# Visible Bright Light III (VBL-III)

## 1. SCOPE

**1.1. Scope of Specification**. This specification establishes the performance requirements of the Visible Bright Light III (VBL-III). This performance specification will be the basis of a new re-solicitation. The current system mission of the VBL-III is to provide United States Special Operations Command (USSOCOM) operators visible illumination to a minimum of 50 meters. The fundamental operational requirements for the VBL-III are described in the Performance Specification For the Miniature Day/Night Sight (MDNS) Development to the M4 SOPMOD Kit, N00164-02-R-0014, dated 30 April 2003. However this VBL-III performance specification expands on that document, (1) to allow alternative approaches due to new technologies developed after the original performance specification was written, (2) to incorporate operator feedback, and (3) to adapt to changes to the DoD acquisition and requirements regulations.

The VBL-III is an accessory fielded by the Joint Weapons Accessories Program, which is a USSOCOM-sponsored program, which supports Army, Navy, and Air Force Special Operations Forces (SOF) Units. The Weapons Accessories (WPNAC) Program Management Office (PMO) at Naval Surface Warfare Center, Crane Division (NSWC Crane), provides standardized, versatile weapons accessories to meet needs across SOF mission scenarios. Weapons Accessories increase operator survivability and lethality by enhanced weapon performance, target acquisition, signature suppression, and fire control. The Weapons Accessories PMO provides these accessories when they are operationally suitable, affordable, sustainable, and funded.

**1.1.1. Applicable Weapons**. The role of the VBL-III is specifically to provide an improved illumination capability for the small arms in use by SOF. The threshold Host Weapons are (1) the M4A1 Carbine (alone), (2) the M4A1 Carbine performing while mated with an M203-series Grenade Launcher, (3) the MK16 and MK17 SOF Combat Assault Rifles (alone), and (4) the MK16 and MK17 SOF Combat Assault Rifles performing while mated with MK13 Enhanced Grenade Launcher. Objective Host Weapons that may coincidentally utilize the VBL-III include any of the SOF suite of small arms, such as the 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, Mk46 LMG, Mk48 LMG, M72 LAW, Remington 870 Series Shotguns, Mossberg 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 the VBL-III, depending on that nature of proposals resulting from this solicitation and the availability of resources.

1.1.2. Baseline System. The SU-233/PVS Gun Light, NSN 5855-01-533-0996, is the baseline system that the VBL-III will be compared against. The VBL-III will improve upon the current baseline system in terms of cost, schedule, and performance.

**1.2. Basic Terminology**.

**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)**.

**1.2.2. Key Performance Parameters (KPPs). KPPs** are those attributes or characteristics of a system that are considered critical or essential to the development of an effective military capability and those attributes that make a significant contribution to the characteristics of the future joint force. The **KPPs** are attributes that contribute most significantly to the desired operational capability and are usually in threshold **(T)** -objective **(O)** format. These statements will guide the acquisition community in making tradeoff decisions between the threshold and objective values of the stated attributes. Because operational testing will assess the ability of the system(s) to meet the production threshold values as defined by the **KPPs**, Key System Attributes **(KSAs)**, and Other Performance Attributes **(OPAs)**, these attributes must be testable. Specifications labeled **(KPP)** must be met prior to production and fielding at the **(T)** level of performance or better. Failure to meet a KPP will prevent production and fielding.

**1.2.3. Key System Attribute (KSAs).** An attribute or characteristic considered crucial in support of achieving a balanced solution/approach to a key performance parameter **(KPP)** or some other key performance attribute deemed necessary by the sponsor. **KSAs** provide decision makers with an additional level of capability performance characteristics below the **KPP**-level and require a sponsor to change if they cannot be met prior to production and fielding.

**1.2.4. Go-No Go (G-NG).** Specifications or instructions labeled **(G-NG)** are proposal screening criteria, and are must-pass events/values. Any offering failing the **(T)** value of any of the **(G-NG)** criteria will be removed from further testing and will not be considered for contract award. These are not to be confused with KPPs. Any offering failing a **G-NG** criterion results in proposal rejection, and no further consideration for award.

**1.2.5. Other Performance Attributes (OPAs).** Specifications labeled **(OPA)** represent desirable performance attributes or features. Specifications which have no markings to denote **KPPs** or **KSAs** are by default, **OPAs**. Meeting or exceeding the specifications for **OPAs** (or the intent of the **OPAs**) may add source-selection value to a proposal. The **OPAs** exhibit high and low values or tolerance ranges.

**1.2.6. Other Terms and Abbreviations**. See Part 6.

**1.3. Maturity Of Technology**. 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 VBL-III acquisition effort seeks to rapidly develop, test, and field a system in a timeframe relevant to current conflicts. The VBL-III acquisition seeks systems 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. Detailed Requirements**. 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 specific requirements to the performance of the VBL-III. Sections 3.4 – 3.8 of this specification identify requirements that apply to all systems in the WPNAC program.

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

**1.4.4. Notes**. 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. 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.

Documents, Defense Department, Joint Staff, and Defense Agency Level:

Department of Defense Instruction
Operation of the Defense Acquisition System NUMBER 5000.02
December 8, 2008

Chairman of the Joint Chiefs of Staff Manual
Operation of the Joint Capabilities Integration and Development System, CJCSM 3170.01C, 1 May 2007

Defense Logistics Agency Joint Regulation 4145.11
Safeguarding of DLA Sensitive Inventory Items, Controlled Substances, and Pilferable Items of Supply," February 1, 1990

Standards, Military:

| | |
|---|---|
| Federal Standard 595B | Colors Used In Government Procurement |
| MIL-HDBK-454B | General Guidelines for Electronic Equipment |
| MIL-STD-130N | Identification Marking of U.S. Military Property |
| MIL-STD-1913 | Dimensioning of Accessory Mounting Rail for Small Arms Weapons |
| MIL-STD-40051-2 | DOD Standard Practice Technical Manuals |
| MIL-STD-464 | Electromagnetic Environmental Effects Requirements for Systems |
| MIL-STD-810G | Environmental Engineering Considerations and Laboratory Tests |
| MIL-STD-882D | System Safety |
| TOP 3-2-045 | Automatic Weapons, Machineguns, and Hand and Shoulder Fired Weapons |

Other Documents:

| | |
|---|---|
| Title 10 | United States Code (10 U.S.C.) |
| DA PAM 350-38 | Standards in Weapons Training (STRAC Manual) |
| 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 |
| USSOCOM Special Text | “Special Operations Peculiar Modification (SOPMOD) |

Accessory Kit for the M4A1 Carbine", ST 23-31-1, 30 January 1999.

**2.3. Non-Government publications.**

The following documents form a part of this document to the extent specified herein.

AMERICAN NATIONAL STANDARDS

| | |
|---|---|
| ANSI IPC J-STD-001A | Requirements for Soldered Electrical and Electronic Assemblies |

**2.4. 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

## 3.1. General MDNS Requirements

**3.1.1. Interfaces**. The VBL-III shall interface with the host weapon 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 all Weapons Accessories systems (**KPP**).

**3.1.2. Waterproofing**. The VBL-III will not exhibit design features that preclude waterproofing to a depth of 66 feet. The VBL-III shall be waterproof to a depth of 66 feet for a minimum of two hours (**KPP**).

**3.1.3. Interoperability**. The VBL-III design shall not cause unsafe conditions or interfere with the functioning of the M4A1 Carbine (**T**). The VBL-III will interoperate with existing Weapons Accessories subsystems, or substitute them singly or in combination (**O**) (**KPP**). Easily mounted without interference with other accessories (OPA)

**3.2. General Improvements to Core Capabilities.** VBL-III 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 host weapons. The VBL-III will exhibit improved Operational 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 goal is increased hit scores by SOF operators during day, night, rain, mist, smoke, vegetation, fog, dust, and extreme low light conditions (**OPA**). The VBL-III will provide optimal quality for target detection, recognition, and identification.

**3.2.2. Portability**. The VBL-III 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 without sacrificing performance of the baseline VBL-III (**OPA**).

**3.2.3. Ease of Maintenance** The VBL-III will exhibit improved corrosion resistance, and ease of cleaning and field maintenance (**OPA**).

**3.2.4. Endurance**. The VBL-III will exhibit recoil shock endurance sufficient to allow use on all SOF small arms. See also 3.4 below. The VBL-III shall be fully functional for a minimum of:

> 10,000 rounds (**T**), 30,000 rounds (**O**) of 5.56mm ball on the M4A1 Carbine and MK16 and MK17 rifles. (**KSA**).
>
> 5,000 rounds (**T**), 10,000 rounds (**O**) of 40mm HEDP on the M4A1 Carbine equipped with an M203E1 Grenade Launcher (**OPA**).

**3.2.5. Reliability**. The VBL-III will exhibit functional reliability exceeding that of the present baseline VBL-III at high and low temperature extremes as well as other hostile (sand/dust/dirt/mud/surf/temperature shock) environmental conditions (**OPA**).

**3.2.6. Safety**. The VBL-III will exhibit improved safety features. See also 3.6 below (**OPA**).

**3.2.7. Counter-Detection**. The VBL-III will exhibit low or no susceptibility to optical retro-reflection augmentation. No light emissions that were not intended by the operator emitting forward from the VBL-III subsystems will be detectable at 10 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 10 meters in front of the operator by the night-adapted eye (**T**), or Night Vision Devices (**O**). The VBL-III subsystems shall not emit noise that is detectable by the unaided human ear at a distance beyond five meters in any direction. (**OPA**)

**3.2.8. Lens Resistance to Obscuration**. The VBL-III 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. (**OPA**).

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

**3.2.10. Life Cycle Costs** The VBL-III will exhibit decreased life-cycle support costs, e.g. low or no maintenance designs, modular maintenance concepts, and simplified maintenance procedures. (**OPA**).

**3.2.11. Snag Hazards**. The VBL-III subsystems will be designed to deflect or minimize battlefield snag hazards, such as vines, branches, and barbed wire (**OPA**).

**3.2.12. Tools**. No special tools shall be required to install, remove, or adjust the VBL-III subsystems unless the concepts of use/maintenance reasonably benefit (**OPA**).

**3.2.13. Reliability**. The VBL-III subsystems shall have a 90% probability of operating 36 hours on a 3-day mission without failure (**T**). The VBL-III subsystems shall have a 90% probability of operating 48 hours on a 4-day mission (**O**) (**OPA**).

**3.2.14. Best Value Acquisition**. 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 (**OPA**).

**3.2.15. Host Weapons**. Hardware identified in this specification is intended for mounting on the M4 series carbines, the M4A1 carbines mated to grenade launchers, the MK16/MK17 SCARs, and the MK16/MK17 SCARs mated to the MK13 Enhanced Grenade Launcher Module. However, experience indicates that SOF combatants may utilize the VBL-III on a wide variety of weapons identified in section 1.1.1. Although it may not be practical to test the VBL-III on all weapon platforms, proposals should clearly identify which weapons are applicable for the VBL-III usage. While the M4A1 Carbine and MK16/MK17 are the core weapons for the VBL-III, interoperability with all “Host Weapons” is desired (**OPA**), but not at the expense of performance of the proposed the VBL-III on the M4A1 Carbine and MK16/MK17 SCAR.

### 3.3. Specific Visible Bright Light III (VBL-III) Requirements

In addition to the requirements listed in 3.1 and 3.2 above, the VBL III shall demonstrate the following performance characteristics.

**3.3.1. Weight**. Weight (with battery and mounting hardware, if required) shall be nominally equal to or less than 14 ounces (**T**), 6 ounces (**O**), excluding accessories, if any (**KPP**).

**3.3.2. Size**. The VBL III should have a maximum length of 7.0 inches (**T**), 4.0 inches (**O**). The maximum width should be 2.5 inches (**T**), 1.3 inches (**O**). The maximum height, as measured from the MIL-STD-1913 rail should be 3.0 inches (**T**), 1.5 inches (**O**). If the VBL III is designed with offset rail mounts to allow usage with forward handgrip, the additional dimensions contributed by the offset will be subtracted from the height measurements (**OPA**).

**3.3.3. Batteries**. Batteries must be common and commercially available. The battery(s) shall be able to be replaced without using tools and without having to remove the VBL-III from the host weapon. The battery lid shall have a lanyard or other loss-prevention mechanism connected to the body of the sight. The batteries common and commercially available, shall be (**KPP**):

> 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.

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**). The VBL III batteries shall be capable of being replaced by the operator, with both hands (**T**) one hand (**O**). The VBL-III 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 the VBL-III shall be minimized for extended battery life (**OPA**).

**3.3.4. Lithium Safety**. The VBL III shall incorporate design features to reduce the hazards from lithium batteries. These features may include, but are not limited to; (1) operation from a single battery instead of multiple batteries, (2) maximum electrical current usage significantly less than 1 amp, (3) internal circuitry to detect and protect against operating conditions leading to lithium battery failure, (4) housing design that allows safe venting of battery gasses (**OPA**).

**3.3.5. Mounting**. The VBL III shall interface with the host weapon Upper Receiver Group (URG) mounting rail via MIL-STD-1913 Rail Interface System (**G-NG**). The VBL-III shall be capable of attaching to the 3:00, 6:00, 9:00 and 12:00 rails using mounting systems that provide flexible configurations designed to enhance operator manipulation when used with and without a forward handgrip (**KSA**).

**3.3.6. On/Off Switches**. The VBL-III shall provide at least one switch capable of constant on/off and momentary pressure activation that is integral with the VBL-III (**G-NG**). The VBL-III shall concurrently or in addition provide an on/off switch that is capable of being mounted on a rail or a forward handgrip (**KSA**) that provides a momentary (**T**) and constant (**O**) on/off function (**OPA**). All switches shall be of tactile design so that the operator can feel when the switch is activated. Water immersion to a depth of 66 feet shall not activate the integral or remote switch, nor render them inoperable (**KPP**).

The VBL-III shall be compatible with the function of the existing dual button remote switches to concurrently control the flashlight and the LA-5/PEQ (**KSA**).

The on/off switch shall be intuitive, fast, and human error-free in activation. The design of the on/off switch shall be recessed and protected from inadvertent operations and damage. The on/off switch shall be ambidextrous and usable with ungloved hands (**T**) gloved hands (**O**). Gloves include flight gloves, Nomex, and MIL-G-81188. (**OPA**)

**3.3.7. Mode Control Selector**. The VBL-III shall have a mode control capability that allows the operator to preset which function the VBL-III performs when the on/off switch is

activated or to directly activate a function from a single control. The control shall be of tactile design so that the operator can feel when he is changing modes. Water immersion to a depth of 66 feet shall not affect the selector, nor render it inoperable (**KPP**).

The mode control selector shall be intuitive, fast, and human error-free in activation. The design of the mode control selector shall be protected from inadvertent operations and damage. The mode control selector shall be ambidextrous and usable with ungloved hands (**T**) gloved hands (**O**). Gloves include flight gloves, Nomex, and MIL-G-81188. (**OPA**)

**3.3.8. Operating Modes**. The VBL-III shall have multiple modes of operation. Mode selection shall be achieved with the mode control selector (**O**) and/or filters (**T**). All filters shall be interchangeably mounted to the light bezel. Each filter shall be quickly removable. (**OPA**)

**3.3.8.1. Full Visible White Light Mode**. 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**). (**OPA**)

<u>3.3.8.2. Variable Beam Width (OPA)</u>

**3.3.8.2. Reduced Visible White Light Mode**. The VBL-III should be capable of reduced output mode for breaching type applications and extending battery life. The number of reduced settings shall be one (**T**), two (**O**). The lowest reduced setting shall be less than 10 lumens (**T**), and the second reduced setting shall be approximately half of the maximum light output (**O**). (**OPA**)

**3.3.8.3. Infrared Mode**. The VBL-III shall be capable of generating IR illumination compatible with Gen III night vision. There shall be no emissions visible to the naked eye when the light is operating in infrared mode. The current SU-233/PVS will be the baseline of comparison during testing. (**OPA)**

**3.3.8.4. Strobe Mode**. The VBL-III shall be capable of generating a full brightness white light strobe that is visually disabling when looking into the light. (**OPA)**

**3.3.8.5. Non-Accidental Discharge Mode**. The VBL-III shall provide a capability to prevent accidental light discharges. This capability can be a function of a self locking position on the mode control selector or an opaque cover that blocks all emissions. (**OPA)**

**3.3.8.6. Reduced Glare Mode**. The VBL-III shall provide a capability to reduce glare during dusty or foggy conditions. The methods for implementing this capability may include, but are not limited to; (1) modified wavelengths of light, (2) polarizing filters (**OPA).**

**3.3.9. 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**) (**OPA**).

### 3.4. Environmental Performance Requirements (Common to All MDNS Subsystems) (OPA)

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

**3.4.1. Environmental Performance Parameters**. The VBL-III shall meet the performance requirements specified in tables 8 and 9 below: (**OPA**)

| Environmental Factor | Recommended test Severity | Reference |
|---|---|---|
| **Low pressure** | 35,000 ft ASL equivalent | MIL-STD-810G Method 500.5, Procedure I |
| **Low Temperature** | -40°C storage for 12 hours<br>-40°C operational | MIL-STD-810G Method 502.5, Procedure I<br>MIL-STD-810G Method 502.5, Procedure II |
| **High Temperature** | +71°C storage for 12 hours<br>+49°operational | MIL-STD-810G Method 501.5, Procedure I<br>MIL-STD-810G Method 501.5, Procedure II |
| **Temperature Shock** | +71°C/-40°C, 3 cycles á 24 h | MIL-STD-810G Method 503.5 |
| **Solar radiation** | 1120 W/m$^2$ at +42°C during 3 h | MIL-STD-810G Method 505.5, Procedure I |

Table 8 - Environmental Requirements List #1

| Environmental Factor | Recommended test Severity | Reference | Remarks |
|---|---|---|---|
| **Humidity** | +30°C/+60°C, 85-95 % RH, 96 hours | MIL-STD-810G Method 507.5, Procedure II | |
| **Immersion** | 66 feet of salt water for 2 hours | MIL-STD-810G Method 512.5, Procedure I | |
| **Ice** | Ice 20 mm (6+13) thickness | MIL-STD-810G Method 521.3 | Ice removal is permitted. |

| | | |
|---|---|---|
| **Salt fog** | 5 % NaCl, +35°C for 48 hours | MIL-STD-810G Method 509.5 |

Table 9 – Environmental Requirement List #2

**3.4.2. Shock and Vibration**. The VBL-III shall meet the shock and vibration requirements listed in Table 10 below (**OPA**):

| ***Environmental Factor*** | ***Reference*** |
|---|---|
| **Vibration** | MIL-STD-810G Method 514.6, Category 10, Procedure I |
| **Rough Handling** | MIL-STD-810G Method 514.6, 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

**3.4.3. Firing Schedules**. As a minimum, the VBL-III shall be capable of meeting the following firing schedules:

**3.4.3.1. 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. Simulated weapon shock/recoil using shock profiles may be used to validate this requirement.

| 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

**3.4.3.2. Endurance Firing Schedule for other SOF Host Weapons**. 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. Simulated weapon shock/recoil using shock profiles may be used to validate this requirement.

### 3.5. External Interface Requirements

**3.5.1. Interfaces**. The VBL-III shall be mounted for use on the host weapon using MIL-STD-1913 interfaces (**O**). No VBL-III 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 Weapons Accessories System (**T**).

**3.5.2. Host Weapon Interface**. When mounted to any host weapon, the VBL-IIIwill not interfere with the normal function of the host weapon. (**OPA**)

### 3.6. Operating Safety and Complexity

**3.6.1. Safety**. The VBL-III shall not pose a safety hazard to the operator during handling, transportation, storage and use. (**KPP**). The VBL-III shall conform to the following TECOM safety guidelines:

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

### 3.7. Design and Construction

**3.7.1. Rough Handling**. The VBL-III design shall withstand rough handling with no physical damage, degradation in accuracy or physical damage other than normal scratches to the protective coating. (**OPA**)

**3.7.2. Labeling**. The VBL-III shall have an individual serial number and warranty expiration date applied in accordance with MIL-STD-130N. (**OPA**)

**3.7.3. Workmanship**. **(This entire paragraph is an OPA)** Workmanship and finish shall be in accordance with the best commercial practice **(T)**. It shall conform to requirements of ANSI IPC J-STD-001A. Finish and parts shall not exhibit poor material and processing such as seams, laps, laminations, cracks, visible steps, sharp edges, nicks, scratches, burrs, deformations, and missing operations which may affect serviceability, functioning, operation, appearance, or safety **(T)**. Surfaces shall be continuous and free from pits, scratches, and gouges Flashing or other extraneous metal shall be removed from cast or forged parts **(T)**. Threaded fasteners shall be torqued in accordance with industry standards or as specified in the maintenance manual **(T)**. Seals shall be tight and will preclude leaks **(T)**. Hammering to shape, salvage operations (including repair by welding except that normal cosmetic welding or surface blemishes on forgings or castings prior to heat treatment shall be permissible) or other similar practices shall not be permitted without prior approval from the contracting office **(T)**.

**3.7.4. Surface finish**. **(Entire Following Paragraph is an OPA)** The VBL-III shall be protected with a durable corrosion resistant coating **(T)**, corrosion proof coating **(O)**, for all SOF climatic environments, including NBC contaminated environments. The VBL-III shall be constructed of corrosion resistant materials, which are abrasion, impact, and battlefield chemical resistant **(T)**. The coating shall minimize dust attraction and contamination **(T)**. The coating shall withstand NBC decontamination procedures **(O)**. All external and visible surfaces shall be of a rough, dull, non-reflective coating/finish that retains paint **(T)**. The VBL-III and external components shall be delivered in Color #3 0118 in Fed Std. 595B **(T)**. The item should have a dull, non-reflective, matte brown finish. Main parts and assemblies which are intrinsically opaque due to function will be mid-level brown in external color **(T)**. Interpretation of color is subjective, therefore a "target" and range is provided. The Objective Pantone® Target Color Target is 7504M **(O)**. The color range shall include the light extreme, Pantone® 465M, and the dark extreme, Pantone® 7505M. All small external parts, switches, and fasteners should be of the same color, but may be mid level grey (approximate Pantone® 444M) if the objective color is impractical (i.e. compromising form, fit, or function). Color requirements do not necessarily apply to functionally constrained external devices such as serial numbers, mode markings, lenses, viewing windows, tritium inserts, and indicator lights. When evaluating the appearance of the item the following characteristics should be evaluated in order of importance: 1) Matte finish, 2) Color, and 3) Consistency. Labels should be provided in subdued colors (i.e. brown/tan base color with grey lettering). The VBL-III should be in a type of finish to support various camouflage combinations with minimum infrared/radar signatures **(O)**. Finish shall be resistant to peeling, flaking, chipping, and require a minimum of operator preventative maintenance **(T)**. Internal coatings should be lubricious/low friction, mitigating the use of lubricants **(O)**. Non-metallic components shall be fungus and chemical resistant **(T)**. All polymer components shall resist moisture absorption **(T)**.

**3.7.5. Corrosion control**. **(This entire paragraph is a KSA)** The VBL-III materials and coatings shall protect the VBL-III from degradation in all SOF climatic environments and weather conditions experienced in all climates and geographical areas including maritime, coastal, desert, tropical jungle, arctic, urban areas, and mountain environments **(T)**. The materials and coatings shall minimize the attraction of dust and contamination **(T)**. Parts are to be corrosion resistant **(T)** corrosion proof **(O)**. The VBL-III shall be protected with a durable corrosion resistant coating **(T)** corrosion proof coating **(O)**, constructed of corrosion resistant materials **(T)**, which is/are abrasion, impact, and battlefield chemical resistant in the NBC environment **(T)**. The VBL-III shall exhibit no functional degradation after a salt fog exposure of 4-days **(T)**, 10-days **(O)**.

**3.7.6. Fungus**. **(Entire Following Paragraph is an OPA)** The VBL-III shall be constructed of materials that are fungus resistant **(T)**, or that are inert to fungus **(O)**.

**3.7.7. Interchangeability**. The VBL-III design and Integrated Logistics Support (ILS) programs shall conform to the guideline 7 of MIL-HDBK-454B. The system design and ILS program shall ensure that the device assemblies, sub-assemblies and replacement parts

physically and functionally interchange at the Line Replaceable Unit (LRU) level without modification of the fielded equipment. (**KPP**)

**3.7.8. Oil, Solvent, and Other Chemical Compatibility**. The VBL-III 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 operator's manuals shall define compatible oils, solvents, and chemicals, and clearly define any restrictions (**T**). (**OPA**)

**3.7.9. Ozone Depleting Chemicals (ODCS)**. ODCs shall be avoided whenever possible (**OPA**).

**3.8. Schedule**

**3.8.1. Baseline Schedule**. 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.

**3.8.2. Incremental Development Schedule**. Incremental 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 incremental development. Cost, Schedule, and Performance will be key evaluation criteria for incremental development proposals.

**3.9. Cost**. This solicitation will utilize Cost as an Independent Variable (CAIV).

**4. VERIFICATION (Common to All MDNS Subsystems)**

**4.1. System and Sub-System Qualification and Verification.** During design, test and manufacture of the VBL-III, the VBL-III supplier shall develop a sub-system verification test matrix. The VBL-III 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 VBL-III 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 KPP, KSA and OPA 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 (DA-PAM 350-38), Infantry Weapons Systems, and will comply with U.S. Code Title 10 and applicable supplemental regulations and documents. Effectiveness and Ease of Use Test samples will undergo OT in accordance with approved Operational Test Plans. 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**. VBL-III contractors selected for Low-Rate Initial Production (LRIP) and Full Rate Production (FRP) Delivery Orders shall develop Quality Assurance Provisions for the respective VBL-III 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 VBL-III 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-systems. 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 VBL-III prime contractors will maintain a listing of all subsystems produced by serial number. 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 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).

**4.4.3.1. Program Manger (PM) Control of Configuration**. The PM shall use a configuration management approach to establish and control product attributes and the technical baseline across the total system life cycle. This approach shall identify, document, audit, and control the functional and physical characteristics of the system design; track any changes; provide an audit trail of program design decisions and design modifications; and be integrated with the SEP and technical planning. At completion of the system level Critical Design Review, the PM shall assume control of the initial product baseline for all Class 1 configuration changes.

## 5. Preparation for Delivery

**5.1. Basic Issue Items**. The contractor shall provide an operator's manual with each unit (**O**). Basic Issue Items should be proposed as separate CLIN's. (**OPA**)

**5.2. Storage and Transport Cases**. The VBL-III must survive military methods of transport/infiltration to include HMMWV, cargo aircraft, helicopters, static line airborne operations, Fast Boats, and Submersible Diving Vehicles (SDVs). Storage and Transport Cases should be proposed as separate CLIN's. (**OPA**)

**5.3. 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. (**OPA**)

## 6. Notes

**6.1. Operator's Manual**. The VBL-III shall include an operator's manual conforming to the requirements of MIL-STD-40051-2. 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. 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 procures, repair parts list, a top level drawing, warranty information, and any pertinent safety instructions (**KSA**).

**6.2. Lubrication/Cleaning**. (**Entire Following Paragraph is an OPA**) The VBL-III shall not require excessive oil or non-standard or unsafe lubricants or cleansers on any parts. **(T).** Protective coatings for the operating components should not require applying grease or lubricants **(O)**.

**6.3. Marking**. The system shall include a serial number and warranty expiration date in accordance with MIL-STD-130N. These markings shall be clearly visible when the subsystem is mounted on the host weapon, and shall not be obscured through rough handling or exposure to battlefield chemicals. Labels shall incorporate a Unique Identification (UID) code. The UID shall be readable when the system is mounted on the weapon. The bar code shall be approximately 0.250 inches by 0.250 inches. The UID shall contain both the 2D barcode and human readable serial number together. UID construct # 2 is required. Label background color shall be as specified in 3.7.4. Lettering shall be legible against the background.

**6.4. Key Definitions.**
**The following terms are defined below:**

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.

UID: A DOD initiative requiring that government assets be imprinted with a Unique Identification (UID) in the form of a machine readable two dimensional bar code to improve asset visibility and life cycle management.

## 6.5. Abbreviations

| | |
|---|---|
| ANSI | American National Standards Institute |
| ASL | Above Sea Level |
| CAIV | Cost As an Independent Variable |
| CLIN | Contract Line Item Number |
| COIC | Critical Operational Issues and Criteria |
| COTS | Commercial Off-The-Shelf |
| DC | Direct Current |
| DT | Developmental Testing |
| $E^3$ | Electromagnetic Environmental Effects |
| EGLM | Enhanced Grenade Launcher Module |
| EMD | Engineering and Manufacturing Development |
| FRP | Full Rate Production |
| HEDP | High Explosive Dual Purpose |
| ID | Identification |
| ILS | Integrated Logistics Support |
| IR | Infrared |
| KPP | Key Performance Parameter |
| KSA | Key System Attribute |
| LRIP | Low Rate Initial Production |
| LRU | Line Replaceable Unit |
| MDNS | Miniature Day/Night Sight |
| N/A | Not Applicable |
| NBC | Nuclear Biological Chemical |
| NDI | Non Developmental Item |
| O | Objective |
| ODC | Ozone Depleting Chemical |
| OET | Operational Evaluation Team |
| OPA | Other Performance Attribute |
| ORD | Operational Requirements Document |
| OT | Operational Testing |
| OT&E | Operational Testing and Evaluation |
| PAT&E | Production Assurance Testing and Evaluation |
| PMO | Program Management Office |
| SCAR | SOF Combat Assault Rifle |
| STRAC | Standards in Training Commission |
| SOF | Special Operations Forces |
| SOPMOD | Special Operations Peculiar Modification |
| T | Threshold |
| TBD | To Be Defined |
| TECOM | Test and Evaluation Command |
| TET | Technical Evaluation Team |
| UID | Unique Identification |
| URG | Upper Receiver Group |

| | |
|---|---|
| VBL | Visible Bright Light |
| WPNAC | Weapons Accessories |