side focus/parallax adjustment (T).

**3.2.9 Diopter Adjustment**
The Scope shall provide a diopter adjustment to allow for optimal reticle clarity (T).

**3.2.10 Tube Size**
The ECOS-O Scope shall utilize a 34mm tube for construction (T).

**3.2.11 Reticle**
Non-illuminated First Focal Plane graduating grid reticle with 0.2 mil sustentions capable of ranging targets and performing holds out to 600 meters (T).

In addtition to being able to provide the above specified reticle, the vendor must be able to provide an illuminated version. The vendor shall also incorporate design features to allow for future chages to the reticle design and selection.

**3.2.12 Windage and Elevation**
The ECOS-O Scope shall provide adjustments in 0.1 mil increments (T).

**3.2.13 Tactile Adjustments**
The ECOS-O Scope shall provide tactile feedback on all adjustments. The tactile feedback shall be distinguishable with bare hands (T) gloved hands (O).

**3.2.14 Eye-Relief**
The ECOS-O Scope shall have an eye relief of no less than 3 inches (T).

**3.2.15 Weight**
The ECOS-O Scope shall weigh no more than 32 ounces (T) 24 ounces (O) including mount and accessories.

**3.2.16 Mechanical Stop**
The ECOS-O Scope shall have a mechanical stop to provide end of travel protection for the adjusters (T).

**3.2.17 Anti-Reflection Device (ARD)**
The ECOS-O Scope shall be fitted with a removable Anti-reflection Device (ARD) to reduce reflections from surface of front lens (O).

**3.2.18 Lens Resistance to Obscuration**
The ECOS-O Scope's exposed lenses or transparent elements shall have coatings to protect against obscuration in rain, fog, snow, dust and other atmospheric conditions (O).

**3.2.19 Lens Protection and Coatings**
The ECOS-O Scope's exposed optics shall have coatings to protect against abrasion, corrosion, and salt spray. In addition coatings should be employed to reduce glare, and to facilitate the transmission of the visible wavelength of the aiming dot (O).

## 3.3 ECOS-O Sight Requirements

**3.3.1 Magnification**
The ECOS-O Sight shall have a magnification of 1x +/- 5% (T).

**3.3.2 Size**
The ECOS-O Sight shall not exceed 2.5 inches in Length, 1.5 inches in height, 1.75 inches in width (T).

**3.3.3 Enclosed System**
The ECOS-O Sight shall consist of an enclosed sighting system as to preclude mulfunciton due to environmental factors such as rain, mud, etc (T).

**3.3.4 Zeroing**
The ECOS-O Sight shall provide boresight adjustments in 0.5 MOA increments for both elevation and windage adjustments (T) 0.25 MOA increments for both elevation and windage adjustments (O).

**3.3.5 Battery**
The ECOS-O Sight shall utilize a battery that is common and commercially available (T). The ECOS-O Sight shall not require a battery for illumination (O).

**3.3.6 Dot Size**
The ECOS-O Sight shall have an 2.0 MOA aiming dot (T) 1.0 MOA aiming dot (O).

**3.3.7 Dot Size Settings**
The ECOS-O Sight shall have a manually adjustable dot size independent of brightness setting (O).

**3.3.8 Manual Brightness**
The ECOS-O Sight shall provide a manual brightness adjustment for the aiming dot (T).

**3.3.9 Reverse Polarity Protection**
The ECOS-O Sight shall provide reverse polarity protection that will prevent damage to the sight when the battery is inserted with improper polarity orientation (T).

### 3.3.10 Weight

The ECOS-O Sight shall weigh no more than 8 ounces (T) 5 ounces (O) including mount and accessories.

### 3.3.11 Mechanical Stop

The ECOS-O Scope's elevation adjustment shall have a mechanical stop to provide end of travel protection for the adjusters (T).

### 3.3.12 Reticle Visibility

The ECOS-O Sight's wavelength of the reticle shall be any wavelength within the visible region (420nm to 690nm) (T).

### 3.3.13 Lens Resistance to Obscuration

The ECOS-O Sight's exposed lenses or transparent elements should have coatings to protect against obscuration in rain, fog, snow, dust and other atmospheric conditions(O).

### 3.3.14 Lens Protection and Coatings

The ECOS-O Sight's exposed optics should have coatings to protect against abrasion, corrosion, and salt spray. In addition coatings should be employed to reduce glare, and to facilitate the transmission of the visible wavelength of the aiming dot (O).

## 4. Verification

### 4.1 System and Subsystem Verification

During design, test and manufacture of the ECOS-O, the applicable supplier shall develop a subsystem verification matrix. The supplier shall demonstrate compliance with matrix parameters during production assurance testing, DT and OT.

### 4.2 Developmental Testing (DT)

Verification of the technical performance parameters shall be performed during developmental testing in accordance with the requirements listed in this specification. The material developer may validate other requirements through analysis. Both DT and OT will incorporate "fix-to-shoot" methodology. This allows test technicians to perform rapid corrections or repairs to broken or malfunctioning test articles to allow completion of testing.

### 4.3 Operational Testing (OT)

An independent OT activity will develop a test plan containing measurable operational criteria. Test plans will utilize STRAC Manual Chapter 5 (DA-PAM 350-38), Infantry Weapons Systems, and will comply with U.S. Code Title 10 and applicable supplemental regulations and documents (see references in section 2.1.1.)

### 4.4 Innovative Capabilities for DT/OT Evaluation

DT and OT may implement exploratory testing on innovative ancillary or alternative capabilities offered over and above the specifications requirements. Exploratory DT and or OT results may be used for source selection information.

### 4.5 Production Assurance Testing and Evaluation

### 4.5.1 Quality Assurance Procedures

The contractor selected for Full Rate Production (FRP) delivery orders shall develop Quality Assurance Provisions documentation. These Quality Assurance Provisions shall include, but are not limited to: manufacturing and assembly controls, factory acceptance tests which include verification of all key parameters, structural integrity inspections as validated through weapon shock, and immersion and temperature cycling. Factory acceptance tests shall be documented and conducted on all systems prior to shipment to the government. The quality system shall be ISO 9000-2 or equivalent.

### 4.5.2 Quality Control and Production Acceptance Plans

The ECOS-O prime contractor shall develop the Quality Control and Acceptance Plans on serial production lots. The Quality Control and acceptance plans will conform to standardized sampling plans. These plans include functional testing to confirm (1) the correct assembly and workmanship standards for the system (2) the function of sub-assembly components and (3) transmission of all interface signals between sub-systems. Manufacturing and assembly controls shall include the establishment of capable processes with attention to continuous improvement. The Quality System shall contain a method for monitoring and controlling critical processes, reports on product and process trend analysis in manufacturing and test, and product variation, including provisions for effective root cause analysis and correction. Quarterly reporting will be required in accordance with the appropriate Contract Data Requirement List (CDRL).

### 4.5.3 Quality Consistency and Configuration Control Records and Reporting

The ECOS-O prime contractor will maintain a listing of all subsystems produced, by serial number, if applicable, or by lot number if items are not serialized. For non-serialized items, criteria will be published to define and track internal acceptance criteria. This includes initial prototypes and FRP systems. 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 unspecialized items) any changes from (1) the prototype baseline configuration to establish the FPR baseline and (3) any changes cut into production at any point that materially deviates from the established baseline.

## 5. Packaging

### 5.1 Operator's Manual

Each ECOS-O 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 deliverable system, an electronic version of the manual in Microsoft Word™, complete with line drawings shall be supplied as a CDRL. The Operator's Manual shall be no larger than 4.5 x 6 inches. The Operator's Manual shall contain as a minimum an equipment description, mounting instructions, operating procedures, zeroing procedures, and other adjustments (if applicable), inspection, cleaning, field level maintenance procedure, reticle kit conversion procedures, operator troubleshooting aids, repair parts list, a top level drawing, warranty information and any pertinent safety instructions.

### 5.2 Graphic Training Aid (GTA)

A waterproof GTA card will be provided with each system in accordance with contractual requirements as a loose-leaf or tear-out element of Operators Manual.

### 5.3 Basic Issue Items (BII)

The ECOS-O, reticle, front and rear lens covers, elevation/ballistic cap, reticle battery, operator's manual and a lens cleaning kit shall be provided as BII. The lens cleaning kit shall include a one ounce plastic bottle of anti-fog cleaning solution, a lens cleaning brush, and a packet of lens wipe tissues, . Basic issue items should be proposed as separate Contract Line Item Numbers (CLINs).

### 5.4 Shipping and Storage Cases

Each ECOS-O must survive military methods of transport/infiltration to include HMMWV, cargo aircraft, helicopters, and static-line airborne operations. The contractor shall provide, at a minimum, a small Plastic/cardboard box to contain the ECOS-O in its entirety.

### 5.5 Commercial Packaging

Commercial packaging shall ensure that the product does not degrade during transport and storage for a period of up to nine months. Commercial packaging shall preclude degradation encountered in outdoor storage for up to six months. The commercial packaging must preclude oxidation of metals.

## 6. Notes

### 6.1 Endurance Firing Schedules for Other Host Weapons

Endurance firing schedules for other host weapons (paragraph 6.1) may also be imposed at the discretion of the Operational Test Authority (OTA), the Operational Evaluation Team (OET), and Technical Evaluation Team (TET). Data thus obtained may be used for "best value" source selection information. Simulated weapon shock using shock profiles may be used to validate these requirements.

### 6.2 Key Definitions

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

**Aiming Dot:** Aiming Dot is defined as a shape visually perceived and generally considered to be of a circular form relative to its outer edges, whether it be solid, translucent, or hollow.

**Damage:**

a) Electrical failure or malfunctioning intermittent or continuous, including flickering or blinking.

b) Cracks, breakage, deformation, corrosion, or deterioration of any part or finish, and missing or loose components.

c) Degradation of image quality.

**Degradation of Performance:** Degradation of performance is defined as the diminishment of any performance parameter to a level below the specified acceptable limit, including but not limited to reliability, maintainability, safety, accuracy, and static performance characteristics such as seals, optical coatings, and the condition of materials (brittleness of plastics, weakened seals, or deformed plastics).

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

**Effectiveness:** The overall degree of mission accomplishment of a system when used by representative personnel in the environment planned or expected for operational employment of the system considering organization, doctrine, tactics, survivability, and vulnerability.

**Failure (Electronic):** The failure of the fire control to provide for an electronic image or aim point.

**Fix-To-Shoot:** A test methodology wherein the test activity may perform simple mechanical repairs to hardware in the event of unforeseen failures in order to complete a test sequence. Fix-to-Shoot is inherently limited by time and technical capability available when a failure occurs.

**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.

**Normal Operating Temperature:** Ambient temperature is defines as +22.8 ºC +/-10 ºC (+73 ºF +/-18 ºF.)

**Milliradian:** A milliradian is numerically defined as 0.05730 degrees.

**MOA:** Minute of Angle is numerically defined as 0.01667 degrees.

**Observation:** The act or the faculty of seeing.

**Quick Detach:** Not requiring the use of any tool to attach or detach a system to a MILSTD 1913 rail while remaining in accordance with the manufactures' terminal mounting requirements and specifications of tightness.

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

**Special Tools:** Any implement not generally found contained within a common multi-tool.

**Subsystem:** The configuration of all materials that comprise the housing of optics and mechanisms of adjustment.

**System:** The configuration of all materials that comprise the housing of optics, mechanisms of adjustment (subsystem), protective devices, and all required mounting items.

**Tactical:** The traits or characteristics which are desirable in military use and applications.

**Zero:** The ranges at which the point of aim and the point of impact are one and the same, usually expressed in terms of the longest range at which the trajectory of the projectile intersects the point of aim.

# Abbreviations and Acronyms

| | |
|---|---|
| ASL | Above Sea Level |
| BDC | Bullet Drop Compensator |
| BII | Basic Issue Items |
| BIS | Backup Iron Sight |
| CDRL | Contract Data Requirement List |
| COTS | Commercial-Off -The -Shelf |
| DODIC | Department of Defense Identification Code |
| DODISS | Defense Index of Specifications and Standards |
| DOS | Day Optic Sight |
| DT | Developmental Test |
| ECOS-O | Enhanced Combat Optical Sight-Optimized |
| EMD | Engineering and Manufacturing Development |
| EPR | Enhanced Performance Round |
| FRP | Full Rate Production |
| GTA | Graphic Training Aid |
| ICD | Interface Control Document |
| ID | Identification |
| KPP | Key Performance Parameter |
| KSA | Key System Attribute |
| LMG | Light Machine Gun |

DRAFT

| | |
|---|---|
| LRU | Lowest Repairable Unit |
| MDNS | Miniature Day/Night Sight |
| MIL | Milliradian |
| MOA | Minute of Angle |
| NDI | Non-Developmental Items |
| (O) | Objective |
| OET | Operational Evaluation Team |
| ODC | Ozone Depleting Chemicals |
| OT | Operational Test |
| OTA | Operational Test Authority |
| PM | Program Manager |
| PMO | Program Management Office |
| (T) | Threshold |
| TET | Test Evaluation Team |
| WPNAC | Weapon Accessories |

DRAFT