

NIVISYS

OPERATOR MANUAL

Thermal Acquisition Clip-On System

Model: TACS



Nivisys Industries, LLC
400 S. Clark Drive
Suite 105
Tempe, AZ 85281

480-970-3222 (tel)
480-970-3555 (fax)
info@nivisys.com
www.nivisys.com

Export of the commodities described herein is strictly prohibited without a valid export license issued by the U.S. Department of State Office of Defense Trade Controls prescribed in the International Traffic in Arms Regulations (ITAR) Title 22, Code of Federal Regulation, Parts 120-130

SAFETY PRECAUTIONS

WARNING

THE THERMAL FOCAL-PLANE ARRAY UTILIZED WITHIN THE TACS IS SENSITIVE TO EXPOSURE TO EXTREMELY HIGH LEVELS OF RADIANT FLUX. NEVER EXPOSE THE TACS, EITHER POWERED OR UN-POWERED, DIRECTLY TO THE SUN OR ANY OTHER SOURCE OF RADIANT FLUX THAT THE HUMAN EYE CANNOT TOLERATE.

NOTE

INADVERTENT SUN DAMAGE IS NOT CONSIDERED A DEFECT IN MATERIAL OR WORKMANSHIP, AND IS NOT COVERED IN THE PRODUCT WARRANTY.

SAFETY SUMMARY

These safety precautions shall be read prior to performing any operating or maintenance procedure.

Statements denoted by **WARNING are classified as those that highlight an operation or procedure which, if not strictly observed, could result in injury to or death of personnel.**

Statements denoted by **CAUTION are classified as those that highlight an operation or procedure which, if not strictly observed, could result in damage to or destruction of equipment or loss of mission effectiveness.**

Statements denoted by **NOTE are classified as those that highlight an essential operation, procedure, condition or statement.**

Table of Contents

Safety Precautions	3
Safety Summary	5
Table of Contents	7
List of Illustrations	9
CHAPTER 1: PARTS LIST	11
CHAPTER 2: INTRODUCTION	13
Mission Objective	13
TACS Overview	13
CHAPTER 3: PREPARATION FOR USE/INSTALLATION	15
Recommended Battery Type	15
Battery Installation	15
CHAPTER 4: PRINCIPLES OF OPERATION	17
General Operation	17
Powering Up/Down the TACS	21
Focus	21

Table of Contents

Functional Controls	22
Low Battery Indicator	24
Maximum Operating Conditions	25
Performance Specifications	26
CHAPTER 5: MAINTENANCE & SERVICING TACS	27
Cleaning	27
Preventative Maintenance Checklist	28
Troubleshooting	29
CHAPTER 6: STORAGE AND SHIPMENT	31
WARRANTY	33

List of Illustrations

Figure 1-1. Major Components	12
Figure 3-1. Battery Installation	16
Figure 4-1. Mounting Bracket	18
Figure 4-2. Separated Units	19
Figure 4-3. Installed Units	20
Figure 4-4. Releasing Unit	20
Figure 4-5. Functional Controls	22

(This page intentionally left blank.)

CHAPTER 1: PARTS LIST

The major components included in the TACS kit are shown in Figure 1.

1. TACS
2. Mounting Bracket, PVS-14
(additional configurations available)
3. (2) Lithium 123 Batteries
4. Soft Carrying Case
5. Operator Manual
6. QRG
7. Allen Wrench
8. Lens Cloth
9. Shoulder Strap



Figure 1-1. Major Components

CHAPTER 2: INTRODUCTION

The purpose of this manual is to aid the user in understanding, operating, and maintaining the TACS.

Mission Objective:

The TACS provides the user the ability to enhance the functionality of currently fielded AN/PVS-7, AN/PVS-14, AN/PVS-15, AN/PVS-23, and F4949 goggles, by adding a thermal image overlay to the I² scene without modifying in-service hardware, thus giving situational awareness in extreme low light, no light or foliated conditions where I² devices do not work well.

TACS Overview:

At the core of the TACS is a Long Wave Infrared (LWIR) 320 x 240 pixel VOx Focal Plane Array (FPA). This LWIR sensor measures thermal radiation of 8-12 microns wavelengths. The FPA video is processed and displayed on the internal Organic Light Emitting Diode (OLED) display and then optically injected into the objective of the I² device.

The TACS attaches to the host NVG with a bracket that clamps to the body of the goggle. The bracket has a dovetailed “hot shoe” to hold and supply power to the TACS.

When mounted to the NVG, the TACS is powered by one (1) lithium-123 battery located in the integrated battery compartment. The DL123 battery typically yields 3.5 hours of battery life at room temperature (23°C).

CHAPTER 3: PREPARATION AND INSTALLATION

Recommended Battery Type:

The recommended battery type for use with the TACS is lithium 123, also known as a Photo Lithium.

Battery Installation:

Install Lithium-123 battery as follows:

1. Unscrew battery cap and remove.
2. Install battery with the positive tab pointing out of the battery compartment (towards the cap).
3. Reinstall Battery cap. Turn until snug. The radial seal on the battery compartment is independent of tightening force, so excessive force is not required.

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.**

WARNING

RISK OF FIRE. INDIVIDUAL LITHIUM BATTERIES CAN EXPLODE OR LEAK AND CAUSE INJURY IF DISASSEMBLED, CHARGED, CRUSHED, HEATED, PUNCTURED, SHORT CIRCUITED, OR OTHERWISE TAMPERED WITH. TURN OFF EQUIPMENT IF THE BATTERY COMPARTMENT BECOMES HOT.



FIG 3-1. Battery Installation

CHAPTER 4: PRINCIPLES OF OPERATION

General Operation:

NOTE

THE TACS HAS A FIXED-FOCUS OBJECTIVE. IMAGES FROM ~20 FEET THROUGH INFINITY WILL APPEAR IN CLEAR FOCUS.

The general steps of operation are listed below and detailed in subsequent sections.

1. Attach the mounting bracket to the host NVG.
2. Attach the TACS.
3. Turn on the TACS and adjust brightness.
4. Adjust brightness.
5. Select desired Mode and Polarity.

Attaching the mounting bracket

1. Loosen the clamping screw.
2. Slide the bracket over the objective lens of the NVG.

3. Tighten the clamping screw enough to prevent the bracket from sliding on the NVG.



FIG 4-1. Mounting Bracket

CAUTION

**OVER-TIGHTENING THE CLAMPING SCREW
MAY RESULT IN DAMAGE TO THE NVG**

Attaching the TACS

1. Mount the NVG to the helmet.
2. Slide the TACS camera into the bracket on the NVG until it stops.

3. To remove, slide the release knob just behind the thermal objective. The knob is slid Clockwise when viewed by the user in the operational position



FIG 4-2. Separated Units



FIG 4-3. Installed Units



FIG 4-4. Releasing the Unit

Power up/down the TACS:

1. The TACS is powered on or off by rotating the rear knob

NOTE

**IF POWER IS REMOVED ANY OTHER WAY,
USER SETTINGS MAY NOT BE SAVED.**

2. Once on, continuing to rotate the rear knob increases the brightness.

NOTE

**WHEN THE TACS IS ON YOU SHOULD SEE A
THERMAL IMAGE OVERLAY
THROUGH THE NVG.**

**UPON POWER OFF, THE UNIT HAS A
5 SECOND DELAY BEFORE IT CAN
BE POWERED ON.**

Focus:

To minimize user adjustment, the TACS has a fixed-focus objective.

Functional Controls:

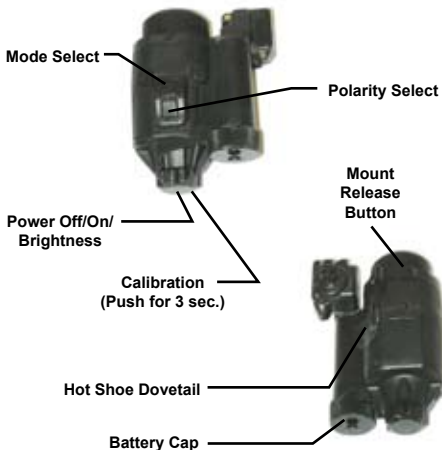


FIG 4-5. Functional Controls

Off/On/Brightness

The brightness control adjusts the maximum luminance internal to the OLED. Adjust the brightness by rotating the brightness control knob clockwise and counter-clockwise.

Mode Select

There are three modes available in the TACS:

1. Full Thermal: High Sensitivity
2. Patrol: Lower Sensitivity, less thermal clutter
3. Outline: Outlines high contrast targets.

Outlining allows the target to be viewed with high resolution I² imagery.

When the unit is turned on, the thermal image presented is “Full Thermal” and “White Hot.” Pressing the Mode Select button changes the unit from “Full Thermal” to “Patrol,” a reduced sensitivity mode which minimizes the thermal clutter in the I² image. Only stronger targets are displayed. Pressing the Mode Select button again changes to Outline. Pressing the Mode

Select button a third time cycles back to “Full Thermal”.

Polarity Select

To select “white hot” or “black hot” polarity, press the Polarity button on the bottom of the TACS camera housing. Each press toggles between White Hot and Black Hot.

Calibration

If the thermal image appears degraded, perform calibration as follows:

1. Place lens cap or any thermally uniform field over the TACS objective lens.
2. Push Off/On/Brightness switch for 3 seconds.

Low Battery Indicator:

When the low battery indicator appears in the center of the display, the TACS will have at least 15 minutes of operating time remaining. See Chapter 3 for battery installation instruction.

Should the battery not be replaced promptly, the unit will eventually begin to display a static-filled image.

NOTE

Power down the system before removing the battery.

Maximum Operating Conditions:

Operating Conditions	Min	Max	Units
Operating Temperature	-20	+52	Celsius
Storage Temperature	-40	+60	Celsius
Altitude		30,000	Feet
Waterproof (1 hour)		3	Feet

Performance Specifications:

Performance Spec	Requirement
Range	>250m
Alignment	Fusion Overlay
Focus	Fixed
Submersion	3ft for 1 hour
NVG Interface	
Battery Life	>3 hours
Switches & Controls	
Weight	220 grams
Size	<4.5”L, 3”W, 2.5”H

CHAPTER 5: MAINTENANCE AND SERVICING TACS

Maintenance is limited to cleaning of the exterior surfaces, including lenses, replacement of batteries and the neck cord.

Cleaning:

CAUTION

**SCRATCHING OR OTHERWISE DEFORMING
LENSES WILL PERMANENTLY DEGRADE
SYSTEM PERFORMANCE.**

NOTE

**DIRT AND OTHER ARTIFACTS FOUND ON
EITHER OF THE LENSES CAN DEGRADE
SYSTEM PERFORMANCE.
THE LENSES ARE HARD COATED, AND WILL
WITHSTAND NORMAL CLEANING WITH LENS
CLEANER AND LENS Cloth.**

Preventive Maintenance Checklist:

Step	Item	Procedure
1	Completeness	Carry out inventory of equipment including accessories.
2	Exterior Surfaces	Inspect for dents, scratches, cracks, corrosion, fungus, salt contamination or other damage. Wipe dry.
3	Objective Lens	Inspect for dust, dirt, fingerprints, abrasion, chips, scratches, etc. Clean Optics
4	Battery Compartment	Ensure that the lid of the battery compartment can be opened and closed properly and that the batteries can be inserted.
5	Storage	Remove batteries and replace TACS in its carrying case.

Troubleshooting:

Malfunction	Test or Inspection	Corrective Action
Camera won't start	Check Battery Check battery compartment and cartridge for debris or other impediments to battery contacts	Replace with fresh batteries Clean battery compartment and cartridge Return for maintenance
Image is degraded	Check objective and display head for debris, smudges, scratches, etc. Check if the calibration includes debris artifacts or a previous scene	Clean with lens cloth Perform Calibration

(This page intentionally left blank.)

CHAPTER 6: STORAGE & SHIPMENT

1. Power down the TACS
2. Packaging after use
 - a. Remove battery (Section 3.2)
 - b. Inspect the battery housing for corrosion or moisture. Clean and dry if necessary.
 - c. Place the TACS into its soft carrying case.
 - d. Return to storage area.

NOTE

PRIOR TO PLACING THE TACS INTO THE CARRYING CASE, ENSURE IT IS FREE OF DIRT, DUST, AND MOISTURE.

(This page intentionally left blank.)

WARRANTY

EQUIPMENT WARRANTIES AND REMEDY:

Seller warrants that each newly manufactured item sold hereunder and such portion of a repaired/refurbished item as has been repaired or replaced by Seller under this warranty, shall be free from defects in material or workmanship at the time of shipment and shall perform during the warranty period in accordance with the specifications incorporated herein. Should any failure to conform to these warranties be discovered and brought to Seller's attention during the warranty period and be substantiated by examination at Seller's factory or by authorized field personnel, then at its own cost, Seller shall correct such failure by, at Seller's option, repair or replacement of the non-conforming item or portion thereof, or return the unit purchase price of the non-conforming item or component. Buyer agrees that this remedy shall be its sole and exclusive remedy against Seller and that no other remedy shall be available or pursued by Buyer against Seller. In no event shall the Seller be liable for any cost or expense in excess of those described in this paragraph and expressly excluding any liability or damages for special, incidental or consequential damages.

WARRANTY (cont.)

The warranty period for newly-manufactured items shall extend 12 months from the date of shipment by Seller unless a different warranty period is agreed in writing to by Seller. The warranty period for repaired/refurbished electronic components shall extend for the unexpired warranty period or 90 days, whichever is longer, of the item repaired or replaced. The warranty period for intensifier repair/replacement shall extend six (6) months from the date of shipment by seller or the balance of original warranty, whichever is longer.

This warranty shall not extend to any item that upon examination by Seller is found to have been subject to:

- a. mishandling, misuse, negligence or accident.
- b. installation, operation or maintenance that either was not in accordance with Seller's specifications and instructions, or otherwise improper.
- c. tampering, as evidenced, for example, by broken seals, damaged packaging containers, etc.
- d. repair or alteration by anyone other than Seller without Seller's express advance written approval.

WARRANTY (cont.)

Failure to promptly notify Seller in writing upon discovery of any non-conforming item during the warranty period shall void the warranty as to such item. Buyer shall describe any such non-conformity in detail, expressing its position as to return of any article under the remedy provided herein. No returns shall be accepted without prior approval by Seller, who shall arrange for transportation. The cost of transportation for articles returned to Seller and/or redelivered to Buyer shall be paid by Seller only if Seller is responsible for repair or replacement under this warranty. In the event the item is found to conform to the specifications and requirements of this order, the transportation charges related to the return and re-delivery thereof are for the account of Buyer.

Return Material Authorization Number (RMA#):
Warranty and non-warranty items returned to Nivisys for repair or replacement require a RMA#. Email support@nivisys.com, call 1-480-970-3222 or fax 1-480-970-3555 with a serial number and detailed information to obtain a RMA#.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY OTHER WARRANTY, EITHER EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

(This page intentionally left blank.)

