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OPERATOR MANUAL

FOR THE

Multi-Use Minimonocular NVG (MUM^2)

MFG P/N: NVM-000-A1/A2

ITI-Manual Revision 2.2 – March 2005

SAFETY SUMMARY

CAUTIONS

The MUM^2 is a precision optical instrument and must be handled carefully at all times to prevent damage.

Do not scratch the external lens surfaces or touch them with your fingers.

The demist coating on the demist shield can be damaged if cleaned while wet or cleaned with wet lens paper. Clean only when the demist shield is dry and only use dry lens paper.

To protect the image intensifier, keep the lens cap on the objective lens when the monocular is not in use or when operated in daylight conditions.

Be careful not to touch the glass surfaces. If you get fingerprints or contamination of the glass surfaces, use lens paper to clean the sacrificial window. If moisture is needed, use your breath to mist the surface of the glass prior to wiping.

The IR illuminator is a light that is invisible to the unaided eye for use during conditions of extreme darkness. However, the light from the illuminator can be detected by a night vision equipped enemy.

It is recommended that the eyecup be replaced with the optional shuttered eye guard during weapon-mounted use.

NOTES

The MUM^2 is not a weapon sight, however, it can be used in conjunction with a collimated dot sight or laser aiming device.

When utilizing the MUM2 for driving purposes, the goggles may not be used in the hand-held mode. The goggles must be worn on the head- or helmet-mounted position.

At operating temperatures below –20°C (-4°F), alkaline batteries are not recommended, as operating life will be severely reduced. Lithium-iron disulfide 1.5V AA batteries, 123A 3.0VDC Lithium, or equivalent should be used below –20°C (-4°F).

The purpose of the illuminator is for viewing at close distance up to 3 meters when additional illumination is needed.

To move the power switch from the OFF position, you **must** push in the switch, and then turn it.

Make sure that shading is not the result of improper eye-relief adjustment.

EQUIPMENT LIMITATIONS

To avoid physical and equipment damage when using the MUM^2, carefully read and understand the following safety precautions.

- The equipment requires some night light (moonlight, starlight, etc.) to operate. The level of performance depends upon the level of light.
- Night light is reduced by passing cloud cover, while operating under trees, in building shadows, etc.
- The equipment is less effective viewing into shadows and other darkened areas.
- The equipment is less effective through rain, fog, sleet, snow or smoke. The equipment will not “see” through dense smoke.
- Adjust vehicular speed to prevent overdriving the range of view when conditions of possible reduction or loss of vision exist.
- Long exposure to high levels of external light source for extended periods of time can significantly reduce the service life of the image intensifier tube and permanently degrade the equipment.

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HOW TO USE THIS MANUAL

Usage

You must familiarize yourself with the entire manual before operating the equipment. Read the complete maintenance task before performing maintenance and follow all **WARNINGS**, **CAUTIONS**, and **NOTES**.

Manual Overview

The manual contains sections for Operating and Maintaining the Multi-Use Minimonocular NVG.

Components of End Item are in **Appendix A**.

Repair Parts List is in **Appendix B**.

SECTION I
GENERAL INFORMATION

Figure 1- 1 Helmet Mounted MUM^2

1.1 GENERAL INFORMATION

a. Type of Manual:
Operator (Including Repair Parts List).

b. Model Numbers and Equipment Name:
NVM-000-A1 – MUM^2 without I^2 tube
NVM-000-A2 – MUM^2 with I^2 tube

c. Manufacturer:

Insight Technology, Incorporated
9 Akira Way
Londonderry, NH 03053

d. Purpose of Equipment:
To provide the soldier with the ability to observe at night under moonlight and starlight conditions. The MUM^2 can be handheld, head mounted, helmet mounted or weapon mounted to enable walking, driving, weapon firing, short-range surveillance, map reading, vehicle maintenance, underwater diving, and administering first aid. The unit allows for horizontal and vertical adjustments when head or helmet mounted and is also equipped with an infrared light-emitting source.

1.2 WARRANTY INFORMATION:
This item shall conform to design, manufacturing, and performance requirements and be free from defects in material and workmanship for a period of one (1) year from the date of shipment. If item is defective, notify your Service Command Technical point of contact.

1.3 TECHNICAL INFORMATION:
For technical information contact Insight Technology directly at 603.626.4800, or techinfo@insight-tek.com or your Service Command point of contact.

1.4 LIST OF ABBREVIATIONS

cm..... Centimeters
BAT ..... Battery
g ..... Grams
Illum..... Illuminator
in..... Inches
IR..... Infrared
m ..... Meters
mm ..... Millimeters
MUM^2 ..... Multi-Use Minimonocular NVG
NVG's ..... Night Vision Goggles
Oz.....ounces

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SECTION II
EQUIPMENT DESCRIPTION

2.1 SYSTEM DESCRIPTION

The MUM^2 is a hand-held, head-mounted, helmet-mounted, or weapon-mounted night vision system that enables walking, driving, weapon firing, short-range surveillance, map reading, vehicle maintenance, underwater diving, and administering first aid in both moonlight and starlight. Each unit allows for vertical adjustment (by using head straps), fore-and-aft adjustment, objective lens focus, and eyepiece focus. The device is also equipped with an infrared light-emitting source.

2.2 WEIGHT, DIMENSIONS, AND PERFORMANCE

Figure 2- 1 Weight, Dimensions, and Performance

WEIGHT AND DIMENSIONS	
Weight (with mounting hardware)	265 g
Length	10.4 cm
Width	4.4 cm
Height	6.4 cm
PERFORMANCE	
Magnification	1x
f-Number	1.2
Field of View	40° +/- 2° with 18 mm I^2 tube format
Focus Range	25cm (9.8in.) to infinity
Eyepiece Diopter Adj.	-6 to +4
Eye Relief	27mm
Voltage	3.0 VDC
Power Requirements	1 DL123A or 1 AA
Waterproof	20 meters
CONTINUOUS OPERATION	
1 DL123A battery	>40 hours
1 AA battery	>20 hours

2.3 DESCRIPTION OF MAJOR COMPONENTS

Figure 2- 2 MUM^2 Major Components

Table 2- 1 MUM^2 Major Components

ITEM	DESCRIPTION
Kit Components	
1	Weapon Mount Assembly
2	Neck Cord
3	Headmount Adapter Assembly
4	Eye Cup
5	Shoulder Strap
6	Lens Cap
7	Sacrificial Window
8	MUM^2 Assembly
9	Demist Shield
10	Headmount Assembly
11	Lens Tissue
12	AA Battery, Alkaline, 1.5v
13	Battery Sleeve Adapter
14	Lithium Battery DL123, 3v
15	Browpads (Thin, Medium, Large)
16	Operator Manual
17	Soft Carrying Case
Optional Components	
Camera/Camcorder Adapter	
Dive Window	
Flip-up Helmet Mount	
Dual Carriage Mount	
3x or 5xAfocal Lens	
3x Lens (Custom Order)	
Infrared Flood/Spot	
Compass	
Shipping/Storage Case (optional)	
Shuttered Eyeguard (optional)	

2.3.1 MAJOR COMPONENTS

1. Weapon Mount Assembly
A small arms adapter that allows the MUM^2 to be mounted on a weapon.

2. Neck Cord
The neck cord is worn around the neck and also tethers the lens cap to the MUM^2.

3. Headmount Adapter Assembly
This item attaches the MUM^2 to the head mount or helmet mount.

4. Eye Cup
A rubber cup used for operator comfort, to protect eyepiece, and for nighttime back light security.

5. Shoulder Strap
Allows the carrying bag to be slung across the shoulder for ease of carrying.

6. Lens Cap
A cap used to protect the lens, and for testing the unit in daylight.

7. Sacrificial Window
A replaceable window supplied to protect the objective lens during operation in adverse conditions. This o-ring sealed window also doubles as the objective lens dive window.

8. MUM^2 Assembly
The monocular night vision device with unity magnification.

9. Demist Shield
Used to prevent eyepiece lenses from becoming fogged. This o-ring sealed window also doubles as the objective lens dive window.

10. Headmount Assembly
Adjustable universal assembly that secures the MUM^2 to the operator's head providing hands free operation.

11. Lens Tissue
Lens Tissue cleans the lenses during maintenance.

12. Battery, AA Alkaline, 1.5v
A single, AA alkaline battery is used to power the unit.

13. Battery Sleeve Adapter
Allows the MUM^2 to accept a single, standard AA alkaline battery used to power the unit, instead of the Lithium Battery.

14. Battery, DL123A Lithium, 3v
A single, 123A lithium battery is used to power the unit.

15. Brow pads (Thin, Medium, or Large)
Varying thickness brow pads are provided to allow the head mount assembly to adapt to differing head sizes.

16. Operator Manual
Provides equipment description, use of operator controls and preventative maintenance.

17. Soft Carrying Case
A protective nylon bag used for storing the MUM^2 and accessories.

2.3.2 OPTIONAL COMPONENTS (not shown)

Camera/Camcorder Adapter
This adapter attaches to the eyepiece for collection of imagery from the MUM^2.

Dive Window
This window attaches to the MUM^2 prior to submerging to protect it during diving operations.

Flip-up Helmet Mount
Provides mount interface for the MUM^2 to a range of ballistic helmets.

Dual Carriage Mount
Adapter that allows two MUM^2's to be attached in a binocular configuration

3x or 5x Afocal Lens
Attaches to the MUM^2 for enhanced range performance

3x Lens (Custom Order)
Attaches to the MUM^2 for enhanced range performance

Infrared Flood/Spot
Focusing lens for the extended source IR LED to narrow or widen the illumination beam.

Compass
Projects magnetic azimuth orientation into the operator's field of view when using the MUM^2.

Shipping/Storage Case
A hard plastic case designed to protect all MUM^2 components during shipping/storage.

Shuttered Eyeguard
Used to maintain display backlight security.

SECTION III
MOUNTING PROCEDURES

3.1 MOUNTING PROCEDURES

3.1.1 Mounting the MUM^2 to the weapon:
Loosen the clamping knob on the weapon mount. Position the monocular weapon mount on to the weapon's mounting rail. Adjust the fore/aft position of the monocular as necessary by loosening the clamping knob. Position the weapon mount on the rail and tighten by turning the clamping knob (see Figure 3- 1).

Figure 3- 1 Attaching Weapon Mount to Weapon

Align the monocular and the weapon mount. Slide the monocular rearwards until the alignment boss aligns with the alignment groove on the weapon mount. Push until the monocular locks into the weapon mount (see Figure 3- 2).

Figure 3- 2 Attaching MUM^2 to Weapon Mount

CAUTION

It is recommended that the eyecup be replaced with the optional shuttered eyeguard during weapon-mounted use.

NOTE

The MUM^2 is not a weapon sight, however, it can be used in conjunction with a collimated dot sight or laser aiming device.

3.1.2 Mounting the MUM^2 to a Head/Helmet Mount Adapter:

To mount the MUM^2 to a head/helmet mount, perform the following:

1. Hold the head/helmet mount adapter by the large knurled knob with the (small) rotational knob facing forward.
2. Rotate the knurled knob and slide the mount onto the center of the monocular rail.
3. Ensure that the mount is fully locked into the recoil stop on the monocular.

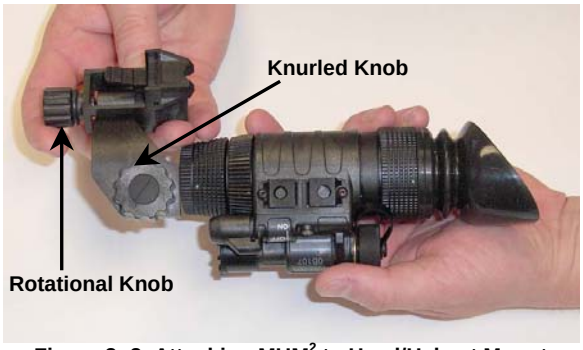

Figure 3- 3 Attaching MUM^2 to Head/Helmet Mount Adapter

3.1.3 Attaching the MUM^2 with Head/Helmet Mount Adapter to the Head Mount:

Align the head mount and the head/helmet mount adapter. Move the monocular rearwards until the Alignment Boss meets the Alignment Groove on the head mount. Push until the monocular locks into the head mount.

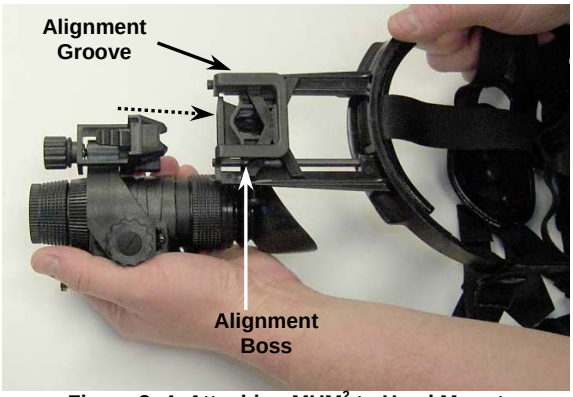

Figure 3- 4 Attaching MUM^2 to Head Mount

SECTION IV
OPERATING PROCEDURES

4.1 OPERATING INSTRUCTIONS

4.1 BATTERY INSTALLATION

The MUM^2 operates with one DL-123A battery or one AA battery when using the battery adapter.

Table 4- 1 Battery Life

Estimated Battery Life	
Battery Type	**Usage**
DL-123A	**> 40 Hours**
Standard AA	**> 20 Hours**

CAUTION

To protect the image intensifier, keep the lens cap on the objective lens when the monocular is not in use or when operated in daylight conditions.

NOTE

At operating temperatures below –20°C (-4°F), alkaline batteries are not recommended, as operating life will be severely reduced. Lithium-iron disulfide batteries or equivalent should be used below –20°C (-4°F).

4.1.1 Install DL-123A battery as follows:
Unscrew the battery cap (A) and insert the battery (B), observing the polarity as indicated. Replace the battery cap (A) and screw cap hand tight.

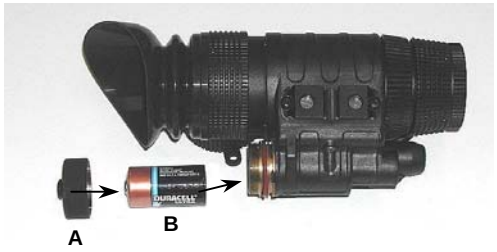

Figure 4- 1 DL-123A Battery Installation

4.1.2 Install standard AA batteries as follows:
Unscrew the battery cap (A) and screw in the battery adapter (C). Insert AA battery (B) observing the polarity as indicated. Replace the battery cap and screw cap hand tight.

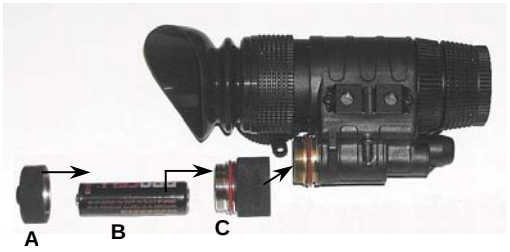

Figure 4- 2 AA Battery Installation

4.2 MECHANICAL FUNCTIONS

The mechanical functions of the MUM^2 allow for differences in the physical features of individual operators and are used to operate the system. These functions include the On/Off/On IR control, eye relief (see Section III Mounting Procedures – Headmount Adjustments), diopter adjustment, and objective lens focus.

Figure 4- 3 Mechanical Functions

4.3 ON/OFF/IR POWER SWITCH

This three-position switch performs as follows:

- **OFF** – System is off.
- **ON** – Push in and turn the knob to the ON position to activate the monocular.
- **IR** – Push and turn the knob counterclockwise to activate the infrared illuminator.

Low battery Indicator
A yellow indicator light is visible through the eyepiece – located just outside the intensified field of view. When illuminated, it indicates a low battery condition.

Objective Lens Focus
The objective lens can be adjusted for the sharpest image of the viewed object. Turn the objective lens counterclockwise to adjust towards infinity. Turn clockwise to bring the focus in for close-up objects.

Diopter Adjustment Ring
The diopter adjustment ring is used to focus the eyepiece for use without the need for glasses.

NOTE

To move the power switch from the OFF position, you **must** push in on the switch while turning it.

4.4. INFRARED (IR) ILLIUMINATOR OPERATIONS

Push and turn the On/Off/On IR switch knob to the On IR position, observing that a red light appears in the eyepiece to indicate that the IR illuminator is operating.

CAUTION

The IR illuminator is a light that is invisible to the unaided eye for use during conditions of extreme darkness. However, the light from the illuminator can be detected by the enemy using night vision devices.

NOTE

The purpose of the illuminator is for viewing at close distance up to 3 meters when additional illumination is needed.

4.5 SACRIFICAIL WINDOW INSTALLATION

Perform the following procedure to install the sacrificial window onto the objective lens.

1. Remove the lens cap from the objective lens of the monocular.
2. Hold the sacrificial window by the notched end and thread it clockwise into the end of the objective lens. Do not over tighten.
3. Replace the lens cap onto the objective lens over the sacrificial window.

CAUTION

Be careful not to touch the glass surfaces. If fingerprints or contamination are on the glass surfaces, use lens paper to clean the sacrificial window. If moisture is needed, use your breath to mist the surface of the glass prior to wiping.

4.6 DEMIST SHIELD INSTALLATION

Perform the following procedure to install the sacrificial window onto the objective lens.

1. Carefully remove the eyecup.
2. With the threaded end of the demist shield towards the eyepiece, thread the shield on by turning in a clockwise direction. Do not over tighten, and replace the eyecup.

CAUTION

The demist coating on the demist shield can be damaged if cleaned while wet or cleaned with wet lens paper. Clean only when the demist shield is dry and with dry lens paper.

SECTION V
OPERATIONAL DEFECTS

5.1 OPERATIONAL DEFECTS

Operational defects relate to the reliability of the image intensifier and are an indication of instability. If identified, they are an immediate cause for rejecting the MUM^2. They include shading, edge glow, flashing, flickering, and intermittent operation.

5.1.a. Shading

If shading is persistent, you will not see a fully circular image (Figure 5-1). Shading is very dark and you cannot see an image through it. Shading always begins on the edge and migrates inward eventually across the entire image area. Shading is a high contrast area with a distinct line of demarcation. Return the MUM^2 to the armorer.

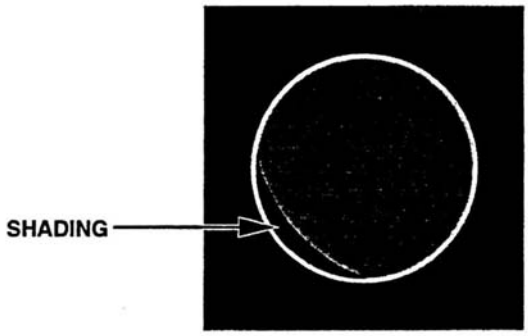

Figure 5- 1 Shading

NOTE

Make sure the shading is not the result of improper eye-relief adjustment.

5.1.b. Edge Glow

Edge glow is a bright area (sometimes sparkling) in the outer portion of the viewing area (see Figure 5-2). To check for edge glow, block out all light by cupping a hand over the lens. If the image tube is displaying edge glow, the bright area will still show up. Return the MUM^2 to the armorer.

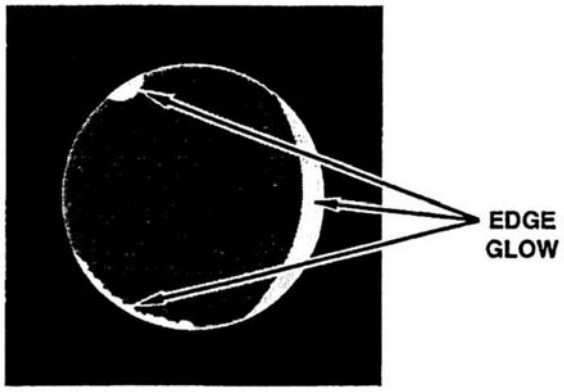

Figure 5- 2 Edge Glow

5.1.c. Flashing, Flickering, or Intermittent Operation

The image may appear to flicker or flash. If there is more than one flicker, check for loose battery adapter or weak battery. Return the MUM^2 to the armorer.

5.1.d. Cosmetic Blemishes

These are usually the result of manufacturing imperfections that do not affect image intensifier reliability and are not normally a cause for rejecting an MUM^2. However, some types of blemishes can get worse over time and interfere with the ability to perform the mission. If you believe a blemish is cause for rejection, record the specific nature of the problem on the maintenance forms and identify the position of the blemish by using the clock method and approximate distance from the center (e.g., 5:00 toward the outside, 2:30 near the center, or 1:00 midway). The following are cosmetic blemishes:

1. Bright Spots. A bright spot is a small, non-uniform, bright area that may flicker or appear constant (Figure 5-3). Not all bright spots make the MUM^2 rejectable. Cup your hand over the lens to block out all light. If the bright spot remains, return the MUM^2 to the armorer. Bright spots usually go away when the light is blocked out. Make sure any bright spot is not simply a bright area in the scene you are viewing. **Bright spots are acceptable if they do not interfere with the ability to view the outside scene and the ability to perform the mission.**

2. Emission Points. A steady or fluctuating pinpoint of bright light in the image area and does not go away when all light is blocked from the objective lens of the MUM^2 (Figure 5-3). The position of an emission point within the image area does not move. Not all emission points make the MUM^2 rejectable. Make sure any emission point is not simply a point light source in the scene you are viewing. **Emission points are acceptable if they do not interfere with the ability to perform the mission.**

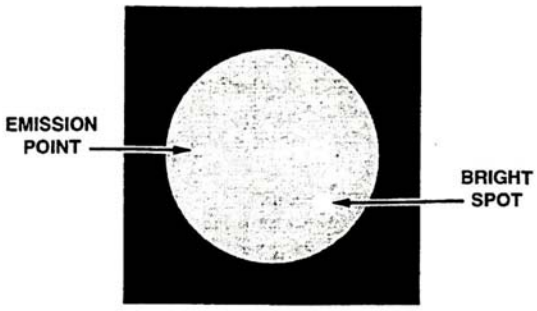

Figure 5- 3 Bright Spots and Emission Points

3. Black Spots. These are cosmetic blemishes in the image intensifier or dirt or debris between the lenses. Black spots are acceptable as long as they do not interfere with viewing the image. **No action is required if this condition is present unless the spots interfere with the operator's ability to perform the mission.**

4. Fixed-Pattern Noise. This is usually a cosmetic blemish characterized by a faint hexagonal (honeycomb) pattern throughout the viewing area that most often occurs at high light levels or when viewing very bright lights (See Figure 5-4). This pattern can be seen in every image intensifier if the light level is high enough. **This condition is acceptable as long as the pattern does not interfere with viewing the image and interfere with the ability to perform the mission.**

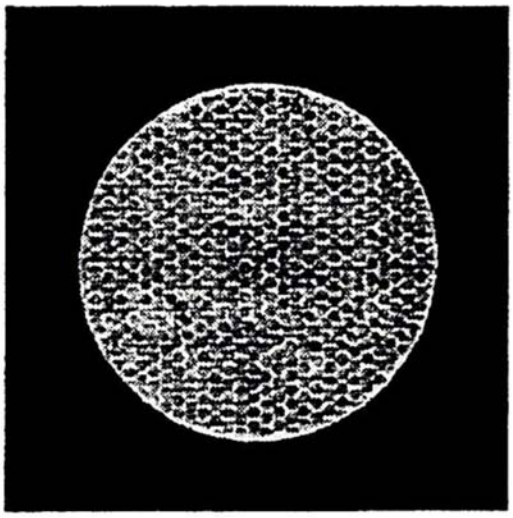

Figure 5- 4 Fixed Pattern Noise

5. Chicken Wire. An irregular pattern of dark thin lines in the field of view either throughout the image area or in parts of the image area (See Figure 5-5). Under the worst-case condition, these lines will form hexagonal or square-wave shaped lines. **No action is required if this condition is present unless it interferes with viewing the image and interferes with the operator's ability to perform the mission.**

Figure 5- 5 Chicken Wire

SECTION VI
MAINTENANCE

6.1 PREVENTIVE MAINTENANCE

The user's environment will determine the interval level (i.e., deployment, mission, use) for the preventive maintenance steps listed in the table below.

Table 6- 1 Preventive Maintenance Checks and Services for MUM[2]

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If:
1.	Before	Maintenance	Open carrying case, inventory items and check records for 180-day services completed.	Not Current.
			Previously recorded faults on maintenance records.	Fault not corrected.

Table 6- 1 Preventive Maintenance Checks and Services for MUM^2 (cont.)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If
		MONOCULAR		
2.	Before/After	Optical Surfaces	Inspect lens for dirt, fingerprint residue, chips, or cracks. If necessary, clean and dry lens with water and lens tissue.	Scratches or chips hinder vision with monocular turned on, or if cracks are present.
3.	Before/After	External Surfaces	Inspect for cracks or damage. Scratches and gouges are OK if operation is not affected	Cracked or damaged

Table 6- 1 Preventive Maintenance Checks and Services for MUM^2 (cont.)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If
4.	Before/After	Battery Adapter / Compartment	Check to make sure battery adapter is present. Inspect for corrosion, moisture, corroded or defective contacts, and that o-ring is present.	Adapter is missing, contacts damaged or corroded, or o-ring is missing.
5.	Before/After	Diopter Adjustment Ring	Rotate diopter adjustment ring to make sure the eyepiece is not too tight or too loose. Range is approximately ½ turn.	Binding, not moving freely or too loose.

Table 6- 1 Preventive Maintenance Checks and Services for MUM^2 (cont.)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If
6.	Before/After	Eyecup	Inspect for dirt, dust, and cracked or torn cup. Inspect for bent, broken or improperly fitting eyecup. If necessary, clean with water.	
7	Before/After	Objective Lens Focus Ring	Rotate objective lens focus ring to ensure free movement (range is approx. 1/3 turn	Binding or not moving freely.
8.	Before/After	Lens Cap	Inspect for cracked, torn, or missing lens cap.	

Table 6- 1 Preventive Maintenance Checks and Services for MUM^2 (cont.)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If
9.	Before/After	On/Off Switch	Turn switch OFF to ON. Each position should have a definite stopping point. Inspect for broken or missing knob.	Switch has no definite stopping points or knob is broken or missing.
10.	Before/After	Viewed Image	Refer to Section V – Operation Defects – to inspect for operational defects.	Flickering, flashing, edge glow, or shading is observed.
11.	Before/After	Strap Pads	Inspect for cuts, tears, fraying, holes, cracks, or defective fasteners.	Damage causes straps or pads to be unserviceable.

Table 6- 1 Preventive Maintenance Checks and Services for MUM^2 (cont.)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If
12.	Before/After	Socket	Inspect for dirt, dust, or corrosion. Insert MUM^2 latch into socket to verify secure attachment of MUM^2 to head mount. If necessary, clean socket with water.	Damaged, latch won't work or too loose.
13.	Before/After	For and Aft Adjustments	Press the socket-release button and check for free motion. Inspect for damage.	Binding, damaged or non-operational slide mechanism.

Table 6- 1 Preventive Maintenance Checks and Services for MUM^2 (cont.)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If
14.	Before/After	Straps	Inspect for cuts, tears, fraying, holes, cracks, or defective fasteners.	Damage causes straps to be unserviceable.
15.	Before/After	Head mount / Helmet Mount Adapter	Inspect for dirt, dust, or corrosion. Insert into head/ helmet mount socket to verify secure attachment.	Damaged, will not latch securely.
16.	Before/After	Small Arms Mount Adapter	Inspect for dust, dirt, or corrosion.	Damaged, will not mount to MUM^2 or will not mount to weapon mount rail.

Table 6- 1 Preventive Maintenance Checks and Services for MUM^2 (cont.)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If
CAUTION: The demist coating on the demist shield can be damaged if cleaned while wet (or cleaned with wet lens paper). Clean only when the demist shield is dry and only use dry lens paper.				
17.	Before/After	Demist Shield	Inspect for dirt, dust, scratches or damage. If necessary, clean when shield is dry with dry lens tissue only.	Damage or scratches hinder vision with MUM^2 on.
18.	Before/After	Sacrificial Window	Inspect for dirt, dust, scratches, or damage. If necessary, clean.	Damage or scratches hinder vision with MUM^2 on.

Table 6- 1 Preventive Maintenance Checks and Services for MUM^2 (cont.)

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable If
19.	Before/After	3X Magnifier	Inspect optical surface for dirt, dust, scratches or cracks.	Damage or scratches hinder vision.
20.	Before/After	Carrying Case	Remove all items and shake out loose dirt or foreign material. Inspect for tears, cuts, excess wear or damage to mounting clips.	
21.	Before/After	Shoulder Strap	Inspect for cuts, tears, or excess wear or damaged clips.	

6.2 OPERATOR TROUBLESHOOTING

Table 6-2 lists common malfunctions that you may find with your equipment. Perform the tests, inspections, and corrective actions in the order they appear in the table.

This table cannot list all the malfunctions that may occur, all the tests and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If the equipment malfunction is not listed or actions listed do not correct the fault, notify your maintainer.

Table 6- 2 Operator Troubleshooting for MUM^2

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Monocular fails to activate.	Visual. Check for defective, missing or improperly installed batteries.	Turn switch to OFF position and then ON. Replace batteries or install correctly.
2. IR illuminator fails to activate.	In a dark location with system turned on, activate IR. Visually check IR illuminator operation; scene should brighten.	If IR illuminator fails to activate, refer to higher level maintenance.
3. IR indicator fails to activate.	Visual.	Refer to higher level of maintenance.
4. Afocal lens does not fit	Check for o-rings. Check correct adapter.	Install proper o-rings (2 each). Use MUM^2 adapter.

Table 6- 2 Operator Troubleshooting for MUM^2 (cont.)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
5. Poor image quality	Check objective lens or eyepiece focus. Check for fogging or dirt on lens.	Refocus. Clean lens surface. If image quality is still poor, refer to higher level of maintenance.
6. Light visible around eyecup	Check eye-relief distance. Check eyecup for resiliency.	Readjust for proper eye-relief distance. If eyecup is defective, refer to higher level of maintenance.
7. Diopter adjustment cannot be made	Check to see if the diopter adjustment ring is bent or broken	If damaged, refer to higher level of maintenance.

Table 6- 2 Operator Troubleshooting for MUM^2 (cont.)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
8. Battery adapter difficult to remove.	Visually inspect for the presence of an o-ring Check for damaged battery adapter.	If o-ring is missing, replace. If damaged, refer to higher level of maintenance.
9. Head straps cannot be tightened	Check for defective buckles, fasteners or straps.	If damaged, refer to higher level of maintenance.
10. Head mount or helmet mount socket and head/helmet mount adapter latch does not catch.	Check socket or latch for dirt. Check socket or latch for damage.	Clean socket and latch. If damaged, return both head mount or head/helmet mount adapter to higher level of maintenance.
11. Helmet mount will not tighten to helmet.	Inspect mounting hardware for damage.	If damaged, refer to higher level of maintenance.

6.3 CLEANING THE MUM^2

CAUTIONS

The MUM^2 is a precision optical instrument and must be handled carefully at all times to prevent damage.

Do not scratch the external lens surfaces or touch them with your fingers.

Wiping a demisting shield with lens paper while wet (or with wet lens paper) can damage the coating.

Clean monocular with water, if necessary, and dry thoroughly. Clean lenses with lens paper (and water, if necessary, except for demisting shield).

6.4 HEADMOUNT MAINTENANCE

6.4.a. Brow pad Replacement:
Replace the brow pads when cracked, torn, or contaminated. Perform the following procedure to remove and replace the brow pads. Firmly grasp the head mount and remove the old brow pad. Gently press on the new brow pad. Lightly smooth out any wrinkles in the new brow pad.

6.4.b. Neck pad Reinstallation:
During operation of the monocular, it is possible for the neck pad to become separated from its position on the headband. Perform the following procedures to reinstall the neck pad.

1. Lift the upper headband strap retention tab (see Figure 6-1), allowing the neck pad strap to be inserted underneath.

2. Slip the neck pad strap all the way under the upper strap retention tab and then pull the lower part of the neck pad strap under the lower strap retention tab.

3. Repeat steps 1 and 2 for the other side of the headband and neck pad if necessary.

Figure 6- 1 Neckpad Reinstallation

6.4.c. Lacing the Sliding Bar Buckle:

1. While wearing and/or adjusting the head mount, it is possible for a strap to slip out of a slide fastener. Perform the following procedure to replace the strap and sliding bar buckle.

2. Thread the strap from the inside of the buckle over the moveable sliding bar (see Figure 6-2). Thread the strap back through the buckle but this time under the sliding bar and over the serrated part of the buckle.

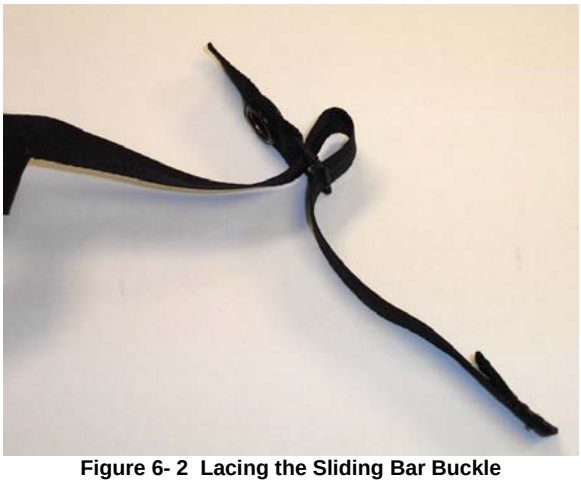

Figure 6- 2 Lacing the Sliding Bar Buckle

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APPENDIX A
END ITEM COMPONENTS

Figure A- 1 Components of the End Item

Table A- 1 Components of the End Item

ITEM	DESCRIPTION	PART NO.
1	Weapon Mount Assembly	NVM-024
2	Neck Cord	7B-306
3	Headmount Adapter Assembly	NVM-042
4	Eye Cup	7B-422
5	Shoulder Strap	7B-267
6	Lens Cap	NVM-178
7	Sacrificial Window	NVM-032
8	MUM^2 Assembly	NVM-001-A1
9	Demist Shield	NVM-033
10	Headmount Assembly	7B-268-A1
11	Lens Tissue	7B-626
12	AA Battery, Alkaline, 1.5v	M30-044
13	Battery Sleeve Adapter	NVM-038
14	Lithium Battery DL123, 3v	DL123A
15	Browpads (Thin, Medium, Large)	7B-280, 7B-435, 7B-436
16	Operator Manual	NVM-MANUAL
17	Soft Carrying Case	7B-262

APPENDIX B
REPAIR PARTS LIST

Figure B- 1 Repair Parts

Table B- 1 Repair Parts List

ITEM	DESCRIPTION	PART #
1	Shipping/Storage Case	7B-257-2
2	Weapon Mount Assembly	NVM-024
3	Shuttered Eyeguard	
4	Neck Cord	7B-306
5	Lens Tissue	7B-626
6	Headmount Adapter Assembly	NVM-042
7	Eye Cup	7B-422
8	Shoulder Strap	7B-267
9	Lens Cap	NVM-178
10	Sacrificial Window	NVM-032
11	MUM^2 Assembly	NVM-001-A1
12	Demist Shield	NVM-033
13	Headmount Assembly	7B-268-A1
14	AA Battery, Alkaline, 1.5v	M30-044
15	Battery Sleeve Adapter	NVM-038
16	Lithium Battery DL123,3v	DL123ABK
17	Browpads (Thin, Medium, Large)	7B-280,435,436
18	Manual	NVM-MANUAL
19	Soft Carrying Case	7B-262
20	Battery Cap Assembly	NVM-142
21	Purge Screw	7B-315
22	Battery Cap Retainer	NVM-156
23	Objective Lens Assembly	NVM-030
24	Eyepiece Lens Assembly	NVM-035
25	Electronics Assembly	NVM-020
26	I^2 Tube Housing Assembly	NVM-036
27	Light Pipe	NVM-074
28	Pan head Screw (2)	MHW3212-007B

For Technical Information

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