Qualify with the M4/M16 using the AN/PAS-13B (V-1) (LTWS)
071-SAWE10 / Version 1.0
Effective Date 08 Mar 2013

SECTION I. ADMINISTRATIVE DATA

All Courses Including This Lesson

Course Number	Version	Course Title
None		

Task(s) Taught(*) or Supported

Task Number	Task Title
Individual	
071-008-0014 (*)	Dismount an AN/PAS-13 Thermal Weapon Sight from an M16 Series Rifle/M4 Series Carbine
071-008-0015 (*)	Mount an AN/PAS-13 Thermal Weapon Sight on an M16 Series Rifle/M4 Series Carbine
071-100-0021 (*)	Engage Targets with an M16-Series Rifle or M4-Series Carbine Using an AN/PAS-13 Thermal Weapon Sight
Collective	
07-3-9013	Conduct Action on Contact
07-3-1333	Knock Out a Bunker
07-3-9018	Enter and Clear a Building (Section-Platoon)
07-3-9021	Clear a Trench Line
07-3-1072	Conduct a Disengagement (Section-Platoon)

Reinforced Task(s)

Task Number	Task Title
None	

Knowledge

Knowledge Id	Title	Taught	Required
071-WPN-0059	Identity and Location of Parts of Infantry Weapons	No	Yes
071-WPN-0063	Weapons Functions	No	Yes
071-WPN-0064	Target Detection Techniques	No	Yes
071-WPN-0065	Range Estimation Techniques	No	Yes
071-WPN-0066	Theory and Operation of Night Vision Devices	Yes	No
071-WPN-0067	Firing Positions	No	Yes
071-WPN-0068	Firing Techniques	No	Yes
071-WPN-0069	Zeroing Techniques	No	Yes
071-WPN-0093	Thermal Weapon Sight Capabilities	Yes	No

Skill

Skill Id	Title	Taught	Required
071-WPN-0009	Zero Infantry Weapons	No	Yes
071-WPN-0006	Clear Infantry Weapons	No	Yes
071-WPN-0008	Correct Weapons Malfunctions	No	Yes
071-WPN-0022	Detect Targets	No	Yes
071-WPN-0007	Detect Weapon Malfunctions	No	Yes
071-WPN-0023	Engage Targets with Infantry Weapons	Yes	No
071-WPN-0024	Follow Safety Procedures	No	Yes
071-WPN-0033	Load and Unload Infantry Weapons	No	Yes
071-WPN-0025	Mount Night Vision Devices to Infantry Weapons	Yes	No
071-WPN-0027	Zero Night Vision Devices to Infantry Weapons	No	Yes

Administrative/ Academic Hours

The administrative/academic hours required to teach this lesson are as follows:

Academic	Resident Hours / Methods		
Yes	0 hrs	25 mins	Lecture
Yes	4 hrs	40 mins	Conference/Demonstration
Yes	5 hrs	25 mins	Practical Exercise (Hands-On)
Yes	0 hrs	0 mins	Test Review
Yes	0 hrs	0 mins	Test
Total Hours:	10 hrs	40 mins	

Test Lesson Number

Hours	Lesson Number
None	

Prerequisite Lesson(s)

Lesson Number	Lesson Title
None	

Training Material Classification

Security Level: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Foreign Disclosure Restrictions

FD7. This product/publication has been reviewed by the training/educational developers in coordination with the DOTD, MCoE, Ft Benning, GA 31905 FD authority. This product is NOT releasable to students from foreign countries.

References

Number	Title	Date	Additional Information
FM 3-22.9	RIFLE MARKSMANSHIP M16-/M4-SERIES WEAPONS	12 Aug 2008	
TM 11-5855-312-10	PERATOR's MANUAL SIGHT, THERMAL AN/PAS-13B(V)2 (NSN 5855-01-464-3152)	15 Feb 2005	

Student Study Assignment

NONE.

Instructor Requirements

Complete a risk management worksheet. It is recommended that you use the ground risk assessment tools provided by the US ARMY COMBAT READINESS/SAFETY CENTER at https://grat.safety.army.mil/ako_auth/grat/default.aspx

Additional Support Personnel Requirements

Name	Student Ratio	Qty	Man Hours
OIC	1:32		
Combat Lifesaver	1:16		
Driver, LMTV	1:12		
Range NCOIC	1:32		

Equipment Required for Instruction

ID - Name	Student Ratio	Instructor Ratio	Spt	Qty	Exp
0000-01-160-6022 - BATTERY NONRE 1.5V 6S	1:2	0:0	No	0	No
1005-00-921-5004 - Magazine, Cartridge	4:1	0:0	No	0	No
1005-01-231-0973 - CARBINE,5.56 MILLIMETER	1:2	0:0	No	0	No
2330-01-108-7367 - Trailer Water: M149A2	1:32	0:0	No	0	No
4110-01-485-3548 - CHEST,ICE STORAGE	2:32	0:0	No	0	No
4470-01-359-2799 - COMPUTER, NOTEBOOK/LAPTOP	1:32	0:0	No	0	No
4933-01-506-5630 - BORELIGHT SYSTEM,LASER	4:32	0:0	No	0	No
5180-01-506-8287 - TOOL KIT,SMALL ARMS	1:32	0:0	No	0	No
559359 - SCREEN PROJECTION	1:32	0:0	No	0	No
5820-01-451-8252 - Radio Set: AN/PRC-119F(C)	0:0	0:0	No	2	No
5855-01-383-6860 - Sight Thermal: AN/PAS-13(V)1	1:2	0:0	No	0	No
5855-01-432-0524 - Monocular Night Vision Device: AN/PVS-14	1:2	1:1	No	0	No
6260-01-178-5559 - LIGHT,CHEMILUMINESCENT	1:8	0:0	No	0	Yes
6515-00-137-6345 - Plug Ear Universal Size 400S	1:1	0:0	No	0	No
6515-01-472-1863 - INTRAVENOUS INJECTION SET	4:32	0:0	No	0	No
6530-01-290-9964 - Litter, Folding, Rigid Pole	1:32	0:0	No	0	No
6545-01-254-9551 - MES,COMBAT LIFESAVER-1999	1:16	0:0	No	0	No
6625-00-064-6100 - TEST TARGET, THERMAL	1:2	0:0	No	0	No
6685-01-590-1047 - Monitor, Heat Stress: Questemp 44	1:32	0:0	No	0	No
6730-01-455-1939 - Projector, Multimedia	1:32	0:0	No	0	No
6760-00-985-6749 - Tripod, Photographic	1:32	0:0	No	0	No
7210-00-081-1417 - Sheet, Bed Cotton White	6:8	0:0	No	0	No
7520-00-053-9580 - Pen, Ball-Point, Medium, Black	1:8	0:0	No	0	No
8960-01-430-4378 - ICE	2:32	0:0	No	0	Yes
9150-01-053-6688 - CLEANER,LUBRICANT AND PRESERVATI	1:16	0:0	No	0	No
Z40430 - TRUCK, CARGO, 4X4, LMTV	1:12	0:0	No	0	No

(Note: Asterisk before ID indicates a TADSS.)

Materials Required

Instructor Materials:

FM 3-22.9 RIFLE MARKSMANSHIP, M16-/M4-SERIES WEAPONS (INCL C1)

TM 9-1005-319-10 Operators Manual M4 Carbine

TM 11-5855-306-10 Operators Manual PVS 14

TM 11-5855-312-10 Operators Manual PAS 13B

Student Materials:

Note taking material.

Field Uniform.

Classroom, Training Area, and Range Requirements

ID - Name	Quantity	Student Ratio	Setup Mins	Cleanup Mins
17120 General Instruction Building		1:32	15	15
17805 Range, Record Fire, Automated (ARF)		1:32	15	15
17801 Range, Firing Zero/ Basic 10m-25m		1:32	15	15

Ammunition Requirements

DODIC - Name	Exp	Student Ratio	Instruct Ratio	Spt Qty
A059 - Cartridge, 5.56 Millimeter	Y	80:1		

Instructional Guidance

NOTE: Before presenting this lesson, instructors must thoroughly prepare by studying this lesson and identified reference material.

Before presenting this lesson

1. Have on hand identified reference material linked to the lesson plan.
2. Review presentation and develop a list of questions to use during class.
3. Review and prepare conference / discussion material presented.
4. Ensure all equipment listed for this lesson plan (LP) is present, operable, and set up for use before class.
5. Refer to the practical exercise of this lesson plan. When necessary develop additional situations to use during the practical exercise.
6. PowerPoint users: Ensure the SLI file you are using has been called up using Microsoft PowerPoint Viewer and SLI / slide 1 is showing on the screen before class.
7. Whenever noted, slides are available to assist in explanation of task steps. Use slides as needed during class or practical exercise to reinforce training. The instructor may choose to use / not use the LP SLIs as developed, modify the existing SLIs content / order or insert new material as is necessary based on audience analysis to assist in Soldier learning. Changes must be annotated as a pen / ink change on the vault file master LP, VIP LP, and instructor LP. Changes must be approved through Senior Instructor and TDCD 183rd RTI Development Team notified.
8. Whenever necessary, ask leading questions of Soldiers in order to prompt Soldier discussion.
9. Encourage Soldiers to relate their first hand experiences during the activities.
10. Facilitate this lesson using Instructor methodologies.
11. Control group activities using Instructor techniques.

Proponent Lesson Plan Approvals

Name	Rank	Position	Date
Robert Padin	Not available	Approver	08 Mar 2013

SECTION II. INTRODUCTION

Method of Instruction: Lecture
Instr Type(I:S Ratio/Qty): instructor (4:32/0)
Time of Instruction: 25 mins
Instructional Strategy: Large Group Instruction

Motivator

Modern battles occur during the day and night, under various battlefield conditions. Being able to see during these conditions will increase a soldier's chances of successful target engagement and survival.

Terminal Learning Objective

NOTE. Inform the students of the following Terminal Learning Objective requirements.
At the completion of this lesson, you [the student] will:

Action:	Qualify with the AN/PAS-13B (V-1) (LTWS)
Conditions:	Given a record fire range day and night, an M16/M4 series weapon, an LTWS, timed target exposures at ranges specified IAW the appropriate FM for the weapon, and the allocated amount of ammunition required by the specific qualification table.
Standards:	Achieve 23 out of 40 target hits at various ranges with the M16/M4 series weapon.

Safety Requirements

Safety Requirements in a Classroom Setting:

Safety is of the utmost importance in any training environment. During the training process, commanders will utilize the 5-Step Risk Management process to determine the safest and most complete method to train. Every precaution will be taken during the conduct of training.

Safety is everyone's responsibility to recognize, mitigate, and report hazardous conditions.

Instructor note: The instructor will brief the students on the unit/facility SOP for classroom contingencies i.e. what doors will be used to exit the classroom, rally points, severe weather, WBGT/Kestrel set up, etc.

Safety Requirements other than Classroom Settings:

Safety must be paramount in the complex outdoor environment. During the training process, commanders will utilize the 5-Step Risk Management process to determine the safest and most complete method to train. Every precaution will be taken while replicating realistic battlefield conditions.

Safety is everyone's responsibility to recognize, mitigate, and report hazardous conditions.

Instructor note: The instructor will brief the unit/site SOP and Risk Management Worksheet for all potential contingencies encountered during that training period/event i.e. WBGT/Kestrel set up, trail vehicles for PT/foot marches, severe weather, fire, evacuation routes, muzzle awareness, range safety briefs, required medical FLA with driver and medics with emergency equipment, student injury procedures, and rally points etc.

Risk Assessment Level

Moderate - All Army Instructors will conduct a Risk Assessment Worksheet (DA Form 7566, CRM Worksheet, Apr 05) prior to training and brief Soldiers on identified hazards and required controls.

Assessment: The operations officer, in cooperation with the principal instructor, will prepare a risk assessment using the before, during, and after checklist and the risk assessment matrixes contained in Risk Management FM 5-19.

Controls: See Attached DA Form 7566.

Leader Actions: See Attached DA Form 7566.

Environmental Considerations

NOTE: Instructor should conduct a Risk Assessment to include Environmental Considerations IAW FM 3-34.5, Environmental Considerations {MCRP 4-11B}, and ensure students are briefed on hazards and control measures.

Users must comply with all local environmental regulations and guidance while conducting training.

Evaluation

Soldiers will be evaluated by task performance measures.

Instructional Lead-in

Up to this point you have trained and qualified with iron sights. Now you will learn how to increase your target engagement during low visibility by employing the AN/PAS-13B (V-1) LTWS.

SECTION III. PRESENTATION

NOTE: Inform the students of the Enabling Learning Objective requirements.

A. ENABLING LEARNING OBJECTIVE

ACTION:	Identify Characteristics of the AN/PAS-13B (LTWS)
CONDITIONS:	Given a LTWS with a fresh battery pack and 8 standard/Lithium “AA” batteries.
STANDARDS:	Identify all six components of the AN/PAS-13B IAW TM 11-5855-312-10.

ELO A - LSA 1. Learning Step / Activity ELO A - LSA 1. Identify Characteristics of the LTWS

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 15 mins
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Before we can effectively discuss LTWS operation, it will be necessary to familiarize yourself with the LTWS system and subassemblies, and associated hazards.

NOTE: Prepare your slide with the characteristics of the LTWS

a. Safety Hazards:

1) Optical Material: Germanium, Cadmium, and Mercury; Moderate toxic when ingested or inhaled. Caution should be observed when handling optical assemblies; Optical elements might be broken. Be wary of splinters. Broken optics can produce small particles or dust which are easily inhaled. Hands should be thoroughly cleaned after handling assemblies.

2) Battery Pack: Do not open battery, dispose of fire, heat above 212 degrees F, expose to water, recharge, put in backwards, mix with used or other battery types. Battery may explode or leak and cause personnel injury.

NOTE: Avoid handling or carrying LTWS by the eyepiece, I/O connector, eyecup, objective lens cover, or battery cover latch. Any one of these may detach or break off from the system, or cause damage to the system.

Equipment Data: LTWS

1.) Length (inches) 12.87
2.) Height (inches) 4.33
3.) Width (inches) 3.25
4.) Weight w/batteries (lbs.) 2.52

5.) Power Consumption

a. On mode (watts) 2.6-4.8

b. Standby mode (watts) 1

6.) Field of View (FOV) (degrees) 15

(Field of view is halved in zoom mode) 7.5

7.) Magnification Factor 1.55X

(Magnification is doubled in zoom mode)

8.) Effective Ranges viewing a man 550 meters

(under good atmospheric conditions)

The LTWS is a silent lightweight, compact, durable, battery powered thermal sight. The LTWS operates with low power consumption. The primary battery is a non-rechargeable 1.5 Volt AA lithium. If unavailable, any 1.5 Volt AA battery will function but at a significantly reduced life.

WARNING

Do not recharge lithium-iron disulfide battery. Do not short circuit battery pack terminals. Do not mix with used or other battery types.

LTWS Purpose: Provides target acquisition under conditions of limited visibility such as near or total darkness, smoke, fog, dust and haze. The LTWS also operates effectively during daytime.

LTWS Function:

1) Thermal imaging system: Converts Thermal infrared light into a visual image

2) Provides selectable and adjustable reticles for aiming accuracy.

3) Provides magnification for target detection and aiming accuracy.

4) Allows operator adjustment of image display.

5) Provides system status to operator.

Description: The LTWS is an IR imaging sensor used for target acquisition under conditions of low visibility. The LTWS can be mounted on the M16/M4 series weapon systems and the M136 Rocket Launcher (AT4). IR light is received through the objective lens, detected by an IR sensor, converted to digital data, processed and then displayed for the user. The LTWS is composed of two functional groups: The objective lens and the basic sensor.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review

ELO A - LSA 2. Learning Step / Activity ELO A - LSA 2. Components of the LTWS.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 15 mins
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

TWS Major Components and subassemblies:

1) Carrying Case: Is a soft cloth bag with storage compartments for two battery packs, TM, weapon bracket, lens cleaner solution, cleaning kit and the LTWS. Note, when replacing LTWS back into carrying case the LTWS will be secured by the velcro attach strap

2) Objective Lens: receives IR light emitting from an intended target and its surroundings, it then magnifies and projects the IR light onto the detector through the chopper in the basic sensor

3) Sensor Assembly: The chopper modulates the IR light received from the objective lens, onto the detector/processor assembly that senses the IR light and converts it to video. The reticle power assembly conditions the video for display. The IR image is displayed along with the reticle and symbology for viewing through the diopter

4) Eyepiece: Focuses raster and indicators to eye; provides diopter adjustment; provides system status display; provides hands-free standby/on switch and prevents light emission

5) Diopter: Displays thermal image and all system indicators on the display for the operator

6) Weapon Bracket: Attachment interface between mount and weapon system.

7) Lens Cleaning Kit: Cotton pads and lens cleaner used to clean eyepiece and telescope lenses.

8) Transit/Storage Case: Hard case used for transportation and storage.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review

ELO A - LSA 3. Learning Step / Activity ELO A - LSA 3. Warm up period.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 15 mins
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Purpose:

a. Allows sensors to warm up to operating temperature as fast as possible when LTWS is initially turned on.

b. Status Indicator shows an 8-step gray scale that appears at the bottom of the image for approx. 33 seconds when the eyecup is first depressed after initial system turn on.

c. Normally requires up to 2 minutes after turn-on.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review

ELO A - LSA 4. Learning Step / Activity ELO A - LSA 4. Modes of Operation.

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(4:32/0)
Time of Instruction:	0 hrs 15 mins
Instructional Strategy:	Large Group Instruction
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

Standby mode:

Purpose: Saves battery power when operator is not looking into LTWS.

Occurs when eyecup has not been depressed, power is not applied to display or most electronics, and emergency mode is not activated.

On mode:

Purpose: Normal operation

Occurrence: LTWS is in stand by mode, eyecup is not depressed, warm up period is over, and emergency mode is not selected. When pressure is applied to the eyecup, a switch engages power to the display, and the LTWS is fully operational, image is displayed immediately.

Emergency mode:

Purpose: Keeps system in the "on" mode regardless of whether eyecup is depressed; provides immediate display of image.

Occurs when EMERGENCY button is pressed, lights EMER indicator, warm up period is complete. IR video is enabled at the I/O connector for external viewing.

Emergency mode should only be used when contact is expected. IE, Ambush, Mount and Defensive operations.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review

ELO A - LSA 5. Learning Step / Activity ELO A - LSA 5. Identify the Controls on the LTWS.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 20 mins
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

CONTRAST Control

1) Rotary switch with AUTO detent position (fully clockwise)

2) Function

a) Like TV contrast

b) Adjusts contrast of thermal image displayed on raster

c) Automatic and manual modes

(1) Automatic mode: contrast setting is automatically controlled by the LTWS.

(2) Manuel Mode: operator must adjust LTWS for suitable viewing.

d) The higher the contrast, the greater the difference in intensity between different objects

3) Operation

a) Normal environmental conditions: AUTO

b) Adverse conditions may warrant manual setting

c) When intensity difference between objects in desired image area is not very pronounced, contrast should be increased

a. EMERGENCY

1) Momentary push-button located at left rear behind contrast rotary knob.

2) Overrides eyecup standby/on switch to turn system on and places system in emergency mode

3) Emergency mode:

a) System is fully powered and will not turn off until EMERGENCY switch is depressed again

b) Eyecup must be depressed in order for the display to eliminate

c) Overrides 3 second delay

4) Press and release to toggle between emergency and standby

5) Use of emergency mode will decrease battery life by approximately 2/3

b. BRIGHTNESS control

1) Rotary switch with OFF detent position (fully counter-clockwise)

2) Function

a) Turns system on by pushing in and rotating clockwise

b) Adjusts brightness of display (raster and indicators)

c) Raster image and reticle will show equal amount of increase/decrease in brightness

d) The lower you set the brightness, the more you increase the resolution.

The higher the brightness, the lower the resolution.

3) Operation

a) Set LTWS to standby mode by pushing in and turning knob fully clockwise out of OFF position

b) Brightness increases with clockwise rotation

c) OFF is actuated by pushing in and turning knob counter-clockwise

4) Best setting depends on polarity and environmental conditions

(1) If environmental conditions cause IR image to be too dark, BRIGHTNESS may need to be turned up

(2) On a clear bright day, brightness may need to be turned down

(3) When the LTWS is turned on, automatically defaults to white hot

polarity setting

a) Black hot - Reacts opposite to white hot

Focus Ring

1) Located on telescope

2) Function

a. Adjusts focus of thermal scene from 10 meters (NEAR) to infinity (FAR)

b. Critical for target image - Other controls cannot compensate for out-of-focus image

c. Manual adjustment - no auto mode

d. Affects both normal FOV and electronic zoom simultaneously.

NOTE: Slight adjustment may be necessary when changing from normal FOV to X2 electronic zoom.

3) Usual settings

a. Normal FOV: Target detection

b. X2 Electronic zoom: Target detection and engagement

ZOOM/RETICLE SELECT switch

1) Momentary and direct push-button located on top behind battery housing.

2) Function

a. Toggles the zoom and controls selection of reticles

b. The following reticles are available (M16 and M136)

3. Zoom operation

a. Press and release quickly to change from normal to x2 zoom

b. When zoom is activated, the FOV is cut in half and magnification is doubled

c. Zooms in on the reticle, regardless of the reticle location within the FOV

d.Press and release quickly to change back to normal.

4. Reticle select operation

a) Must be held for 3 seconds until reticle select appears on raster to enable reticle changes

b) After being held for 3 seconds, release, each following push and release of switch immediately selects one of the available reticles

c) After 10 seconds of no switch action, switch becomes deactivated

RETICLE ADJUST

1) Four-position momentary switch located on underside of housing

2) Function

a) Adjusts reticle aiming features in azimuth and elevation

b) Used during zeroing of LTWS

3) Operation

a) To activate switch, switch must be held in one of the four positions for 2 seconds to enable position changes
b) After being held for 2 seconds, each following depression in any of the four positions will continuously change reticle position until switch is released
c) After 10 seconds of no switch action, switch becomes deactivated

c. Reticles

1) Reticles available on the LTWS are the M16 (used with M16/M4 series weapons), and the M136 Rocket launcher

a) Reticles corresponding to individual weapons are selected using RETICLE SELECT switch

2) Reticles are always brighter than thermal image for any brightness setting

3) Reticle indicators

a) Reticle indicators are fixed and will not move when aiming features of reticle are adjusted during zeroing
b) Reticle Select Indicator: indicates type of reticle selected

NOTE: The M4 uses the M16 reticle

c) Azimuth and Elevation Indicators

(1) Azimuth indicator: Number of increments reticle is left (L) or right (R) from center default position.
(2) Elevation indicator: Number of increments reticle is up (U) or down (D) from center default position
NOTE: Center default position is 000.0 left/000.0 up

Reticle Adjustment

a) RETICLE ADJUST control
b) Only aiming features and artillery grid patterns are affected

d. BLK/WHT polarity switch

1) Momentary push-button located at right rear of housing

2) Function

a) Selects polarity of thermal image displayed on raster

b) Toggles between white hot (WHT) or black hot (BLK)

3) Operation

a) System initializes to WHT HOT

b) Press to toggle between white hot and black hot

c) Operator experience and personal preference determines best setting

4) Polarity Effects

a) Target Appearance

(1) Potential targetusually have features withhigh temperature and/or emissivity

(2) Vehicle: engine compartments, exhaust, moving parts, heated compartments

(3) People: skin

b) White hot

(1) Objects radiating more thermal IR light are brighter

(2) Potential targets will usually have some bright features

(3) In general, better for detection

· Hotter objects are displayed in white and cooler objects are displayed in black

· eye is usually drawn to bright objects may not be best if background is very hot

c) Black hot

(1) Objects radiating less IR light are brighter

(2) Potential targets will usually have some dark features

· Hotter objects are displayed in black and cooler objects are displayed in white

e. Diopter Focus Ring

1) Adjusts focus of reticle and status indicators to operators eye

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review

ELO A - LSA 6. Learning Step / Activity ELO A - LSA 6. Indicators and Display.

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(4:32/0)
Time of Instruction:	0 hrs 10 mins
Instructional Strategy:	Large Group Instruction
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

Status Indicators (located on raster)

1. WHT HOT/BLK HOT: Indicates polarity

2. EMER: Illuminated when emergency mode has been selected

3. LOW BATTERY:

Indicates that battery power is low.

Once indicator is displayed, 5 to 35 minutes of battery operating time remains.

The low battery indicator is designed to work specifically with ”AA” lithium batteries. If using non lithium “AA” batteries indicator may not illuminate before batteries run down.

If low battery indicator is displayed, install fresh battery pack.

Warm-up Period

1. Eyecup depressed:

Polarity, EMER, and LOW battery indicators function normally

An 8 step gray scale appears at the bottom of the image for 33 seconds

Eyecup not depressed: indicators and raster not on.

When eyecup is released the CRT always shuts off

Operating Mode Indications

On Mode Indications

Eyecup depressed

EMER indicator is not lit

Other indicators function normally

Raster takes approximately 3 seconds to form clear image initially, then functions normally

Eyecup not depressed: indicators and raster not on.

Display Raster

a) Displays thermal image with superimposed reticle

b) Provides high visual acuity without disrupting operator's night vision adaptation

c) 3-second delay for clear image after eyecup is depressed in "ON"mode from stand by mode.

(1) Emergency Mode Indications

a) EMER indicator is lit

b) Other indicators function normally

c) Raster functions

d) There is no longer a 3 sec delay when eyecup is depressed

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review.

ELO A - LSA 7. Learning Step / Activity ELO A - LSA 7. Individual Reticle Features.

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(4:32/0)
Time of Instruction:	0 hrs 10 mins
Instructional Strategy:	Large Group Instruction
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

Reticle aiming features

1) Angular Measurements Using Zeroing Aim Features for LTWS

b. Individual reticles

NOTE: Show Transparencies with reticles, and briefly point out the individual features of each reticle.

NOTE: The following portion of the class will consist of a demonstration of the LTWS component locations. Identify the location of the various components.

NOTE: Conduct a check on learning and summarize the enabling learning objective.

Are there any questions pertaining to this lesson?

1. During this session, we discussed the LTWS functions, subassemblies, and the function, or functions, of each of these subassemblies, and the safety considerations of the LTWS.

2. LTWS provides the capability of day or night target detection and acquisition, including adverse conditions.

3. Some of the hazards involved are serious. Proper observance of the procedures and safety precautions described in the Technical Manual will be sufficient to avoid injury to personnel or damage to equipment.

Check on Learning:

QUESTION: What is the function of a thermal imaging system?
ANSWER: To convert Thermal Infrared light into a visible image for viewing.
2. QUESTION: What two types of weapon systems can be utilized with the LTWS.
ANSWER: a. M16/M4 Series b. M136 Rocket Launcher
3. QUESTION'. What items are stored in a TWS carrying case?
ANSWER: 1) Carrying case containing the following: a) LTWS b) 2 battery packs c) TM d) Lens cleaning kit e) Appropriate mounting bracket 2) Applicable weapon mounts, brackets and spacers.
4. QUESTION: What are the three modes of operation?
ANSWER: a. Standby b. On c. Emergency
5. QUESTION: What are the safety considerations when handling the LTWS?
ANSWER: Battery hazards and Optical materials
6. QUESTION: What is the function of the BRIGHTNESS control?
ANSWER: In the “OFF” position, no power is applied to the LTWS. Pushed in and turned cw beyond OFF, the LTWS is powered and display brightness can be adjusted.
7. QUESTION: Describe the control operation required to put the LTWS into each operating mode: standby, on, and emergency.
ANSWER: Standby mode - Turn BRIGHTNESS control knob in and cw from the OFF detent, system enters standby mode after warmup period ends. On mode - Press the eyecup the LTWS is in the standby mode. EMERGENCY mode - Press the EMERGENCY switch when LTWS is in standby or on mode.

8. QUESTION: Does the telescope focus need to be adjusted when switching from normal FOV to electronic zoom.
ANSWER: It may be necessary
9. QUESTION: When the polarity is set to black hot, which will appear brighter on the displayed thermal image - hot or cold objects?
ANSWER: Cold objects. Hot objects will be darker.
10. QUESTION: How do you select a specific available reticle on LTWS?
ANSWER: While viewing the display, press the ZOOM/RETICLE SELECT switch for at least 3 seconds, then release to cycle to next available reticle. Press and release again to keep cycling through reticles.
11. QUESTION: How much battery life is left when the low battery indicator becomes illuminated?
ANSWER: Between 5 to 35 minutes.
12. QUESTION: What is the purpose of the emergency mode?
ANSWER: The emergency mode keeps the LTWS fully powered and eliminates the 3 second delay.
13. QUESTION: When adjusting the reticle, which parts of the reticle actually move?
ANSWER: Only the aiming features. 14. QUESTION: What do the numbers on the reticle azimuth and elevation represent?
ANSWER: The number of increments the reticle is positioned away from the center default position.
15. QUESTION: The ZOOM/RETICLE SELECT and RETICLE ADJUST controls are disabled after how many seconds of inactivity?
ANSWER: 10 seconds. Are there any questions pertaining to this lesson?

Review Summary: Conduct a Summary Review.

ELO A - LSA 8. Learning Step / Activity ELO A - LSA 8. Practcal Exercise.

Method of Instruction:	Practical Exercise (Hands-On)
Instr Type(I:S Ratio/Qty):	instructor(4:32/0)
Time of Instruction:	0 hrs 25 mins
Instructional Strategy:	Large Group Instruction
Media Type:	Actual Equipment
Security Classification:	This course/lesson will present information that has a Security Classification of: U - Unclassified.

The following set of instructions is to be read to the class:

1. Refer students to TM 11-5855-314-12&P during PE.

2. Remind students to observe all warnings, cautions and NOTE in the manual.

3. The following portion of the class will consist of a practical exercise. Each student must have a chance to operate the LTWS controls.

4. To be sure this is done, I want you to cycle through the operators position with one student operating the controls while another quizzes the operator asking the name, function, etc. of each control or indicator covered in the lesson.

SUMMARY:

1. During this lesson, we identified all LTWS controls and indicators and discussed their functions.

2. We learned that the BRIGHTNESS control turns the LTWS system on and off, as well as adjusts the brightness of the raster. Normally, the system is in the standby mode when the eyecup is not depressed, and in the $^{1}ON^{1}$ mode when the eyecup is depressed. The EMERGENCY switch is used to override the eyecup standby/on switch during time-critical situations.

3. There are two reticles available on the LTWS model. The available reticles are dependent on the weapon system.

4. Having discussed basic LTWS system features, we now need to examine IR theory. In the next lesson, we will examine IR theory.

TRANSITION: To operate the LTWS, it is necessary to know the system theory of operation. This includes the related infrared, or IR, theory.

Check on Learning:	Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.
Review Summary:	Conduct a Summary Review.

CHECK ON LEARNING (ELO A):

1. QUESTION: What is the function of a thermal imaging system?
ANSWER: To convert Thermal Infrared light into a visible image for viewing.

2. QUESTION: What two types of weapon systems can be utilized with the LTWS.
ANSWER: a. M16/M4 Series b. M136 Rocket Launcher

3. QUESTION'. What items are stored in a TWS carrying case?
ANSWER: 1) Carrying case containing the following: a) LTWS b) 2 battery packs c) TM d) Lens cleaning kit e) Appropriate mounting bracket 2) Applicable weapon mounts, brackets and spacers.

4. QUESTION: What are the three modes of operation?

ANSWER: a. Standby b. On c. Emergency

5. QUESTION: What are the safety considerations when handling the LTWS?

ANSWER: Battery hazards and Optical materials

6. QUESTION: What is the function of the BRIGHTNESS control?

ANSWER: In the “OFF” position, no power is applied to the LTWS. Pushed in and turned cw beyond OFF, the LTWS is powered and display brightness can be adjusted.

7. QUESTION: Describe the control operation required to put the LTWS into each operating mode: standby, on, and emergency.

ANSWER: Standby mode - Turn BRIGHTNESS control knob in and cw from the OFF detent, system enters standby mode after warmup period ends. On mode - Press the eyecup the LTWS is in the standby mode. EMERGENCY mode - Press the EMERGENCY switch when LTWS is in standby or on mode.

8. QUESTION: Does the telescope focus need to be adjusted when switching from normal FOV to electronic zoom.

ANSWER: It may be necessary

9. QUESTION: When the polarity is set to black hot, which will appear brighter on the displayed thermal image - hot or cold objects?

ANSWER: Cold objects. Hot objects will be darker.

10. QUESTION: How do you select a specific available reticle on LTWS?

ANSWER: While viewing the display, press the ZOOM/RETICLE SELECT switch for at least 3 seconds, then release to cycle to next available reticle. Press and release again to keep cycling through reticles.

11. QUESTION: How much battery life is left when the low battery indicator becomes illuminated?

ANSWER: Between 5 to 35 minutes.

12. QUESTION: What is the purpose of the emergency mode?

ANSWER: The emergency mode keeps the LTWS fully powered and eliminates the 3 second delay.

13. QUESTION: When adjusting the reticle, which parts of the reticle actually move?

ANSWER: Only the aiming features.

14. QUESTION: What do the numbers on the reticle azimuth and elevation represent?

ANSWER: The number of increments the reticle is positioned away from the center default position.

15. QUESTION: The ZOOM/RETICLE SELECT and RETICLE ADJUST controls are disabled after how many seconds of inactivity?

ANSWER: 10 seconds.

REVIEW SUMMARY(ELO A): Conduct a Summary Review

B. ENABLING LEARNING OBJECTIVE

ACTION:	Correctly perform Preventive Maintenance Checks and Services on the LTWS.
CONDITIONS:	Given TM 11-5855-314-12&P and an LTWS.
STANDARDS:	Correctly perform PMCS procedures IAW in TM 11-5855-314-12&P.

ELO B - LSA 1. Learning Step / Activity ELO B - LSA 1. Operator Maintenance Tasks.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 30 mins
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

a. Battery Replacement

1) Removal

a) Inspect battery contacts and battery compartment for damage. Forward for repair as required. Insure that when opening battery compartment push in and turn the battery door latch counter clockwise. When closing battery compartment push in and turn the battery door latch clockwise.

b. Lens Cleaning

NOTE: Discuss and demonstrate lens cleaning.

WARNING Do not ingest lens-cleaning compound. Lens cleaning compound is poisonous and can cause illness or death if ingested.

CAUTION Do not get lens cleaning compound on any rubber parts or sealant. Lens cleaning compound may cause rubber parts to deteriorate and may cause some sealants to dissolve.

CAUTION Avoid excessive pressure when wiping lens. Foreign material on lens may scratch lens when wiped off.

c. Exterior Cleaning

NOTE: Discuss and demonstrate external cleaning. Have students read steps in TM.

d. Battery Compartment Cleaning

If you have just replaced the battery with a brand new battery and you're battery low indicator comes on you need to check the battery contacts for corrosion both on the battery and inside the battery compartment.

NOTE: Discuss and demonstrate battery compartment cleaning. Have students read steps in TM.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review.

ELO B - LSA 2. Learning Step / Activity ELO B - LSA 2. Troubleshooting Procedures.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 30 mins
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

1)LTWS does not turn on.

a)Check to see if any indicators are displayed.

2)Low Power.

a)Check to see if LOW BATTERY indicator is displayed.

3)Thermal scene and/or display is not visible.

a) Eye cup must be present and properly aligned.

b) Check to see if objective lens cover is opened.

c)Check to see that BRIGHTNESS and CONTRAST controls are set properly.

d) Check to see if environmental conditions (fog, dust, rain, etc.) are interfering with LTWS. View an object visible to the eye at a distance greater than 10 meters.

4)Thermal scene and/or display are blurry or distorted.

a) Check to see if LOW BATTERY indicator is displayed.

b) Ensure display is focused.

c) Ensure objective lens is focused.

d) Check to see if objective lens or diopter lens is dirty.

e) Adjust BRIGHTNESS knob to optimize view.

f) Check to see if objective lens or diopter lens is cracked or chipped.

g) Check to see if environmental conditions (fog, dust, rain, etc.) are interfering with LTWS. View an object visible to the eye at a distance greater than 10 meters.

5) Gray scale does not extinguish.

a) ensure 33 seconds have passed since eyecup was depressed.

a) If gray scale is still displayed send LTWS to unit maintenance.

6) LTWS will not mount to weapon.

a) Inspect LTWS mount and weapon rail for damage.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review.

CHECK ON LEARNING (ELO B): Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

REVIEW SUMMARY(ELO B): Conduct a Summary Review.

C. ENABLING LEARNING OBJECTIVE

ACTION:	Mounting procedures of the LTW.
CONDITIONS:	In a classroom, given an AN/PAS-13B with eight “AA” lithium or alkaline batteries, battery pack, M16/M4 or AT-4, and applicable mounts and brackets.

STANDARDS:	Mount the LTWS IAW TM 11-5855-314-12 & P.

ELO C - LSA 1. Learning Step / Activity ELO C - LSA 1. Mount the LTWS.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 15 mins
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

M4 and M16A4 Series:

1) Mount LTWS on M4.

a) Loosen screws on carrying handle and remove carrying handle from weapon.

b) Select mounting slot on integrated rail system.

c) Unscrew torque limiting knob on LTWS.

d) Place LTWS on integrated rail system.

e) Tighten torque limiting knob until an audible two clicks are heard.

2) Dismounting LTWS from M4: conducted in reverse from the mounted position.

WARNING Ensure weapon is not loaded and safety is on before mounting or dismounting LTWS.

Weapon may accidentally discharge while mounting or dismounting LTWS causing injury or death.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review.

CHECK ON LEARNING (ELO C): Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

REVIEW SUMMARY(ELO C): Conduct a Summary Review.

D. ENABLING LEARNING OBJECTIVE

ACTION:	Reticle range estimation with the LTWS.
CONDITIONS:	Given a LTWS with a fresh battery pack and targets at various ranges.
STANDARDS:	Correctly estimate the range to a given target using the reticle stadia lines IAW TM 11-5855-314-12&P.

ELO D - LSA 1. Learning Step / Activity ELO D - LSA 1. Reticle Description.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Reticle descriptionn:

1) The zeroing mark is used as the aiming point to zero at 25 meters and to engage targets at that range.

2) The zero aim line is the long horizontal stadia line that is always aligned with the zero mark. It will always be longer than any other stadia line on the reticle.

3) Reticle Range Reference indicators.

4) When vertical stadia lines are addressed in the following learning steps it will include the entire stadia line unless otherwise stated.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review.

ELO D - LSA 2. Learning Step / Activity ELO D - LSA 2. Range estimation on a 5-ft man sized target.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 0 hrs 15 mins
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

NOTE: If a target is half the size of the stadia line then the target is twice the distance, if the target is twice the size of the stadia line then the target is half the distance.

M16/4 reticle.

1) Place the silhouette of a man between the vertical stadia lines.

2) If the man touches the top of the bottom stadia line and the top of the bottom stadia line then the man is at 300 meters.

3) If the man is twice the size then he is half the distance, which would be 150 meters.

4) If the man touched only one stadia line and the zeroing mark then he would be half as big and twice as far, which would be 600 meters.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review.

CHECK ON LEARNING (ELO D):

1. QUESTION: What do we use in order to estimate the distance to a target with LTWS?
ANSWER: The reticle horizontal and vertical stadia lines.
2. QUESTICN: How do we identify the zero aim line?
ANSWER: It is longer then all of the other vertical stadia line.
3. QUESTION: If a target is twice the size of the stadia line then what happens to the distance?
ANSWER: The target is half the distance.
4. QUESTION: With the M136 reticle, what do we use to measure the length of a 10-ft tank?
ANSWER: The horizontal stadia lines located to the left of 100 meter aim point.

REVIEW SUMMARY(ELO D): Conduct a Summary Review.

E. ENABLING LEARNING OBJECTIVE

ACTION:	Zero the LTWS.
CONDITIONS:	Given an M16/M4 series weapon, LTWS, applicable mounting brackets, 25 meter zero range, 25 meter thermalized targets; bore light and 18 rounds of 5.56mm ammunition.
STANDARDS:	Zero the LTWS to the M16/M4 series weapon within 18 rounds or less, with 5 out of 6 rounds inside the impact zone in two consecutive shot groups IAW TM 11-5855-314-12&P.

ELO E - LSA 1. Learning Step / Activity ELO E - LSA 1. Zero the LTWS at 25 meters on an M4/16 series weapon.

Method of Instruction: Practical Exercise (Hands-On)
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 1 hr 0 min
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a

NOTES: Discuss and demonstrate target preparation.

1) Cutting out a square and mounting cardboard (insulator) behind the target modifies a 25-meter zeroing target.

2) Affix target to silhouette.

a. LTWS Zeroing concept.

1) Objective is to position LTWS reticle to align with target aim point when shot group center corresponds to desired point of impact.

a) Reticle is electronically generated and is adjustable.
b) LTWS optics are fixed and are not adjustable.
c) Only reticle aim features are moved during zeroing.

2) Typical Target Features.

NOTE: Discuss typical target features.

3) Determining LTWS Zeroing Adjustments.

a) LTWS Reticle Increments: LTWS reticle adjustment increments do not correspond to squares on M16A2 25M zeroing target.

WARNING Ensure weapon is not loaded and safety is on before zeroing LTWS. A loaded weapon may accidentally be fired while zeroing LTWS, causing injury or death.

b. Zeroing LTWS to the M4/16 Series

1) Set to normal field of view or electronic zoom.
2) Use the reticle adjust switch to set azimuth and elevation indicator to (000L and 000D).
3) Aim center mass at 25-meter target and fire three rounds to obtain shot group.
4) Locate center of shot group.
5) Check tightness of sight. (Tighten if necessary).
6) Adjust reticle to move the center of shot group to the desire point of impact. (M16A2= 10 squares below target aiming point on a 4 cm square). (M16A4/M4A1= 4.5 squares below target aiming point on a 4 cm square).
7) At 25-meter range each increment of azimuth or elevation setting moves strike of the round:

a) 1 cm for LTWS, Normal Field of View

b) ½ cm for LTWS, electonic zoom

8) Repeat steps 3 through 6 until five out of six consecutive shots are within desire point of impact.

9) Record setting of azimuth and elevation indicators.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a Summary Review.

CHECK ON LEARNING (ELO E):

1. QUESTION: Describe the shape and size of the thermal cut out on the 25-meter zeroing target during target preparation.
ANSWER: A rectangle 4 squares wide by 4 squares high, positioned over the center of the target.
2. QUESTION: When zeroing LTWS, are you adjusting the reticle or the optics?
ANSWER: Electronically generated reticle is moved. Optics is fixed.
3. QUESTION: How does the operator determine the desired point of impact for a given weapon?
ANSWER: TM table 2-8.

REVIEW SUMMARY(ELO E): Conduct a Summary Review.

F. ENABLING LEARNING OBJECTIVE

ACTION:	Engage Targets with an M16-Series Rifle or M4-Series Carbine Using an AN/PAS-13 Thermal Weapon Sight.
CONDITIONS:	You are a member of a squad or team conducting night operations. You have been directed to engage any enemy targets within your sector of fire. You have a loaded M16 series rifle or M4 series carbine with a mounted, zeroed, and operational AN/PAS-13 thermal weapons sight (TWS).
STANDARDS:	Place the AN/PAS-13 TWS into operation. Detect, identify as threat, and determine range to targets in assigned sector of fire. Engage threat targets using your M16-series rifle or M4-series carbine with the AN/PAS-13 TWS while applying correct fundamentals of marksmanship and engagement techniques so that each target is hit or suppressed.

ELO F - LSA 1. Learning Step / Activity ELO F - LSA 1. Place the AN/PAS-13 into operation.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(2:32/0)
Time of Instruction: 0 hrs 10 mins
Instructional Strategy: Large Group Instruction / Demonstrator

Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

1. Place the AN/PAS-13 into operation.
a. Turn power switch to ON position.

Note: The AN/PAS-13 internal modules power on in a sequential order. The sensor module is initially powered on before the display module. Therefore, allow up to 2 minutes from power on until a thermal scene appears on the display.
b. Place your eye over the eyecup and press forward.

Note: This activates the magnetic sensors within the eyecup and places the AN/PAS-13 in the ON mode. The display will momentarily flash (approximately 1/4 second) indicating the system has been properly powered ON.

c. After reticle appears, adjust diopter focus ring for best display focus.
d. Use the on-screen menu (WEAPON) to select the M4/M16 reticle.
e. Open the objective lens cover.
f. Select an object greater than 10 meters away, and adjust objective focus ring for best thermal scene.
g. Using the Menu Key Pad, adjust POL, BRT and GAIN for best thermal scene.
h. Repeat steps f. and g. as needed to optimize thermal scene.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO F - LSA 2. Learning Step / Activity ELO F - LSA 2. Detect targets.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(2:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

2. Detect targets.
Note: Detection of targets depends on your position, your skill in scanning, and your ability to observe the area and recognize target indicators.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO F - LSA 3. Learning Step / Activity ELO F - LSA 3. Assume an appropriate firing position.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(2:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

3. Assume an appropriate firing position.

Note: Your position may vary from a fixed location to a temporary location during movement. Select a physical position and assume an appropriate firing position based on the situation. Your position should protect you from enemy fire and observation, yet allow you to place effective fire on targets in your sector of fire.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO F - LSA 4. Learning Step / Activity ELO F - LSA 4. Distinguish between threat and non-threat targets.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(2:32/0)
Time of Instruction: 0 hrs 5 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

4. Distinguish between threat and non-threat targets.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO F - LSA 5. Learning Step / Activity ELO F - LSA 5. Engage threat targets using the AN/PAS-13.

Method of Instruction: Conference/Demonstration
Instr Type(I:S Ratio/Qty): instructor(2:32/0)
Time of Instruction: 0 hrs 10 mins
Instructional Strategy: Large Group Instruction / Demonstrator
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

5. Engage threat targets using the AN/PAS-13.

a. Determine range to target (Figure 1).

Note: The distance between the two horizontal lines reflects the width of a 5 foot man

at 25 meters. The distance between the two vertical lines reflects the height of a 5 foot man at 300 meters.

b. Obtain a good sight picture.

c. Use appropriate aiming and engagement techniques.

Note: The center dot in the M4/M16 reticle is the 300 meter aim point.

d. Fire on the targets until one of the following occurs:

(1) Target is destroyed.

(2) Target is suppressed.

(3) An order to cease fire is received.

Check on Learning: Conduct a check on learning ask students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

CHECK ON LEARNING (ELO F): Conduct a check on learning ask students questions and correct misunderstandings.

REVIEW SUMMARY(ELO F): Conduct a review and summarize the ELO.

G. ENABLING LEARNING OBJECTIVE

ACTION:	Qualify with the LTWS.
CONDITIONS:	A record fire range day and night, an M16/M4, an LTWS, timed target exposures at ranges specified IAW the appropriate FM for the assigned weapon, and the amount of ammunition required by that specific qualification table.
STANDARDS:	Achieve 23 out of 40 targets hits at various ranges with the M16/M4.

ELO G - LSA 1. Learning Step / Activity ELO G - LSA 1. Conduct a practice qualification exercise.

Method of Instruction: Practical Exercise (Hands-On)
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 2 hrs 0 min
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Note: Practice qualification will be conducted at night and in conjunction with the record qualification.

Conduct of firing

The practice fire is conducted and recorded in accordance with the practice record fire scorecard. The soldiers fire at single and multiple timed targets. Exposure times

require one to two seconds for the mechanism to raise the targets: timing should begin when the targets are fully exposed rather than when the switch is activated.

Ammunition: soldiers will be issued the following ammunition for their assigned weapon. Each soldier will receive the same amount of rounds for both day and night, practice and record qualification

a. M16/M4 series

The rifleman gets 40 rounds 5.56mm ball for the practice qualification.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary: Conduct a review and summarize the learning step.

ELO G - LSA 2. Learning Step / Activity ELO G - LSA 2. Qualify with an M16/M4 series using the AN/PAS-13.

Method of Instruction: Practical Exercise (Hands-On)
Instr Type(I:S Ratio/Qty): instructor(4:32/0)
Time of Instruction: 2 hrs 0 min
Instructional Strategy: Large Group Instruction
Media Type: Actual Equipment
Security Classification: This course/lesson will present information that has a Security Classification of: U - Unclassified.

Note: Qualification will be conducted at night.

Conduct of firing

The record fire is conducted and recorded in accordance with the record fire scorecard. The soldiers fire at single and multiple timed targets. Exposure times require one to two seconds for the mechanism to raise the targets: timing should begin when the targets are fully exposed rather than when the switch is activated.

Ammunition: soldiers will be issued the following ammunition for their assigned weapon. Each soldier will receive the same amount of rounds for both day and night, practice and record qualification

a. M16/M4 series

The rifleman gets 40 rounds 5.56mm ball for qualification.

Check on Learning: Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review Summary:	Conduct a review and summarize the learning step.
CHECK ON LEARNING (ELO G):	Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.
REVIEW SUMMARY(ELO G):	Conduct a review and summarize the ELO.

SECTION IV. SUMMARY

Method of Instruction:	Conference/Demonstration
Instr Type(I:S Ratio/Qty):	instructor(4:32/0)
Time of Instruction:	10 mins
Instructional Strategy:	Large Group Instruction

Check on Learning

Determine if the students have learned the material presented by soliciting student questions and explanations. Ask the students questions and correct misunderstandings.

Review/ Summary

Conduct a review and summarize the TLO.

SECTION V. STUDENT EVALUATION

Testing Requirements	Soldiers will be evaluated by task performance measures.
Feedback Requirements	Feedback is essential to effective learning. Schedule and provide feedback on the assessment and any information to help answer Soldiers' questions about the training exercise.

Appendix A - Viewgraph Masters

Qualify with the M4/M16 using the AN/PAS-13B (V-1) (LTWS)
071-SAWE10 / Version 1.0

Sequence	Media Name	Media Type
None		

Appendix B - Test(s) and Test Solution(s)

PRACTICAL EXERCISE(S)/SOLUTION(S) FOR LESSON 071-SAWE10 Version 1.0

Appendix D - Student Handouts

Qualify with the M4/M16 using the AN/PAS-13B (V-1) (LTWS)
071-SAWE10 / Version 1.0

Sequence	Media Name	Media Type
None		

Appendix E - TRAINER'S LESSON OUTLINE

Qualify with the M4/M16 using the AN/PAS-13B (V-1) (LTWS)

071-SAWE10 / Version 1.0

Effective Date: 08 March 2013

1. The importance of this lesson: (Why)

Qualify with the AN/PAS-13B (V-1) (LTWS)

2. What we want our Soldiers to Achieve: (Outcomes/Standard)

Achieve 23 out of 40 target hits at various ranges with the M16/M4 series weapon.

3. Tasks to be taught

Task Number	Task Title	Task Type
071-008-0014	Dismount an AN/PAS-13 Thermal Weapon Sight from an M16 Series Rifle/M4 Series Carbine	Individual TAUGHT
071-008-0015	Mount an AN/PAS-13 Thermal Weapon Sight on an M16 Series Rifle/M4 Series Carbine	Individual TAUGHT
071-100-0021	Engage Targets with an M16-Series Rifle or M4-Series Carbine Using an AN/PAS-13 Thermal Weapon Sight	Individual TAUGHT
07-3-9013	Conduct Action on Contact	Collective SUPPORTED
07-3-1333	Knock Out a Bunker	Collective SUPPORTED
07-3-9018	Enter and Clear a Building (Section-Platoon)	Collective SUPPORTED
07-3-9021	Clear a Trench Line	Collective SUPPORTED
07-3-1072	Conduct a Disengagement (Section-Platoon)	Collective SUPPORTED

Additional Non-Standard Tasks

None

4. References:

Reference Number	Reference Title	Date
FM 3-22.9	RIFLE MARKSMANSHIP M16-/M4-SERIES WEAPONS	12 Aug 2008
TM 11-5855-312-10	PERATOR's MANUAL SIGHT, THERMAL AN/PAS-13B(V)2 (NSN 5855-01-464-3152)	15 Feb 2005

Additional Non-Standard References

Unit Markanmanship SOPs.

5. Resources

TIME: Time of Instruction (Time not specified)

LAND: Classroom, Training Area, and Range Requirements

Id	Name
17120	General Instruction Building
17805	Range, Record Fire, Automated (ARF)
17801	Range, Firing Zero/ Basic 10m-25m

AMMO: Ammunition Requirements

DODIC	Name
A059	Cartridge, 5.56 Millimeter

MISC: Materiel Items and TADSS Requirements

Id	Name
0000-01-160-6022	BATTERY NONRE 1.5V 6S
1005-00-921-5004	Magazine, Cartridge
1005-01-231-0973	CARBINE,5.56 MILLIMETER
2330-01-108-7367	Trailer Water: M149A2
4110-01-485-3548	CHEST,ICE STORAGE
4470-01-359-2799	COMPUTER, NOTEBOOK/LAPTOP
4933-01-506-5630	BORELIGHT SYSTEM,LASER
5180-01-506-8287	TOOL KIT,SMALL ARMS
559359	SCREEN PROJECTION
5820-01-451-8252	Radio Set: AN/PRC-119F(C)
5855-01-383-6860	Sight Thermal: AN/PAS-13(V)1
5855-01-432-0524	Monocular Night Vision Device: AN/PVS-14
6260-01-178-5559	LIGHT,CHEMILUMINESCENT
6515-00-137-6345	Plug Ear Universal Size 400S
6515-01-472-1863	INTRAVENOUS INJECTION SET
6530-01-290-9964	Litter, Folding, Rigid Pole
6545-01-254-9551	MES,COMBAT LIFESAVER-1999
6625-00-064-6100	TEST TARGET, THERMAL
6685-01-590-1047	Monitor, Heat Stress: Questemp 44
6730-01-455-1939	Projector, Multimedia
6760-00-985-6749	Tripod, Photographic
7210-00-081-1417	Sheet, Bed Cotton White
7520-00-053-9580	Pen, Ball-Point, Medium, Black
8960-01-430-4378	ICE
9150-01-053-6688	CLEANER,LUBRICANT AND PRESERVATI
Z40430	TRUCK, CARGO, 4X4, LMTV

(Note: Asterisk before ID indicates a TADSS.)

Additional Non-Standard Resources

None

6. A possible technique to achieve the outcome:

Maximise hands on training time to allow the students to achieve task mastery.
Grade the Soldiers using the task performance measures.
Retrain Soldiers who do not receive a GO.
Re-test Soldiers until they achieve a GO.

7. Conduct AAR with Soldier and Cadre.

AAR's are essential to ensure the quality of the instruction and the efficiency of the course.
Schedule AAR's with Instructors to solicit feedback on the techniques and procedures in use.
Schedule AAR's with the Student's to solicit feedback on Instructional techniques, information being presented, and efficiency of the course.

NOTE: Before presenting this lesson, Instructors must be thoroughly prepared by studying the appropriate lesson plan and identified reference material.