ATN FIITS-14

FUSION IMAGE INTENSIFICATION THERMAL SYSTEM

OPERATOR'S MANUAL (FIITS-14) REVISION 3 - APRIL 2010

operator's manual

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AMERICAN TECHNOLOGIES NETWORK CORP.

Register your product warranty online at www.atncorp.com/warranty

Manual (FIITS-14) Revision 3 - 2010

SAFETY SUMMARY

STUDY CAREFULLY THIS MANUAL BEFORE TURNING ON AND OPERATING THIS PRODUCT.

CAUTIONS

The ATN FIITS-14 Fusion Image Intensification Thermal System are precision optical-electronic instruments and requires careful handling. To provide safe use of the systems the following instructions should be observed:

- Do not dismantle the device.
- Keep the device clean; protect it from moisture, sharp temperature drops and shocks.
- Be careful not to touch the glass surfaces. If you put fingerprints on, or contaminate the glass surfaces, use only clean and soft materials to clean it.
- Do not leave the device in on position during stops in operation.
- Remove the battery from the device for the period of storage.
- Keep the lens cap on the objective lens when the Night Vision Unit is not in use or when checked out in daylight conditions.
- The IR illuminator is the 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 others when using night vision devices.
- If you use the rubber eyecaps for a long period of time, you may suffer skin inflammation. If you develop any symptoms, consult a doctor immediately.

CAUTION:

THIS PRODUCT CONTAINS NATURAL RUBBER LATEX WHICH MAY CAUSE ALLERGIC REACTIONS

WARNING

Do not permanently attach the device to dynamic-mount applications that continuously transmit vibration (such as on vehicles or heavy machinery).

WARNING

Do not point the device directly at any high-intensity objects that you must not view with your eyes (such as the sun or a welding arc). If you do, you will damage the device.

WARNING

Operating FIITS-14 outside of its specified operating temperature range or voltage range can cause permanent damage and will void the warranty.

WARNING

Use the power button to turn the device off before you remove power (remove batteries or disconnect external power supply).

WARNING

FIITS-14 operates over a wide operating temperature range (-20°C to +50°C). Not all batteries are specified over this same temperature span. Check the manufacturer's specifications of your selected battery to verify the valid temperature range.

WARNING

Do not install batteries of different types (lithium with lithium-ion rechargeable). All batteries must be of the same type.

WARNING

Always replace ALL 2 batteries in Thermal Vision Unit. If you install new batteries with used batteries, the result may be dangerous.

WARNING

Do not replace batteries in a possibly explosive environment, such as a gas station (or any place where you must turn off your vehicle engine). If you do, sparks can cause an explosion.

WARNING

Remove the batteries before you store the device for extended periods (2 weeks or more).

WARNING

Do not carry batteries in pockets containing metal objects such as coins, keys, etc. Metal objects can cause the batteries to short circuit and become very hot. In the case of lithium batteries, a short circuit could cause them to explode.

WARNING

Observe battery manufacturer's guidelines for safe handling and proper disposal of batteries.

EQUIPMENT LIMITATIONS

• The FIITS-14 thermal detector spectral band (7 to 14 mkm) provides a better penetration through smoke, smog, dust, water vapor etc.

• Infrared radiation does not travel through glass and therefore the Thermal Vision Unit does not sense objects if they are behind a glass window.

• The Night Vision Unit 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 Night Vision Unit is less effective viewing into shadows and other darkened areas.

• The Night Vision Unit is less effective through rain, fog, sleet, snow or smoke.

• The Night Vision Unit will not "see" through dense smoke.

• The purpose of the IR illuminator is to view at close distance up to 3 meters when additional illumination is needed.

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SECTION I

INTRODUCTION

1.1 GENERAL INFORMATION

1.1.1. DEVICE

This manual contains instructions for use in operating and maintaining the ATN FIITS-14 fusion image intensification thermal system . Throughout this manual, the ATN FIITS-14 will be referred to as the device or FIITS. Thermal Vision Unit of FIITS will be referred to as TVU. Night Vision Unit of FIITS will be referred to as NVU.

1.1.2. REPORTS

Reports from the user on recommendations for improvements are encouraged. Send reports to the address below.

American Technologies Network Corp.
1341 San Mateo Avenue
South San Francisco, CA 94080
(800) 910-2862
(650) 989-5100
(650) 875-0129 fax
info@atncorp.com
www.atncorp.com

1.1.3. STORAGE

Storage of FIITS should be done in the factory packing and after a thorough PMCS as outlined in Section 5.1. of this manual. This will ensure the device remains in mission ready condition during storage. Battery should be stored separately from the device.

The device should not be placed on the floor, in any area exposed to high temperatures or direct sunlight. Presence of acid and alkaline vapor, as well as of other aggressive admixtures in the air is unacceptable.

1.1.4. WARRANTY INFORMATION

ONE YEAR PRODUCT WARRANTY

This product is guaranteed to be free from manufacturing defects in material and workmanship under normal use for a period of 1 (one) years from the date of purchase. In the event a defect that is covered by the foregoing warranty occurs during the applicable period stated above, ATN, at its option, will either repair or replace the product, and such action on the part of ATN shall be the full extent of ATN's liability, and the Customer's sole and exclusive remedy. This warranty does not cover a product (a) used in other than its normal and customary manner; (b) subjected to misuse; (c) subjected to alterations, modifications or repairs by the Customer of by any party other than ATN without prior written consent of ATN; (d) special order or "close-out" merchandise or merchandise sold "as-is" by either ATN or the ATN dealer; or (e) merchandise that has been discontinued by the manufacturer and either parts or replacement units are not available due to reasons beyond the control of ATN. ATN shall not be responsible for any defects or damage that in ATN's opinion is a result from the mishandling, abuse, misuse, improper storage or improper operation, including use in conjunction with equipment which is electrically or mechanically incompatible with or of inferior quality to the product, as well as failure to maintain the environmental conditions specified by the manufacturer. This warranty is extended only to the original purchaser. Any breach of this warranty shall be waived unless the customer notifies ATN at the address noted below within the applicable warranty period.

The customer understands and agrees that except for the foregoing warranty, no other warranties written or oral, statutory, expressed or implied, including any implied warranty of merchantability or fitness for a particular purpose, shall apply to the product. All such implied warranties are hereby and expressly disclaimed.

LIMITATION OF LIABILITY

ATN will not be liable for any claims, actions, suits, proceedings, costs, expenses, damages or liabilities arising out of the use of this product. Operation and use of the product are the sole responsibility of the Customer. ATN's sole undertaking is limited to providing the products and services outlined herein in accordance with the terms and conditions of this Agreement. The provision of products sold and services performed by ATN to the Customer shall not be interpreted, construed, or regarded, either expressly or implied, as being for the benefit of or creating any obligation toward any third party of legal entity outside ATN and the Customer; ATN's obligations under this Agreement extend solely to the Customer. **ATN's liability hereunder for damages, regardless of the form or action, shall not exceed the fees or other charges paid to ATN by the customer or customer's dealer. ATN shall not, in any event, be liable for special, indirect, in-**

cidental, or consequential damages, including, but not limited to, lost income, lost revenue, or lost profit, whether such damages were foreseeable or not at the time of purchase, and whether or not such damages arise out of a breach of warranty, a breach of agreement, negligence, strict liability or any other theory of liability.

PRODUCT WARRANTY REGISTRATION

In order to validate the warranty on your product, ATN must receive a completed Product Warranty Registration Card for each unit or complete warranty registration on our website at www.atncorp.com. Please complete the included form and immediately mail it to our Service Center: ATN Corporation, 1341 San Mateo Avenue, South San Francisco, CA 94080.

OBTAINING WARRANTY SERVICE

To obtain warranty service on your unit, End-user must notify ATN service department by calling **800-910-2862** or **650-989-5100** or via e-mail service@atncorp.com to receive a Return Merchandise Authorization number (RMA). When returning please take or send the product, postage paid, with a copy of your sales receipt to our service center, ATN Corporation at the address noted above. All merchandise must be fully insured with the correct postage; ATN will not be responsible for improper postage or, missing or damaged merchandise during shipment. When sending product back, please clearly mark the RMA# on the outside of the shipping box. Please include a letter that indicates your RMA#, Name, Return Address, reason for service return, Contact information such as valid telephone numbers and/or e-mail address and proof of purchases that will help us to establish the valid start date of the warranty. **Product merchandise returns that do not have an RMA listed may be refused or a significant delay in processing may occur.** Estimated Warranty service time is 10-20 business days. End-user/customer is responsible for postage to ATN for warranty service. ATN will cover return postage/shipping after warranty repair to end-user/customer only if product is covered by aforementioned warranty. ATN will return product after warranty service by domestic UPS ground and/or domestic mail. Any other requested, required or international shipping method the postage/shipping fee will be the responsibility of the end-user/customer.

1.2. DESCRIPTION AND DATA

1.2.1. DESCRIPTION

A. PURPOSE

The FIITS system by ATN combines Image Intensification and Infrared Thermal Imaging technologies for night time low light and adverse weather conditions observation. This is achieved by combining an advanced image intensification system with a thermal imaging system.

The combination of the channels allows the user to take full advantage of both technologies by dichoptically creating a “Fused” image for enhanced night vision observation.

The results are a fused image that allows you the benefits and capabilities of both technologies. You will be able to detect both the Image Intensified Night Vision scene and the Thermal Imaging scene so you will not miss anything that you would have been unable to see by either technology separately.

The FIITS is lightweight, portable, and can be used as a hand-held binocular or a dual eye goggle.

Figure 1-1. ATN FIITS-14 Fusion Image Intensification Thermal System

B. FEATURES

FIITS has the following important features:

- High resolution imaging
- High Quality optics
- Compact, light weight and durable housing
- Head/helmet mountable for hands free usage
- “Fused” image for enhanced night vision observation
- Handheld binocular or a dual eye goggle usage
- Waterproof

1.2.2. FIITS-14 STANDARD COMPONENTS

The FIITS-14 standard components are shown in Figure 1-2 and presented in Table 1-1.

Figure 1-2. FIITS-14 Standard Components

Table 1-1. FIITS-14- Standard Components

ITEM	DESCRIPTION	QTY
1	Device	1
2	Soft Carrying Case	1
3	Hard Storage Case	1
4	Headmount Assembly	1
5	Lithium Battery CR123A	3
6	Dual Battery Adapter	1
7	Lens Tissue	1
8	Operator's Manual	1
9	Neck Lanyard	1

1) **Device**

The fusion image intensification thermal device.

2) **Soft Carrying Case**

A protective bag used for storing of FIITS and accessories.

3) **Hard Storage Case**

A protective case used for shipping/storing FIITS and accessories.

4) **Headmount Assembly**

Adjustable universal assembly that secures the ATN FIITS-14 to the operator's head providing hands free operation.

5) **Lithium Battery CR123A**

Three CR123A lithium batteries used to power the unit.

6) **Dual Battery Adapter**

Allows the NVU of FIITS to accept the CR123A Lithium and AA size batteries used to power the NVU.

7) **Lens Tissue**

Uses for cleaning of lenses surface.

8) **Operator's Manual**

Provides equipment description, use of operator controls and preventative maintenance checks and service.

9) **Neck Lanyard**

Used to prevent damage due to dropping the device.

1.2.3. FIITS OPTIONAL COMPONENTS

The FIITS optional components are shown in Figure 1-4 and presented in Table 1-3.

Figure 1-4. FIITS-14 Optional Components

Table 1-3. FIITS-14 Optional Components

ITEM	DESCRIPTION	ITEM CODE
1	RCA Video/power Adapter	
2	Flip-up Helmet Mount	ACTIOT14HMNT
3	MICH Helmet Mount Kit	ACTIFI14HMNM
4	PAGST Helmet Mount Kit	ACTIFI14HMNP
5	Life Tracker System	ACMPAN14LTS
6	Brow Pads	
7	Demist Shield	
8	Sacrificial Window	
9	Camera/Camcorder Adapter	ACMPAN14CA
10	Shoulder Strap	

1) RCA Video/power adapter

RCA Video/power adapter used for video transmission and to connect external power sources.

2) Flip-up Helmet Mount

Provides mount interface for the ATN FIITS-14 to a range of ballistic helmets.

3) MICH Helmet Mount Kit

This kit contain MICH helmet mount and adapter which allows to attach the FIITS-14 to the MICH helmet mount.

4) PAGST Helmet Mount Kit

This kit contain PAGST helmet mount and adapter which allows to attach the FIITS-14 to the PAGST helmet mount.

5) Life Tracker System

This patented feature lets you measure the hours of operation that have been used on the system.

6) Brow Pads

Changeable pads for secure head mount fit.

7) Demist Shield

Used to prevent eyepiece lenses from becoming fogged.

8) Sacrificial Window

A replaceable window supplied to protect the objective lens during operation in adverse conditions.

9) Camera/Camcorder Adapter

This adapter attaches to the NVU eyepiece to collect imagery from the NVU.

10) Shoulder Strap

1.2.4. SPECIFICATIONS

The following tables provide information pertaining to the operational, electrical, mechanical, optical and environmental characteristics for the sights.

Table 1-4. Specifications

ITEM	DATA
Magnification	1X
Focus Adjustment	Manual
Eye Relief	25mm
Operating Temperature Range	from -20°C to +50°C
Waterproof	Yes, up to 10 m submersion
Dimensions	130 x 130 x 78 mm
Weight (w/batteries)	0,75 kg
THERMAL VISION UNIT	
Magnification	1X
Objective Focal Length	25 mm
FOV	11° x 8°
Focus Range	from 1m to infinity
Focus Adjustment	Manual
Exit Pupil	14mm
Detector Type	Uncooled Microbolometer
Spectral Response	7-14 µm
Pixels	160 x 120
Pixel Size	30 x 30 µm
Angular Resolution, mrad	1,2
Thermal Sensitivity	< 0,1°C
Range to Detect a Human	475 m
Output Format	Analog PAL / NTSC
Display	OLED matrix
Display Format	SVGA, 852 x 600 pxl

ITEM	DATA
Color	Monochrome
Digital ZOOM	Fixed 2x (optional 5x)
Brightness Adjustment	Manual
Contrast Adjustment	Automatic
Power Supply	2 x 3V, CR123A type
Start-Up Time	< 3 sec
Operating Time w/one battery pack	4 hrs
External Power Supply	DC 6V, 500 mA
NIGHT VISION UNIT	
Magnification	1X
FOV	40°
Focus Range	from 0.25m to infinity
Focus Adjustment	Manual
Eye Relief	25mm
Power Supply	1 x 3V, 123A type or 1 x 1.5V, AA type
Operating Time w/o IR	50-60 hs w/ 3V battery or 25-30 hs w/1.5 battery

* ATN reserves the right to change the above specifications at any time without notice

1.2.5. MECHANICAL FUNCTION

The mechanical adjustments of the FIITS sights allow for physical differences between individual operators using the system. The device functions include the switchboard, refresh button, universal connector, eyepiece diopter adjustment ring, focusing ring, battery compartment cover, mounting rail. The mechanical controls are identified in Figure 1-4.

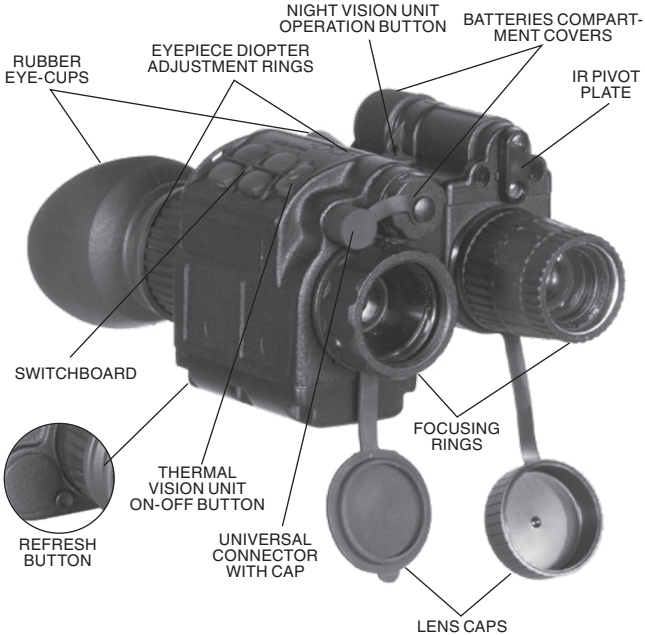


Figure 1-4. FIITS Mechanical Controls

1.2.6. OPTICAL FUNCTION

Thermal Vision Unit

The optical functions include an objective lens, thermal imaging detector and eyepiece. Infrared energy is emitted proportionally to the temperature of an object. The warmer the object, the more energy it emits. The infrared energy from the objects is focused by the optics, onto an infrared detector. The information from infrared detector is passed to electronics for image processing. The signal processing circuitry translates the infrared detector data into an image that can be viewed on the built-in OLED display. The image is observed through an eyepiece by operator.

Night Vision Unit

The optical functions include an objective lens, image intensifier and eyepiece. The objective lens collects light reflected from the night scene by the moon, stars or night sky and inverts the image and focuses that image on the image intensifier.

1.2.7. ELECTRICAL FUNCTION

Thermal Vision Unit

The electronic circuit is powered by replaceable batteries - either two 3.0 Volt lithium battery (CR123A type).

The unit can be to connect to an external 6 VDC/ 1 A power supply used the video cable.

Power from the batteries or external power supply is supplied to the components through the OFF-ON switch button.

Night Vision Unit

The electronic circuit is powered by replaceable batteries - either a 3.0 Volt lithium battery (CR123A type) or one AA 1.5 Volt alkaline batteries (AA size).

Power from the battery is supplied to the components through the operation button.

SECTION II

ASSEMBLY AND PREPARATION

2.1. PREPARATION

2.1.1. PREPARATION FOR USE

This chapter contains the information necessary to prepare the device for operation. This includes unpacking, examination for damage, and battery installation.

A. UNPACKING

The following steps must be accomplished prior to each mission where the sight is used.

1. Open carrying case, remove the device and check contents for completeness.
2. Inspect the device for obvious evidence of damage to optical surfaces, body, eyecups, operation buttons, etc. Ensure that all optical surfaces are clean and ready for use. Clean with lens paper.

B. ATTACHMENT OF NECK LANYARD

To prevent damage due to dropping the device, use the neck lanyard included with your equipment.

C. INSTALLATION OF BATTERY

WARNING

The lithium battery contains sulphur dioxide gas under pressure.

Do not heat, puncture, disassemble, short circuit, attempt to recharge or otherwise tamper with the batteries.

Turn off equipment if battery compartment becomes unduly hot. If possible, wait until the batteries have cooled before removing them.

If you inhale sulphur dioxide, seek medical attention.

Thermal Vision Unit

Install CR123A Lithium batteries as follows.

1. Remove the battery cap by turning it counterclockwise.
2. Check to ensure the o-ring is present. If not, replace it.

3. Observe polarity, as indicated on the outside of the battery compartment, and insert two 3.0 Volt CR123A Lithium battery into the battery compartment, minus (-) end first (Figure 2-1).
4. Replace battery cap by pushing and turning it clockwise. Tighten it firmly to ensure a watertight seal.

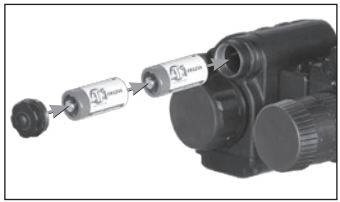


Figure 2-1. Install Batteries

Night Vision Unit

The unit operates with one AA battery or one CR123A battery with using the battery adapter.

Install AA batteries as follows:

With the battery adapter (1) screwed in as shown on the Figure 2-2 you may use one AA type battery.

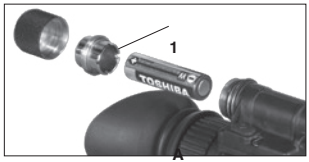


Figure 2-2. AA Battery Installation

Install CR123A standard batteries as follows:

To install a 3V lithium one, take the battery adapter (1) out of the battery cap (2), turn it over, and screw its smaller threading into the same battery cap. Now you may put the 3V lithium battery observing the polarity indications on the battery compartment surface.

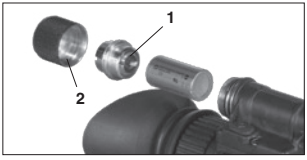


Figure 2-3. CR123A Battery Installation

2.1.2. EXAMINATION FOR OPERATION

Before getting started make sure to follow these steps:

1. Push ON-OFF button on the thermal unit and short push operation button on the night vision unit.
2. Make sure that the luminance in ocular is present.
3. Observe the scene, and adjust the diopter and/or lens for optimal image clarity.

2.2. ASSEMBLY

2.2.1. HEAD MOUNT

To mount the ATN FIITS-14 to a headmount, perform the following:

1. Loosen the screw (1). Push the button (2) and insert the rail of the FIITS-14 into the socket (3) of the headset.
2. Place the headmount with FIITS-14 on your a head.
3. Loosen the screw (1) and move the unit along the rail for eye relief adjustment.
4. The FIITS-14 headmount has a flip-up mechanism. Push the side button (4) on the mount and lift the unit up until the unit stops in the top position.
5. Push the same button (4) to lower FIITS-14 into the viewing position.

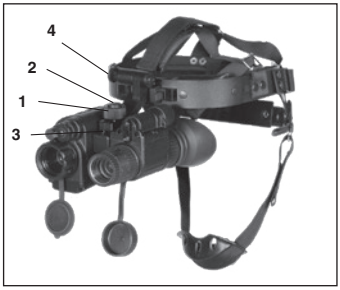


Figure 2-4. Attaching FIITS-14 to Head Mount

2.2.2. HELMET MOUNT

Attachment of ATN FIITS-14 to a universal helmet mount. The Helmet mount fits securely onto helmet via a rugged strapping assembly and grooved hooks. With helmet mount, the FIITS-14 can be positioned directly in front of the user's eyes or flipped up out of the viewing position.

1. Install the mount onto the helmet as shown on the picture.

2. Tighten and fix the straps (1)
3. Attach the goggles to the rail.
4. Loosen screw (3). Push button (2) and insert the bracket of the FIITS-14 into rail (4) of the helmet mount.
5. Place the helmet with FIITS-14 onto head.
6. Loosen the screw (3) and move the unit for proper eye relief adjustment.
7. The FIITS-14 helmet mount has a flip-up mechanism. Push the button (5) on the side of mount and lift the unit up until the unit gets fixed in the top position. When the device reaches the top/upper position it will turn off automatically.
8. Push the same button (5) to lower FIITS-14 to viewing position. Turn the device on for continuation of the operation.

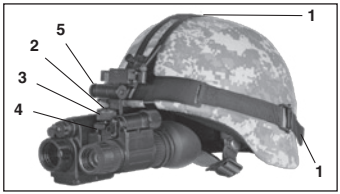


Figure 2-5. Attaching FIITS-14 to Helmet Mount

2.2.3. EXTERNAL POWER SOURCE (ONLY FOR TVU)

WARNING

When the unit is to be powered with external sources, first make sure the batteries have been taken out.

As an external power source, a standard network controller with outer voltage of 6V and current of over 0.5A can be applied. To connect an external source recommend to use a 6mm standard double-pole socket in the way the positive contact is the central contact.

Use both the video or PC cable to connect an external 6 VDC/ 1 A power supply to the FIITS.

Connect an external power supply to the device as follows:

1. Remove the batteries.

2. Remove the protective cap from the device output connector socket.
3. Attach the video/PC cable to the output connector socket.
4. Attach the power jack socket of the cable to a 6 VDC/ 1 A power supply.

NOTES

1. The external power supply plug must have a 6 mm OD contact with center pin positive.
2. Avoid a sudden removal of power source: use the power button «ON/OFF» to turn the device off before you remove batteries or disconnect external power supply.
3. Replace the protective cap on the device output connector socket after disconnecting the cable.

2.2.4. VIDEO OUTPUT (ONLY FOR TVU)

The TVU incorporates a sealed Connector used for video transmission and to connect external power sources. Video Cable attaches the TVU to the video facilities for video recording or video transmission (1) to the external display, though at the same time it accepts the external power supply(2).

Connect the device to an external video display/recorder and to an external power supply as follows:

Figure 2-6. Attaching Video Cable

1. Remove the batteries.
2. Remove the protective cap from the connector socket.
3. Attach the video cable to the TVU output connector socket.

4. Attach the RCA plug of the video cable to a compatible jack on an external video display/recorder, or extension cable.
5. Attach the power jack socket of the cable to a 6 VDC/ 1 A power supply.

WARNING

When the unit is to be powered with external sources, first make sure the batteries have been taken out.

2.2.5. MOUNTING CAMERA/CAMCORDER TO THE ATN FIITS-14

1. Screw Camera Adapter(1) into the front lens of a photographic camera (thread M52x0.75) or a video camera (use adapter ring(3) threaded M37x0.75).
2. Remove the rubber eyecup off the monocular.
3. Connect the adapter with the eyepiece and gently tighten three fixing screws(2) on the adapter.

Figure 2-7. Mounting Camcorder to the ATN FIITS-14

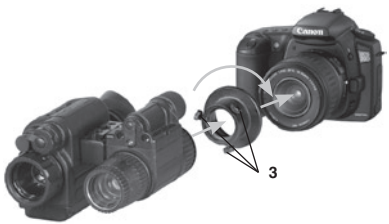


Figure 2-8. Mounting Camera to the ATN FIITS-14

SECTION III

OPERATION

3.1. GENERAL INFORMATION

3.1.1. GENERAL

This section contains instructions for operation of FIITS. The function of controls and indicators is explained.

CAUTION

The device is a precision electron-optical instrument and must be handled carefully at all times.

3.1.2. CONTROLS AND INDICATION

The FIITS is designed to adjust for different users and corrects for most differences. The controls for the device are shown or described in Figure 3-1 and Tables 3-1.

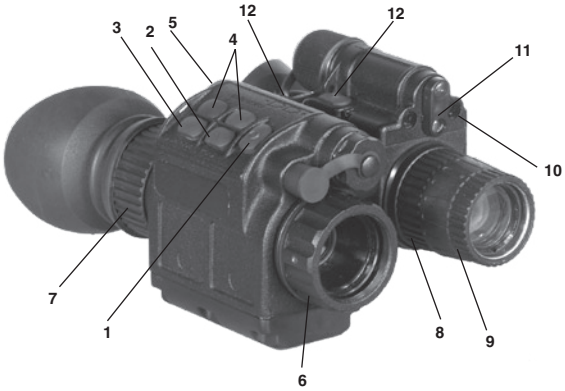


Figure 3-1. Controls

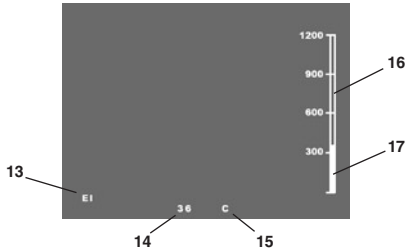


Figure 3-2. Thermal Unit Screen Indications

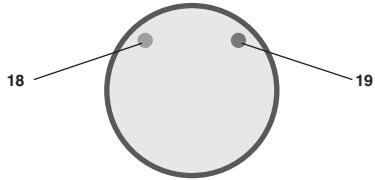


Figure 3-3. Night Vision Unit Screen Indications

Table 3-1. Controls and Indication

ITEMS	CONTROLS AND INDICATORS	FUNCTIONS
THERMAL VISION UNIT		
1	ON-OFF Button	Controls Unit power. To turn the unit on and off press the button.
2	ZOOM Button	Digital 2x magnification On.
3	POLARITY Button	Switch from black/white to color mode.
4	BRIGHTNESS Buttons	Adjustment of the output image brightness.
5	REFRESH Button	Maintain 0.5 second video in the memory of unit.
6	Objective Lens Focus	Focuses objective lens. Adjusts for sharpest image of viewed object.

ITEMS	CONTROLS AND INDICATORS	FUNCTIONS
7	Diopter Adjustment	Focuses eyepiece lens without the need for glasses. Adjusts for sharper image of intensifier screen.
13	EI Indicator	Automatic Electronic Iris (EI) mode indicator.
14	Temperature	Showing the actual measured temperature at the center of the display.
15	Units	Showing the units of temperature measuring.
16	Scale	Scale of the temperature indicator.
17	Bar	Dynamic temperature indicator.
NIGHT VISION UNIT		
8	Ring	Serves to fix the “infinity” position of the front lens focus
9	Objective Lens Focus	Focuses objective lens. Adjusts for sharpest image of viewed object.
10	IR illuminator	IR Illuminator gets activated when the NVU is already on by holding button (12) pressed for 1,5-2 seconds. A red light appears in the eyepiece to indicate that the IR illuminator is operating.
11	Pivot plate	You may focus the IR light for additional distance by placing the focusing lens of the IR pivot plate onto the window of the IR illuminator (10). This will extend the range the useful range of the IR.
12	Operation button	Controls Unit power. To turn the unit on and off push short the button.
18	Green LED indicator	Warns when the Bright Light sensor detects an excess of the bright light
19	Red LED indicator	Indicates that the IR Illuminator is on/ Blinking warns about 20% battery charge left

3.2. OPERATING PROCEDURE

3.2.1. THERMAL VISION UNIT

A. TURNING ON

Open the objective lens cover. The objective lens cover protects the device from inadvertent exposure to extremely high levels of radiant flux. Never leave the device with the objective lens cover off.

To turn the unit on press the button labeled ON/OFF.

After a warm-up time of approximately 3 seconds, video of the thermal scene appears.

NOTE

During the warm-up time, a logo comes into view on the TVU display. Next the thermal image replaces the logo.

NOTE

The image you see will have a yellow tint. The yellow tint provides better contrast and resolution over black and white images.

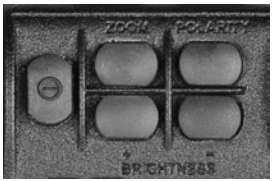


Figure 3-3. Switchboard of Thermal Vision Unit

B. FOCUSING

To focus the TVU you need to adjust the diopter first. The TVU has an adjustable eyepiece with a range of +2 to -6 diopter. Simply turn the diopter clockwise until it stops. Then concentrate on any object and slowly turn the diopter back counter clockwise until the grain in the image is sharp. Then rotate the eyecup to accommodate use over the left or right eye.

You TVU has ability to focus either long range or short. Focus the front lens to rotate it until the image and the grain are both sharp.

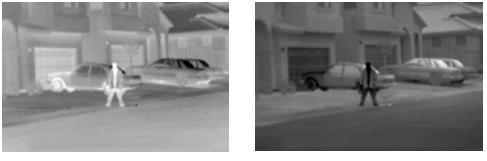
Figure 3-4. Focus Adjustment of TVU

NOTE

The front lens should be readjusted for viewing objects at different distances. Rotate the focusing ring clockwise for far focus, counterclockwise for near focus.

C. POLARITY

«POLARITY» button switches the direct display mode into the reverse one, i.e. from hot-white/cold-black into hot-black/cold-white mode. If the polarity is white-hot, the image will be with hotter objects displayed as white, and the rest of the image displayed as black, and vice versa: with hotter objects displayed as black, if the polarity is black-hot.



Hot-black/cold white mode Hot-white/cold-black mode

Figure 3-5. Display Polarity Modes

D. BRIGHTNESS

Press «BRIGHTNESS +» and «BRIGHTNESS –» buttons for brightness adjustment. Each short push of the buttons «BRIGHTNESS +»

or «BRIGHTNESS –» raises or lowers the display brightness, correspondingly, in stepwise way.

NOTE

Levels 1 to 8 range from full dim to full bright.

E. MANUAL IMAGE REFRESH

Degradation of the image (image blurring) is caused by charge accumulation on the detector array.

Use the «REFRESH» button to maintain an optimum thermal image. During this refresh, the video will freeze for approximately 0.5 second.

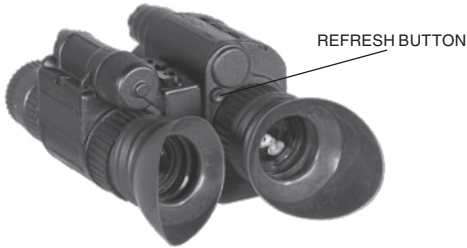


Figure 3-6. Refresh Button

NOTE

While performing very frequent refreshes can provide the best possible image quality but also can decrease substantially the battery life.

F. SHUT DOWN OPERATIONS

To finish the work, perform the following:

1. Use the ON-OFF button to turn the TVU off.
2. Replace the protective cover on the objective lens.
3. Disconnect the cable (if it present).
4. Place the protective cap on to the TVU output connector socket.

3.2.2. NIGHT VISION UNIT

A. TURNING ON

Open the objective lens cover. The objective lens cover protects the NVU from inadvertent exposure to extremely high levels of radiant flux. Never leave the NVU with the objective lens cover off.

To turn the unit on and off push short the operation button.

B. FOCUSING

You may adjust the unit diopter by rotating the eyepiece ring (3). The total dioptric range is covered in 1/2 revolution.

To make the unit focus appropriate for different distances you should rotate the front lens ring (1). The total focusing range is covered in 1/3 ring revolution.

The ring (2) serves to fix the “infinity” position of the front lens focus.

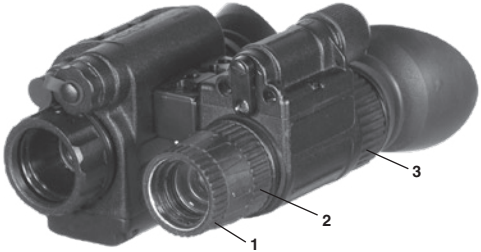


Figure 3-7. Focus Adjustment of NVU

C. BRIGHTNESS

Even under unsteady brightness conditions Automatic Brightness Adjustment System of NVU always keeps the IIT brightness level constant.

D. INFRARED (IR) ILLUMINATOR OPERATIONS

CAUTION

The IR illuminator is a light that is invisible to the unaided eye for use during conditions of extreme darkness. Please note

that, the light from the illuminator can be detected by others that are using night vision devices.

NOTE

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

IR Illuminator gets activated when the monocular is already on by holding button (1) pressed for 1,5-2 seconds. A red light appears in the eyepiece to indicate that the IR illuminator is operating.

You may focus the IR light for additional distance by placing the focusing lens of the IR pivot plate (2) onto the window of the IR illuminator (3). This will extend the range the useful range of the IR.

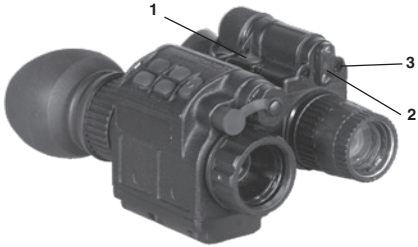


Figure 3-8. Infrared (IR) Illuminator Operations

E. SHUT DOWN OPERATIONS

To finish the work, perform the following:

1. Use the ON-OFF button to turn the NVU off.
2. Place the protective cover on the objective lens.

SECTION IV

OPERATIONAL DEFECTS

4-1 ZEROING 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 NVU. They include shading, edge glow, flashing, flickering, and intermittent operation.

A. SHADING

If shading is persistent, you will not see a fully circular image (Figure 4-1). 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. Contact ATN or point of purchase for warranty/repair procedures.

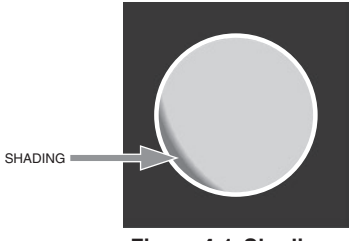


Figure 4-1. Shading

NOTE

Make sure the shading is not the result of improper exit pupil position.

B. EDGE GLOW

Edge glow is a bright area (sometimes sparkling) in the outer portion of the viewing area (see Figure 4-2). 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. Contact ATN or point of purchase for warranty/repair procedures.

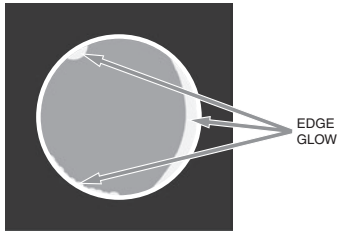


Figure 4-2. Edge Glow

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. Contact ATN or point of purchase for warranty/repair procedures.

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 warranty or repair work. However, some types of blemishes can get worse over time and interfere with the usability of the device. If you believe a blemish is a cause for rejection, warranty or repair please ATN or point of purchase for warranty/repair procedures.

1. Bright Spots.

A bright spot is a small, non-uniform, bright area that may flicker or appear constant (Figure 4-3).

Not all bright spots make the NVU rejectable. Cup your hand over the lens to block out all light. If the bright spot remains, return the NVU. 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.**

2. Emission Points.

A steady or fluctuating pinpoint of bright light in the image area that does not go away when all light is blocked from the objective lens of the NVU (Figure 4-3). The position of an emission point within the image area does not move. Not all emission points make the NVU 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 usability of the device.**

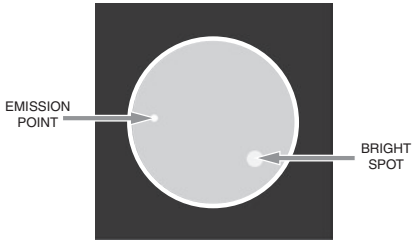


Figure 4-3. Bright Spots and Emission Points

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 usability of the device.**

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 4-4). 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 usability of the device.**

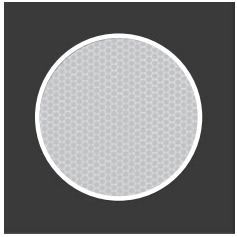


Figure 4-4. Fixed-Pattern Noise

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 4-5). Under the worst-case condition, these lines will form hexagonal or square-wave shaped lines. This is typically viewed in high light conditions. No action is required if this condition is present unless it interferes with the viewing the image and interferes with the users usability of the device.

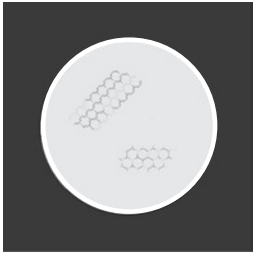


Figure 4-5. Chicken Wire

SECTION V

MAINTENANCE

5-1 PREVENTIVE MAINTENANCE

TABLE 5.1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR ATN FIITS-14

ITEM NO.	INTERVAL	LOCATION ITEM TO CHECK/SERVICE	PROCEDURE	NOT FUNCTIONING AT OPTIMAL LEVEL IF
1.	Before	Maintenance	Open carrying case, inventory items. Previously recorded faults on maintenance records.	Not Current. Fault not corrected.
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 device 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 5.1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR ATN FIITS-14 (CONT.)

ITEM NO.	INTERVAL	LOCATION ITEM TO CHECK/SERVICE	PROCEDURE	NOT FUNCTIONING AT OPTIMAL LEVEL IF
4.	Before/After	Battery Adapter / Compartment	Check to make sure battery adapter is present. Remove battery adapter and 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.	Binding, not moving freely or too loose.
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.	Binding or not moving freely.
8.	Before/After	Lens Cap	Inspect for cracked, torn, or missing lens cap.	

TABLE 5.1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR ATN FIITS-14 (CONT.)

ITEM NO.	INTERVAL	LOCATION ITEM TO CHECK/SERVICE	PROCEDURE	NOT FUNCTIONING AT OPTIMAL LEVEL IF
9.	Before/After	Viewed Image	Refer to Section IV – Operation Defects – to inspect for operational defects.	Flickering, flashing, edge glow, or shading is observed.
10.	Before/After	Strap, Pads	Inspect for cuts, tears, fraying, holes, cracks, or defective fasteners.	Damage causes straps or pads to be unserviceable.
11.	Before/After	Socket	Inspect for dirt, dust, or corrosion. Insert NVU latch into socket to verify secure attachment of NVU to head-mount. If necessary, clean socket with water.	Damaged, latch won't work or too loose.
12.	For and Aft Adjustments	Socket	Press the socket-release button and check for free motion. Inspect for damage.	Binding, damaged or non-operational slide mechanism.

TTABLE 5.1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR ATN FIITS-14 (CONT.)

ITEM NO.	INTERVAL	LOCATION ITEM TO CHECK/SERVICE	PROCEDURE	NOT FUNCTIONING AT OPTIMAL LEVEL IF
13.	Before/After	Headmount / Helmet Mount Adapter	Inspect for dirt, dust, or corrosion. Insert adapter into headmount or helmet mount socket to verify secure attachment.	Damaged, will not latch securely.
14.	Before/After	Small Arms Mount Adapter	Inspect for dust, dirt, or corrosion.	Damaged, will not mount to NVU or will not mount to weapon mount rail.

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.

TABLE 5.1 PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR ATN FIITS-14 (CONT.)

ITEM NO.	INTERVAL	LOCATION ITEM TO CHECK/SERVICE	PROCEDURE	NOT FUNCTIONING AT OPTIMAL LEVEL IF
15.	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 device.
16.	Before/After	Sacrificial Window	Inspect for dirt, dust, scratches, or damage. If necessary, clean.	Damage or scratches hinder vision with device on.
17.	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.	
18.	Before/After	Neck Cord	Inspect for cuts, tears, or excess wear or damaged clips.	

5-2 OPERATOR TROUBLESHOOTING

Table 5-2 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 ATN or your point of Purchase.

TABLE 5.2 OPERATOR TROUBLESHOOTING FOR ATN FIITS-14

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
1. Device fails to activate.	Press operation button. Check for defective, missing or improperly installed batteries. Check for battery contact surfaces or contact springs dirty or corroded.	Press button one short push. Replace batteries or install correctly. Clean the contact surfaces with a pencil eraser and/or alcohol and cotton swabs.
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 of maintenance.
3. IR indicator fails to activate.	Visual.	Refer to higher level of maintenance.
4. 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.
5. Light visible around eyecup	Check eye-relief distance. Check eyecup for resiliency.	Re-adjust for proper eye-relief distance. If eyecup is defective, refer to higher level of maintenance.

TABLE 5.2 OPERATOR TROUBLESHOOTING FOR ATN FIITS-14 (CONT.)

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
6. 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.
7. Battery adapter difficult to remove.	Check for damaged battery adapter.	If damaged, refer to higher level of maintenance.
8. Head straps cannot be tightened	Check for defective buckles, fasteners or straps.	If damaged, refer to higher level of maintenance.
9. Headmount 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 headmount or head/helmet mount adapter to higher level of maintenance.
10. Helmet mount will not tighten to helmet.	Inspect mounting hardware for damage.	If damaged, refer to higher level of maintenance.

5-3 MAINTENANCE PROCEDURES

5.3.1. FIITS MAINTENANCE

The FIITS-14 maintenance consists of external inspection of its components for serviceability, cleaning and installation of the standard and optional accessories. Maintenance instructions covered elsewhere in this manual (PMCS, troubleshooting, etc.) are not repeated in this section.

CAUTION

The ATN FIITS-14 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 demisting shield with lens paper while wet or with wet lens paper can damage the coating.

5.3.2. CLEANING PROCEDURES

A. CLEANING THE DEVICE

1. Gently brush off any dirt from the sight body using only a clean soft cloth.
2. Moisten the cloth with fresh water and gently wipe the external surfaces (except lenses).
3. Dry any wet surfaces (except lenses) with another dry and clean soft cloth.
4. Using lens brush, carefully remove all loose dirt from the lenses.
5. Slightly dampen a cotton swab with ethanol and lightly and slowly wipe the lenses. Clean the glass surfaces by circular movements from the centre to the edge, not touching the lens holder and changing cotton swab after each circular stroke. Repeat this step until the glass surfaces are clean.

B. CLEANING OF ACCESSORIES

Clean accessories with a soft brush (cloth) and soap and water as required.

CAUTION

Dry thoroughly each item before replacing into the storage case.

5.3.3. PREPARING FOR EXTENDED STORAGE

To prepare the FIITS for extended storage, perform the following:

1. Check the FIITS for serviceability as outlined in item 5.1 of this manual.
2. Remove the batteries.
3. Clean the device and accessories.
4. Replace all items in the case.

5.3.4. HEADMOUNT MAINTENANCE

A. REMOVAL AND INSTALLATION OF BROWPAD

1. Remove old browpad (Figure 5-1) by grasping the headband.
2. Replace the browpad by gently pressing on the new browpad and smoothing out any wrinkles in new browpad.

Figure 5-1. Removal and Installation of Browpad

B. REMOVAL AND INSTALLATION OF CHINSTRAP

1. Remove the chinstrap (Figure 5-2) by unsnapping the Velcro tape from the left side of the headband. Unbuckle the chinstraps from narrow strap assembly.

2. Replace the chinstrap by using the Welcro tape on the left side of the headband. Lace the right straps into their respective sliding bar buckles on the right side of the headband for correct lacing (Figure 5-2).

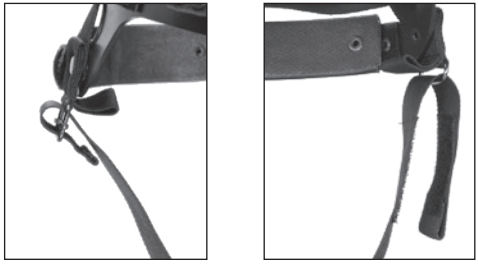


Figure 5-2. Removal and Installation of Chinstrap

C. REMOVAL AND INSTALLATION OF CHIN CUP

1. Remove the chinstrap (Figure 5-3) by unsnapping the Welcro tape from the left side of the headband.
2. Replace the chin cup by sliding the cap on the chinstrap. Fix the Welcro tape onto the place.

Figure 5-3. Removal and Installation of Chin Cup

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