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School of Infantry
Training Command
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AT1502
05 AUG 04

STUDENT OUTLINE

M220E4 TOW2 WEAPON SYSTEM ASSEMBLY AND DISASSEMBLY

1. TERMINAL LEARNING OBJECTIVES

a. Given a SL-3 complete M220E4 TOW2 weapon system and a direction of fire, as an anti-tank team, while wearing fighting loads, assemble a M220E4 TOW2 weapon system on the tripod in accordance with TM 9-1425-450-12 and within 4 minutes. (52TR.03.01)

b. Given a SL-3 complete M220E4 TOW2 weapon system, as an anti-tank team, while wearing fighting loads, disassemble a M220E4 TOW2 weapon system from the tripod in accordance with TM 9-1425-450-12 and within 4 minutes. (52TR.03.02)

2. ENABLING LEARNING OBJECTIVES

a. Given a list of choices, identify the characteristics and capabilities of a M220E4 TOW2 weapon system in accordance with TM 9-1425-450-12. (52TR.03.01a)

b. Given a list of choices and a diagram of a SL-3 complete M220E4 TOW2 weapon system, identify the components of a M220E4 TOW2 weapon system in accordance with TM 9-1425-450-12. (52TR.03.01b)

c. Given an SL-3 complete M220E4 TOW2 weapon system and a direction of fire, as an anti-tank team, while wearing fighting loads, set up the tripod in accordance with TM 9-1425-450-12. (52TR.03.01c)

d. Given an SL-3 complete M220E4 TOW2 weapon system and a direction of fire, as an anti-tank team, while wearing fighting loads, install the traversing unit in accordance with TM 9-1425-450-12. (52TR.03.01d)

e. Given an SL-3 complete M220E4 TOW2 weapon system and a direction of fire, as an anti-tank team, while wearing fighting loads, install the launch tube in accordance with TM 9-1425-450-12. (52TR.03.01e)

f. Given an SL-3 complete M220E4 TOW2 weapon system and a direction of fire, as an anti-tank team, while wearing fighting loads, install the optical sight in accordance with TM 9-1425-450-12. (52TR.03.01f)

g. Given an SL-3 complete M220E4 TOW2 weapon system and a direction of fire, as an anti-tank team, while wearing fighting loads,

install the thermal sight in accordance with TM 9-1425-450-12.
(52TR.03.01g)

h. Given an SL-3 complete M220E4 TOW2 weapon system and a direction of fire, as an anti-tank team, while wearing fighting loads, install the missile guidance set in accordance with TM 9-1425-450-12.
(52TR.03.01h)

i. Given an SL-3 complete M220E4 TOW2 weapon system and a direction of fire, as an anti-tank team, while wearing fighting loads, install the thermal sight battery power conditioner in accordance with TM 9-1425-450-12. (52TR.03.01i)

1. **TOW2 WEAPON SYSTEM CHARACTERISTICS, AND NOMENCLATURE.** The TOW2 weapon system is a heavy anti-tank weapon system (HAW), organic to the tank battalion, infantry battalion, and the light armored reconnaissance battalion.

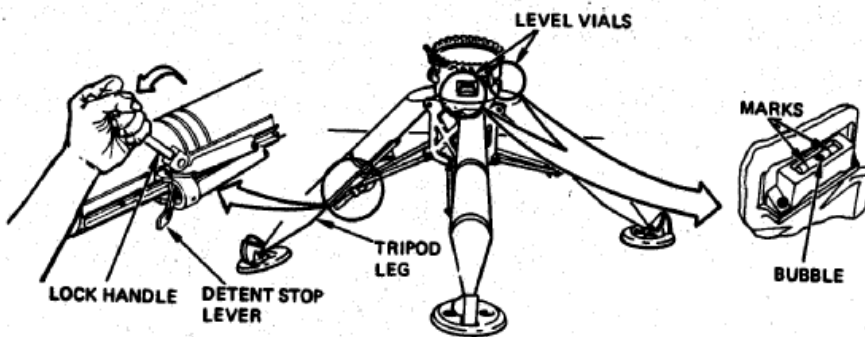
a. Characteristics. Use the acronym TOW.

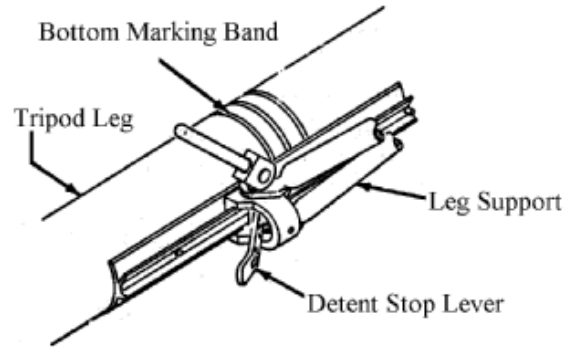
(1) Tube-launched, optical tracked, wire command link guided missile system.

(2) The TOW2 weapon system is both vehicle and man portable system.

b. Nomenclature. The M220E4 TOW2 weapon system is composed of eight main components. These eight components are formed into two groups, the M220E4 launcher, and the AN/UAS 12C thermal sight equipment set.

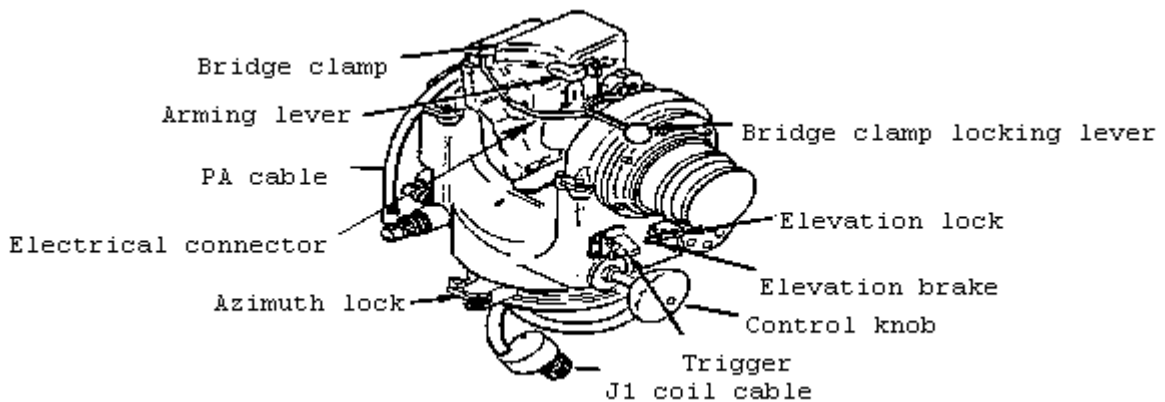
(1) M159 Tripod. Weighs 22 pounds. It holds traversing unit, optical sight, launch tube, and the encased missile, and the tripod legs can be adjusted so the tripod is level.





- (a) Grooved Coupling Clamp. The grooved coupling clamp secures the traversing unit to the tripod.
- (b) Level Vials. Indicates when the tripod is level.
- (c) Friction locks. Locks tripod legs in desired position.
- (d) Detent Stop Lever. Allows tripod legs to be adjusted.
- (e) Anchor Claw. Secures tripod to the ground.
- (f) Anchor Feet. Give additional stability to the tripod.

(2) M83 Traversing Unit (TU). Weighs 58 pounds. It allows the gunner to track target 360 degrees, and allows the gunner to track from +30 degrees above horizon to -20 degrees below horizon. Locks at +30 and -8 degree position.



- (a) Bridge Clamp. Contains the arming lever, and electrical connector between the launcher and the encased missile.
- (b) Arming Lever. Moves the electrical connector into and out of the encased missile.

(c) Bridge Clamp Locking Lever. Secures encased missile in traversing unit.

(d) Launch Tube Locking Latch. Secures launch tube to traversing unit.

(e) Post Amplifier Cable. Transmits signal from Post Amplifier to Missile Guidance Set.

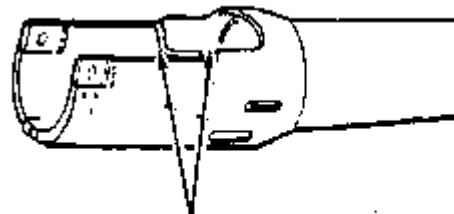
(f) Azimuth Lock. Locks the traversing unit down in azimuth.

(g) Trigger. Provides electrical power to the TOW2 weapon system and starts the firing order.

(h) Elevation Lock and Brake. Lock the traversing unit down in elevation.

(i) J1 Coil Cable. Connects the launcher to the missile guidance set.

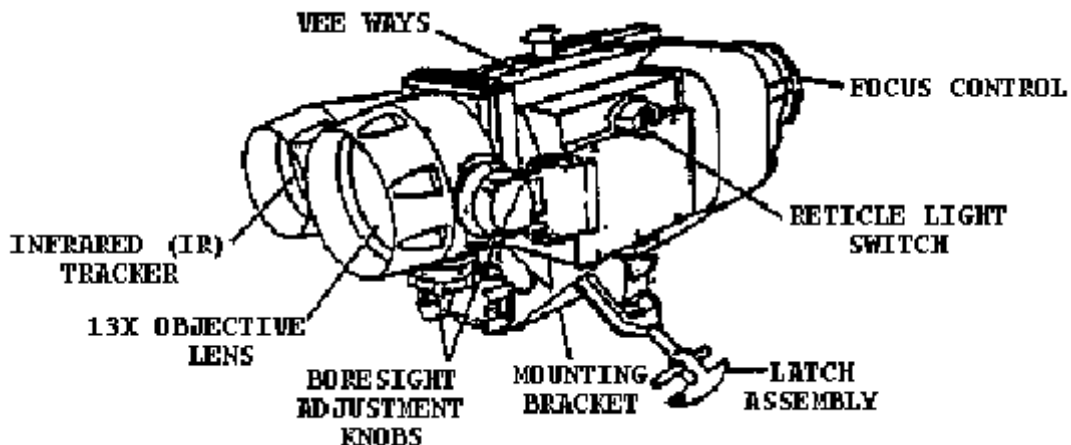
(3) M22 Launch Tube. Weighs 11 pounds. Holds the encased missile, provides guidance for the first part of missile flight, and protects the crew from launch motor blast.



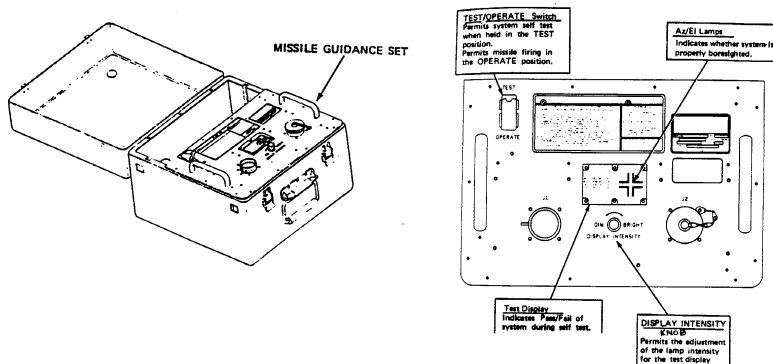
INDEXING SLOTS

LAUNCH TUBE

(4) M9155 Optical Sight. Weighs 31 pounds. Enables gunner to track a target during periods of good visibility, 13 power for enlargement of distant target.

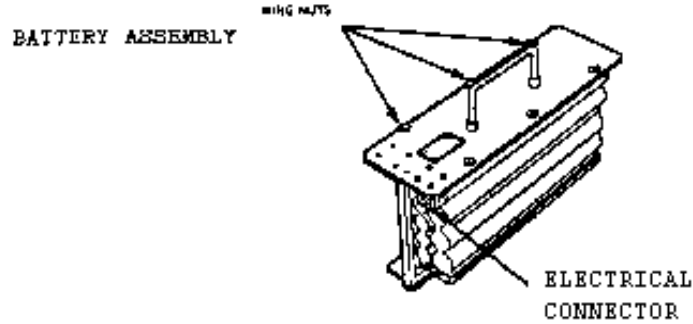


- unit.
- (a) Locking Latch. Locks optical sight to traversing unit.
- (b) Reticle Light switch. Provides power to reticle light.
- (c) Elevation and Azimuth Boresight Adjustment knobs. Permits alignment of the optical sight with the launcher as part of self-test.
- (d) Diopter Focus Ring. Permits eyepiece adjustment for sharpness of crosshairs.
- (5) AN/TSQ 136 Missile Guidance Set (MGS). Weighs 38 pounds. Contains the electrical circuits required for missile control and guidance. The tripod does not hold the missile guidance set.

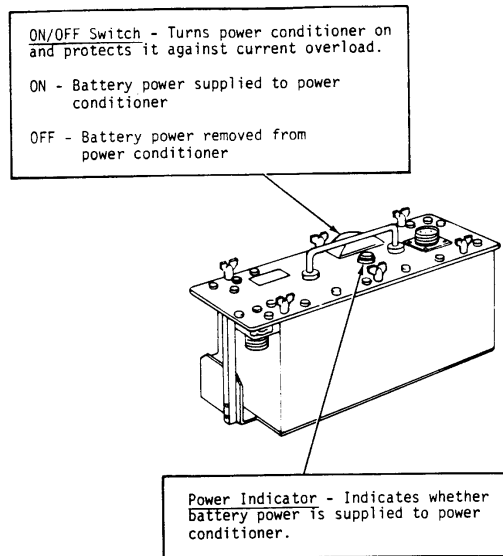


- (a) Battery Well. Houses the BB-287 Battery Assembly.
- (b) Test Operate Switch. Permits system self-test.
- (c) Azimuth and Elevation Cross pad. Indicates whether system is properly boresighted.
- (d) Brightness Intensity Knob. Permits the adjustment of the lamp intensity in the cross pad.
- (e) J1 Coil Cable Connection. Electrical connection point between J1 Coil Cable and Missile Guidance Set.

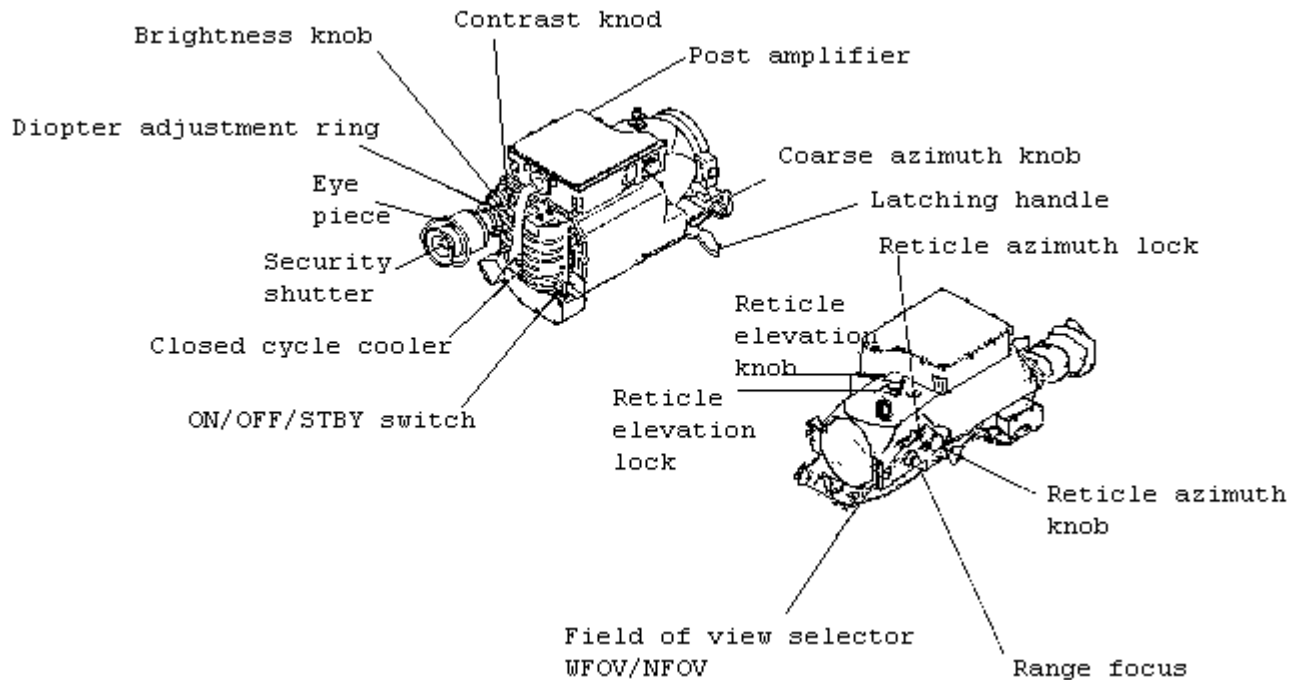
(6) BB-287 Battery Assembly. Weighs 20.5 pounds. Nickel cadmium battery, rechargeable, which provides enough power for 50 missile firings or 25 self-tests. Must be recharged every 30 days.



(a) TOW Vehicle Power Conditioner (TVPC). Replaces battery assembly in missile guidance set for a vehicle mounted TOW2 weapon system, changes vehicle power to power needed in missile guidance set.



(7) AN/TAS 4C Thermal Sight. Weighs 21 pounds. Enables gunner to track in limited to no visibility, has two fields of view; narrow field of view of 12 power, wide field of view of 4 power.



(a) Field Of View Selector Switch. Lets gunner choose field of view seen in night sight.

(b) Range Focus Knob. Adjust the focus of the image seen in the thermal sight.

(c) Azimuth and Elevation Adjustment Knobs. Adjust thermal sight in azimuth.

(d) Post Amplifier. Send tracking signals to the missile guidance set from the thermal beacon on the TOW missile.

(e) Locking handle. Locks the thermal sight to the optical sight.

(f) Diopter Focus Ring. Permits eyepiece adjustment for sharpness of crosshairs.

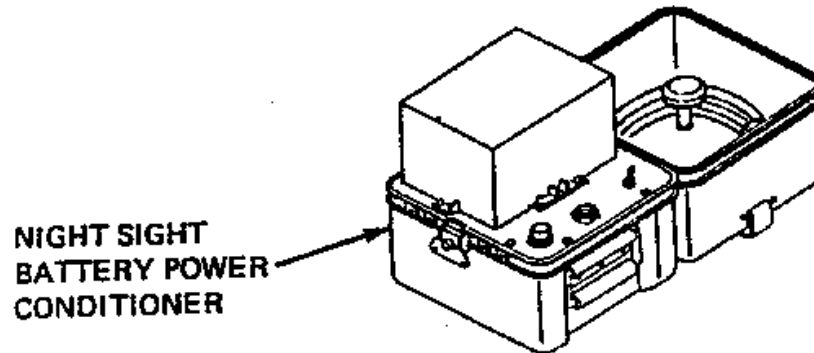
(g) Brightness and Contrast Knobs. Adjust brightness and contrast of an image.

(h) Closed Cycle Cooler. Provides cooling of the thermal sight infrared

(i) On/OFF/STBY Switch. Turns on thermal sight and cooler power.

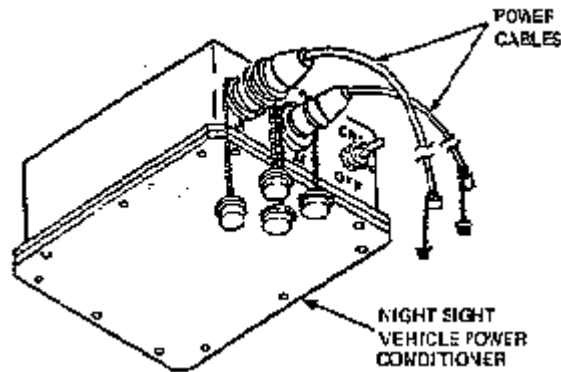
(j) Coarse Azimuth Knob. Aids thermal sight azimuth selection.

(8) Battery Power Conditioner (BPC). Powers the thermal sight when system is ground mounted. Operate for approximately 10 hours.



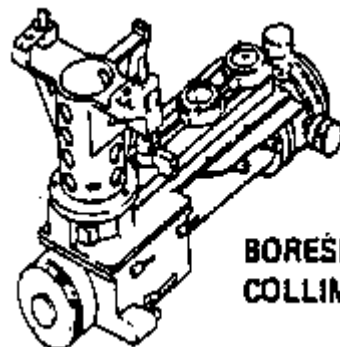
**NIGHT SIGHT
BATTERY POWER
CONDITIONER**

(a) Thermal Sight Vehicle Power Conditioner (VPC). Enables the thermal sight to run from vehicular power system in place of the portable battery.



**NIGHT SIGHT
VEHICLE POWER
CONDITIONER**

(9) Boresight Collimator. Used to align the thermal sight to the optical sight.



**BORESIGHT
COLLIMATOR**

2. CAPABILITIES AND LIMITATIONS OFF THE M220E4 TOW2 WEAPON SYSTEM.

a. The TOW2 weapon system has the following capabilities and features.

- (1) High first round hit probability at long range.
- (2) Penetration in excess of 36 inches of cold rolled homogenous steel or 15 feet of reinforced concrete.
- (3) Range 65 meters to 3,750 meters.
- (4) Highly lethal at all ranges.
- (5) Operates in temperatures of -25 degrees and +140 degrees Fahrenheit.
- (6) Relatively easy to conceal when ground mounted.
- (7) Can be operated on a slope of up to 30 degrees.
- (8) Simple to acquire and track targets.
- (9) Tracking during all periods of low/limited visibility.

b. Limitations of the M220E4 TOW2 Weapon System. The TOW2 weapon system has the following limitations.

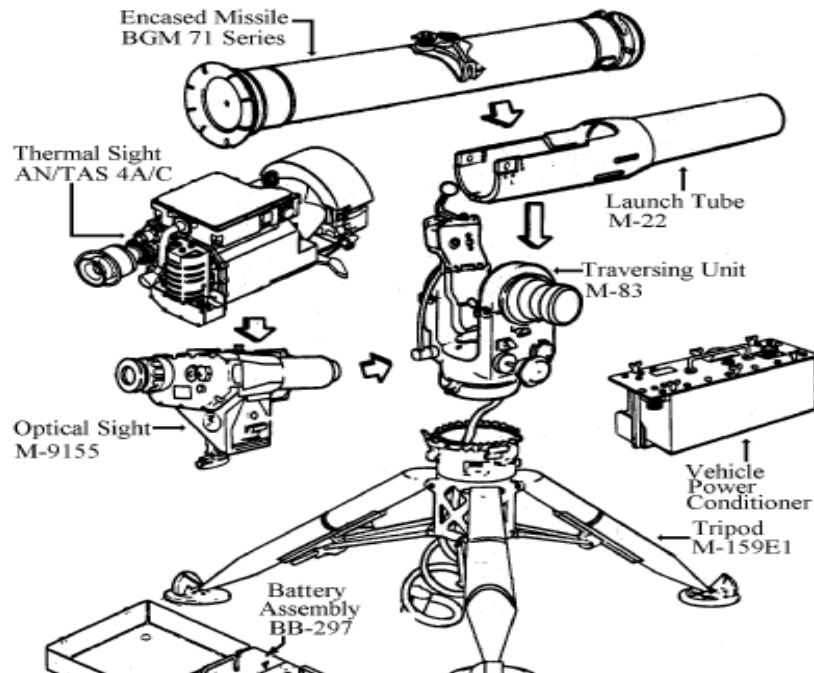
- (1) Gunner and weapon system are vulnerable to enemy fire during tracking.
- (2) Firing is marked by a large signature effect.
- (3) Extremely slow rate of fire.
- (4) Limited effectiveness in wooded or otherwise heavily congested avenues of approach.

3. ASSEMBLY. The eight main components of the TOW2 weapon system can be easily assembled without the use of tools. Ensure the area you are utilizing to mount the system is relatively flat. (If the tactical situation dictates that you must mount your system on uneven ground, you may have to raise or lower sections of the ground immediately beneath the tripod's anchor claws). Before you assemble the TOW2 system, ensure you have all of the components that are organic to that particular system. (For example, do not mount the optical sight for system number 12 on the tripod for system number 08).

a. Setting up the M-159E1 Tripod. The entire TOW system is mounted on a large, lightweight, aluminum tripod. To set up the tripod, follow the procedures below.

- (1) Choose (or be given), a direction of fire.

(2) The gunner lifts the three friction locks on the tripod up to the unlocked position.



(3) The gunner pushes in the detent stop lever and extends the legs to the painted bottom band. Repeat the procedure until all three legs are extended. He sets the tripod up so the groove coupling clamp handle is facing the direction of fire. (If necessary, you may have to rotate the tripod). Check the vial bubble markers to ensure the system is level. If he cannot get the indicator bubble to "center" itself, he may have to readjust the legs, or move the system.

(4) The gunner lowers the locking handles to secure the legs, and sink the anchor claws into the ground, by stepping on them. Recheck the vial bubble markers to ensure tripod is still level.

(5) The gunner opens the grooved coupling clamp.

b. Mounting the M-83 Traversing Unit. All major components, with the exception of the thermal sight, are mounted on the traversing unit. The TU is a large, heavy housing for various internal electrical components, and azimuth and elevation tracking (slew) gears. This component is extremely heavy, (58 lbs.); so exercise caution when handling it. Use the procedure below, to mount the TU to the tripod.

(1) The gunner picks up the traversing unit by the control knobs, with the azimuth lock facing away from him. He positions himself over the cylindrical opening of the tripod, ensuring the azimuth lock is facing the opposite direction of the open groove coupling clamp handle. The assistant gunner pulls the coil cable down through the body of the tripod. (Do not pinch the coil cable between the TU and the tripod. This will result in severe damage to the cable). Ensure the electrical connector end of the coil cord is facing up to prevent dirt or debris from fouling the pins.

(2) The gunner lowers the TU so that it rests evenly between the upper tripod lip and the groove coupling clamp. Gently rock the TU from side to side to ensure it is evenly seated. (Keep at least one hand on the control knobs until the TU is secured in place.)

(3) The gunner holds the bell safety on the groove coupling clamp open and closes the clamp, by pushing the handle forward. If the handle will not close with a reasonable effort, do not force it. Try reseating the TU or have the armory personnel adjust the clamp tension screw.

(4) The gunner ensures the TU is locked in place by attempting to twist the unit from side to side. A properly secured TU will not move once the groove coupling clamp handle is latched down. If the TU does traverse and is properly locked in place, the tension screw needs to be adjusted by the armory personnel.

(5) The gunner checks the vial bubble markers again, to ensure the system is still level, and ensuring that the azimuth and elevation Locks are engaged in the locked positions.

c. Attaching the M-22 Launch Tube. The launch tube is a fiberglass tube designed to help hold the encased missile in the launcher. Use the procedure below to mount the launch tube to the TU.

(1) The gunner picks up the launch tube and lifts up the launch tube latch on the TU.

(2) With the launch tube at a 45 degree angle, the gunner places the two launch tube pins, (located at the rear of the launch tube), into the launch tube brackets.

(3) The gunner slowly lets the launch tube down until the locating pin slides into the mating hole. Then press firmly down on the launch tube catch, until there is a soft "click". He removes the post amplifier cable from the forward cup, and places the free end in the launch tube.

d. Attaching the M-9155 Optical Sight. The optical sight is the primary acquisition sight of the TOW2 system. Its 13 X (Power) magnification will allow you to quickly find your target before you switch over to the thermal sight. The optical sight should never be handled roughly, as it has several sensitive optic devices located internally. Never allow your fingers to touch the surface of the lens while mounting or dismounting the system. Use the procedure below, to mount the optical sight to the TU.

(1) The assistant gunner removes the optical sight from the shroud bag, using the two large, round cut-outs located on the main housing, adjacent to the latch handle. Never remove the sight using the latch handle.

(2) The assistant gunner carefully unlocks the latch handle, and pulls the handle all the way open. Ensure the reticule light switch is turned to the "Off" position and the 30% humidity indicator is in the "blue" then passes the optical sight to the gunner.

(3) The gunner receives optical sight, and holds the optical sight (using the large, round cutouts), with the sight hook mount facing the boresight plate on the left side of the TU drops to one knee, and places the rectangular recess above the hook mount onto the ridge on top of the boresight plate. He carefully lowers the optical sight until it is flush with the boresight plate.

(4) The gunner, keeps his right hand in the large, round cutouts on the optical sight, and with the palm of his left hand, pulls up firmly on the latch handle until it locks into place. You will hear a loud "click". Gently try to move the sight from left to right to ensure it is locked down. Sometimes, the latch handle may lock without the sight hook mount catching on the boresight plate. To remedy this, unlock the latch handle, reach underneath the optical sight and press upward firmly with your fingertips on the sight hook mount. This will force the hook mount onto its latching lip. With upward pressure still on hook mount, raise the latch handle, and lock it in place. Once again, you must move the sight from left to right to ensure it is locked down.

e. Attaching the AN/TAS-4A/C Thermal Sight. The thermal sight is the primary firing sight of the TOW2 system. Its 12 and 4 X (Power) magnification will allow you to quickly confirm your target before you fire. The thermal sight should never be handled roughly, as it has several sensitive optic devices located internally. Never allow your fingers to touch the surface of the lens while mounting or dismounting the system. Use the procedure below to mount the thermal sight to the optical sight.

(1) The assistant gunner carefully lifts thermal sight from its carrying case, by grasping the front and rear ends firmly. Place the sight on top of its carrying case and ensure the coarse azimuth knob is set to "1" or "2", and pull the latch handle all the way to the rear. Ensure the On/Off/Stby switch is set to "Off" and hands the thermal sight to the gunner.

(2) The gunner grasps the thermal sight as described above, and approach the optical sight from the rear. Visually locates the forward vee way and cam post on the top of the optical sight. With the thermal sight at a 45-degree angle centered above the optical sight, he place forward vee way of the thermal sight onto to the forward vee way of the optical sight. Slowly he lowers the thermal sight so the cam post (optical sight) slides into the keyed hole on the thermal sight.

(3) The gunner pushes the thermal sight latch handle all the way forward until it stops with metal on metal contact. He gently moves the sight from side to side to ensure that it is seated correctly. If it is not, unlock the latch handle and repeat the procedure.

(4) The gunner removes the dust cover from the thermal sight post amplifier. Then grasps the free end of the post amplifier Cable from the launch tube. Ensure there is no dirt or debris in the electrical connector. Utilizing the small guide rails, connect it to the post amplifier connector on upper right side of the post amplifier by turning the outer ring clockwise.

f. Installing the AN/TSQ-136 Missile Guidance Set. The MGS controls all tracking and sight precedence transfer procedures. It is the "brains" of the TOW2 system (The TOW2 system has a digital MGS as opposed to the analog MGS found on the older TOW and I-TOW systems). A nickel cadmium battery known as the battery assembly (BB-267) powers the MGS. Use the procedure below to install the battery assembly in the MGS and to attach the MGS to the traversing units' coil cable (J1).

(1) The assistant gunner remove the MGS lid by lifting up on the two latches located next to the carrying handle on the front of the MGS.

(2) The assistant gunner removes the plastic electrical connection cap from the electrical connector on the battery assembly. (Place this on the "dummy" connector located on the opposite side of the real connector). He then locates the guide rail on the battery assembly, and lowers the battery into the battery well in the MGS, using the rail recess as a guide. Ensure it is fully seated.

(3) The gunner presses down on the battery assembly and secures it to the MGS by turning the six wing nuts clockwise until they stop. (Do not over tighten them, or they will break).

(4) The gunner positions the MGS under the tripod so the coil cable will reach the MGS J1 connector. He grasps the free end of the coil cable and looks into the connector face. Ensuring that the electrical pins are free from debris and that none are bent. (If you notice bent pins do not attach the cable. Notify your squad leader).

(5) The gunner locates the small guide rails inside the connector face. Aligning those with the corresponding guides in the collar of the J1 connector on the MGS (under no circumstances attempt to attach the coil cable to the MGS J2 connector. The J2 connector is for test equipment and the M-70 trainer only).

(6) The gunner rotates the Locking Nut clockwise until it stops passed the red line. As you do this, you will hear a faint "clicking" sound. (Be careful not to "cross-thread" the connector, as this will make it extremely difficult to remove). Ensure the coil cable is completely secure by GENTLY rocking it from side to side. If it moves, the locking nut needs to be tightened further.

(7) The gunner slides the MGS directly underneath the tripod, ensuring that the panel face is readable from the gunner's position directly behind the system. The assistant gunner place the MGS lid on the ground, face up, directly behind the down hill leg on the tripod. Fold and place the shroud bag from the optical sight in the MGS lid and places the spare battery assembly on top off the shroud bag.

g. Attaching the Battery Power Conditioner. The BPC powers the thermal sight. Two lithium batteries, located in the battery Well, give the TOW2 system about eight hours of constant operation before they must be replaced. Use the procedure below, to attach the BPC to the thermal sight.

(1) The assistant gunner opens the BPC lid, removes the coiled BPC cable and removes all the dust covers form the BPC cable as well as from the thermal sight connection and the battery power conditioner.

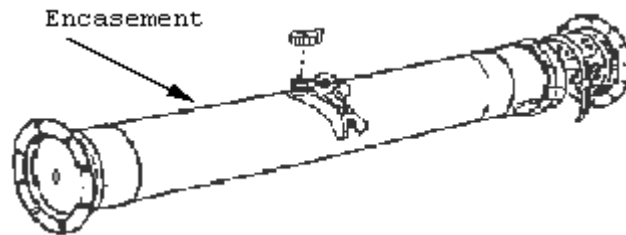
(2) Ensuring that the circuit breaker is in the "Off" position. The gunner connects the output cable connector (8W1P2/8J1) to the electrical connector on the BPC by aligning the keys and rails and rotating the outer ring clockwise until it is fully seated.

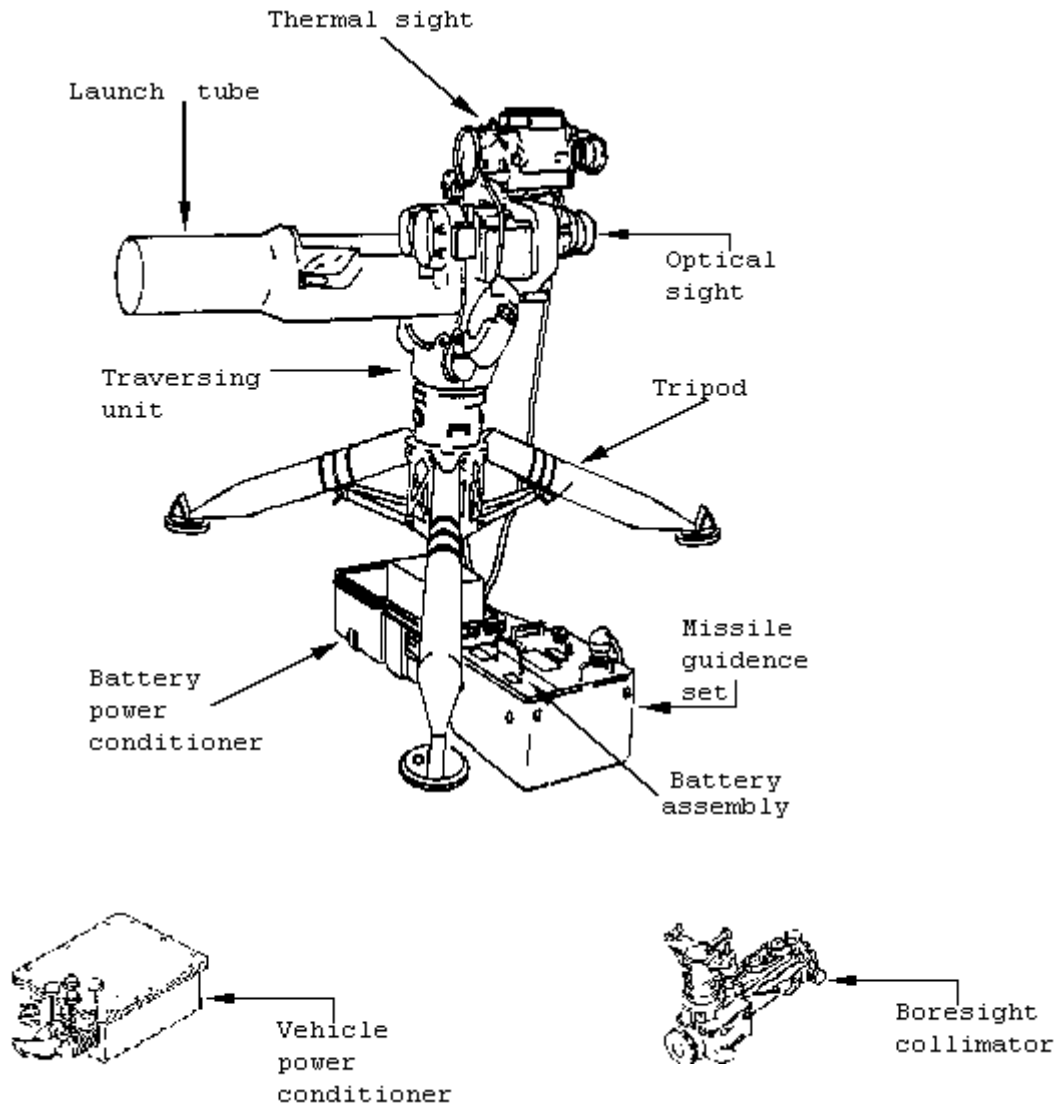
(3) The gunner runs the free end of the cable underneath the left rear Tripod leg and connect it to input power connector (J1), on the aft end of the thermal sight by aligning the keys and rails and rotating the outer ring clockwise. Ensure that no pins are bent prior to connecting the cable to the thermal sight. The pins inside the input power connector are extremely fragile, and easily broken.

(4) The assistant gunner carefully place the BPC on the ground, to the outside edge of the left rear most leg of the tripod. Remove the battery well cover by sliding the small clips outward. Install two lithium batteries and replace the cover and the clips. Turn the circuit breaker to the "On" position.

(5) The gunner turns the circuit breaker on the battery power conditioner to the "On" position. Move the "On/Off/Stby" switch on the thermal sight and places that in the "On" position, and yell "Gun Up". Once the thermal sight is on, you will hear a soft, steady "clicking" sound.

h. Ensuring the M-220E4 (TOW2) system is complete. Once the system is assembled, you should give it the "once over" to ensure it is assembled correctly. Start at the top and work your way down. Check all cables, connectors, and latches, and make sure they are connected properly. Do NOT rush the mounting procedure. If you rush, you will become careless, and you will break something.





4. **DISASSEMBLY.** The eight main components of the TOW2 weapon system can be easily disassembled without the use of tools. Ensure the area immediately around the system is free from clutter and that all component cases and bags are accessible. The dismantling procedure for the TOW2 weapon system is relatively easy. Simply reverse the order that you utilized for the assembly procedure. Ensure that as you disassemble the weapon, you stay alert so the individual components are not stacked haphazardly on top of one another and that all cables are properly in their cases, before the case lids are secured.

a. Removing the battery Power Conditioner

(1) The gunner turns the thermal sight off by places the ON/OFF/ Stby switch on the thermal sight into the off position, and turns the battery power conditioner (BPC) off by placing the ON/OFF switch on the BPC into the off position.

(2) The assistant gunner removes the battery power conditioner battery cover by sliding the battery power conditioner locks to the unlock position. Take out the two lithium batteries and place them in the battery box. Replace the battery cover and engage at least two clips on opposite corners.

(3) The gunner carefully removes the BPC cable from the battery power conditioner electrical connector and the J1 connector on the thermal sight. Then he replaces the dust covers on the BPC cable and the battery power conditioner and the thermal sight J1 connection.

(4) The assistant gunner re-coils the battery power conditioner cable and places it into the battery power conditioner lid. He closes the battery power conditioner lid and ensures it is secured properly using the two latches located on the lower front. (Ensure the battery power conditioner Cable is fitted into the battery power conditioner lid correctly. DO not force the lid closed. If resistance is offered, remove the cable, re-coil it, and repeat the procedure.

(5) The assistant gunner stages the battery power conditioner in the designated area.

b. Removing the AN/TSQ-136 Missile Guidance Set. Before removing the MGS, the coil cable (J1) must be carefully removed. Follow the instructions below.

(1) The gunner rotates outer ring on the coil cable counter clockwise until the J1 coil cable connector can be easily pulled from the connector collar. If the locking nut does not turn easily as you try to unscrew it, grasp the Cable connector and slowly but firmly move it from side to side while attempting to turn it. This should allow you to remove it.

(2) The gunner lifts the coil cable from the J1 connector collar and place it so no dirt or debris can enter the face. Slide the MGS out from underneath the tripod. Never drag the MGS by the coil cable.

(3) Turning the six wing nuts counter clockwise, the gunner removes the BB-287 battery assembly. He removes the plastic connector cap from the dummy connector and replaces it on the actual connector. Place the battery assembly in the designated area. Never rest the battery assembly on concrete or metal, as this will cause it to rapidly discharge.

(4) The assistant gunner removes the shroud bag from the MGS lid and replace the lid on the MGS engage the lid latches. He then stages the MGS next to the battery power conditioner in the designated area.

c. Removing the AN/TAS 4A/C Thermal Sight

(1) The gunner removes the post amplifier (PA) cable from the post amplifier by rotating the outer ring counter clockwise, and carefully replaces it in the holding cup on the traversing unit. He replaces the PA dust cover back onto the PA on the AN/TAS 4A/C thermal sight. If the foam lens cover has fallen off the sight, replace it using the two clasps.

(2) The gunner pulls the locking latch handle completely to the rear. Grasping the thermal sight tightly with one hand in front near forward vee way, and the other in the rear, under the closed cycle cooler. The gunner lifts the rear of the thermal sight so the keyed hole clears the cam post on the optical sight and hands it to the assistant gunner.

(4) The assistant gunner carefully inverts the thermal sight and replaces it in its carrying case. Ensure the latches are used to secure the case.

d. Removing the M-9155 Optical Sight. Before removing the optical sight, ensure the reticle light switch is still "Off". Retrieve the shroud bag and place it next to the system.

(1) The gunner grasps the optical sight with the left hand on the large, round cut-outs, using the right hand. He grabs the optical sight locking latch with a palms up grip, unlock the latch handle by squeezing and pulling down. (You will hear a distinct "click").

(2) The gunner supports the optical sight from both ends (do not hold the optical sight by the latch handle). Carefully pull straight up, so the sight clears the top of the boresight plate ridge. (Ensure your fingers do not touch the lens).

(3) The gunner places the optical sight on top of the shroud bag and closes the locking latch handle. The assistant gunner replaces the optical sight in the shroud bag with the electrical connector on the optical sight facing the padded portion of the shroud bag, and secures the bag with the velcro straps. Carry it to the designated area.

e. Removing the M-22 Launch Tube

(1) The gunner unlocks the launch tube locking latch on the TU and lifts up on the forward end of the missile.

(2) The gunner pulls the launch tube straight up to allow the pins to clear the brackets.

(3) The assistant gunner place the launch tube with the U portion facing the deck in the designated area next to the MGS

f. Removing the M-83 Traversing Unit. Ensure the free end of the PA cable is securely in the holding cup.

(1) The gunner opens the bell safety on the collar of the groove coupling clamp. At the same time, open the groove coupling clamp by pulling out on the handle. Once the handle is open, and the coupling clamp fully releases, let go of the safety spring.

(2) Grasping the traversing unit by the control knobs the gunner lifts the unit approximately four to six inches. The assistant gunner feed the loose end of the coil cable through the opening on the tripod and re-coils the cable and places the connector end in the retaining well on the bottom of the TU.

(3) The assistant gunner carefully carries the TU to the designated area and places it face up (azimuth lock straight up) on top of the MGS (ensure the bridge clamp stays locked).

g. Collapsing the M-159E1 Tripod. Before attempting to collapse the tripod, lift each leg approximately six inches off the deck. (This will release the anchor claws).

(1) The gunner closes the groove coupling clamp, and engage the bell safety. He opens all three lock handles and uses the detent stop levers; close each leg one at a time. Relocking the locking handle when the legs are in the stowed position.

(3) The assistant gunner carries the tripod to the designated area, and stand it upright. (On its feet)

REFERENCES: TM 9-1425-450-12 Operator and Organizational Maintenance Manual for the TOW2 Weapons System; Chapter 2 Pages 2-57 through 2-83.

EXAM TITLE: M220E4 TOW2 Weapon System Assembly and Disassembly Performance Examination (Assembly Procedures)

EXAM ID: AGM1402P

TLO/ELO: 52TR.03.01

STUDENT INSTRUCTIONS:

1. You must assemble a M220E4 TOW2 weapon system on the tripod.
2. You have four minutes to complete this task.
3. To achieve mastery, you must perform each of the performance steps correctly, in order, and within the allotted time.

PERFORMANCE STEPS AND/OR PERFORMANCE STANDARDS:

Performance Steps	1 st ATTEMPT		2 nd ATTEMPT		3 rd ATTEMPT	
	M	NM	M	NM	M	NM
1. Receive a direction of fire.						
2. Lift the three friction locks on the tripod up to the unlocked position.						
1. Press one detent stop lever down and release. Pull one leg out until detent stop lever reaches the bottom band on the leg. Repeat this step for the other two legs.						
2. Position the tripod with coupling clamp handle facing the direction of fire. Using heel of shoe, press all three anchor claws into the ground. If additional support is needed, drive stakes into ground through holes in anchor foot.						
3. Using the detent stop lever, adjust tripod legs until the bubble in each level vial is between the two marks shown. Lower the friction lock on each leg all the way to the locked position.						
4. Open the coupling clamp by pulling the handle out.						
5. Hold the TU over the tripod and pass the coil cable down through the body of the tripod.						

6.	Carefully place the TU on the tripod, and push the coupling clamp handle in to fasten the TU to the tripod. Ensure the safety bail is secure over the handle.						
7.	Place the azimuth lock in the LOCK position and turn the TU from side to side until it locks in place.						
8.	Ensure the TU is locked in place by attempting to twist the unit from side to side.						
9.	Lift up the launch tube latch.						
10.	Place the two launch tube pins in launch tube brackets so that launch tube is pointed in direction of fire.						
11.	Line up locating pin with mating hole in launch tube.						
12.	Place launch tube latch in launch tube catch and press down on latch until it catches.						
13.	Remove daysight from shroud bag.						
14.	Hold daysight with tracker mount facing TU boresight plate.						
15.	Join daysight index plate groove with TU boresight guide and pull latch handle all the way up until latch locks.						
16.	Make sure daysight is securely mounted to TU before letting go.						
17.	Make sure reticle light switch is set to OFF, and check the humidity indicator to be sure the 30 percent section is blue.						
18.	Open the night sight field-handling case and remove night sight from case.						
19.	Place the coarse azimuth knob in position No. 1 (forward position). Move the locking latch toward rear of night sight.						
20.	Check the "vee ways" on night sight and daysight for debris. Line up the keyed hole on night sight with cam post on daysight sight.						
21.	Place the night sight on daysight with night sight lens facing forward, and ensure in seats securely on daysight sight.						
22.	Using your right hand, move latch handle forward toward front of night sight to lock down. Ensure night sight is securely mounted before letting go.						
23.	Remove the PA cable from cable retainer on TU.						
24.	Align yellow mark on PA cable connector with yellow mark on night sight. Gently push in and turn clockwise until secure.						
25.	Open BPC lid and connect power cable to the connector on the BPC.						

26. Connect the power cable to the night sight connector.						
27. Set the circuit breaker to ON. Turn closed cycle cooler ON.						
28. Remove the lens cover from night sight by releasing the two latches.						
29. Set the field-of-view switch to NFOV.						
30. Unlatch the two latches at front of MGS. Open the cover all the way and remove, ensuring it is stowed in a safe place and out of the way of personnel.						
31. Locate battery assembly. Fit the tabs on the battery assembly into grooves of MGS battery well, and push straight down on battery assembly.						
32. Turn the six wing nuts clockwise until tight.						
33. On the coil cable connector, line up the yellow colored index line with yellow colored mating line next to J1 connector on the MGS.						
34. Turn the connector clockwise until the red mark on the J1 connector cannot be seen.						
35. Place the MGS near base of tripod, forward of loading and firing positions.						
36. Place the BPC next to the MGS.						

PERFORMANCE EXAMINATION CHECKLIST

EXAM TITLE: M220E4 TOW2 Weapon System Assembly and Disassembly
Performance Examination (Disassembly Procedures)

EXAM ID: AGM1402P

TLO/ELO: 52TR.03.02

STUDENT INSTRUCTIONS:

1. You must disassemble a M220E4 TOW2 weapon system from the tripod.
2. You have four minutes to complete this task.
3. To achieve mastery, you must perform each of the performance steps correctly, in order, and within the allotted time.

PERFORMANCE STEPS AND/OR PERFORMANCE STANDARDS:

Performance Steps	1 st		2 nd		3 rd	
	ATTEMPT		ATTEMPT		ATTEMPT	
	M	NM	M	NM	M	NM
1. Set the ON/OFF/STBY switch to off on the night sight.						
2. Set the BPC circuit breaker switch to OFF.						
3. Disconnect the BPC cable from the night sight and BPC.						
4. Ensure dust covers are put back on, and stow the BPC cable into the lid of the BPC.						
5. Close BPC lid and secure latch.						
6. Place the lens cover on and secure it with the two latches.						
7. Turn the PA cable connector counter-clockwise and remove it from the night sight.						
8. Insert the PA cable into the cable retainer on the TU. Ensure dust covers are replaced.						
9. Support the night sight and move the latch handle rearward to the unlock position.						
10. Remove the night sight from the daysight and return it to the field handling case and ensure the latches are secure.						
11. Pull and hold the latch in toward handle, and push forward toward the TU.						
12. Carefully lift the daysight off the TU and place in shroud bag, ensuring latch handle is closed.						

13. Close shroud bag and tighten down straps.						
14. Pull the MGS out from underneath the tripod. Turn the coil cable connector counter-clockwise until it is no longer threaded on the J1 connector.						
15. Insert catch strikes on cover into bow handles at rear of MGS, close cover, and secure latches.						
16. Unlock the launch tube locking latch on the TU.						
17. Lift the launch tube pins out of the launch tube brackets and remove from the TU.						
18. Pull out the coupling clamp handle to release TU from tripod.						
19. Lift the TU off the tripod and set it on the ground with the PA cable facing up.						
20. Place the coil cable in the bottom of the TU and wind up the cable.						
21. Close the coupling clamp.						
22. Release tripod legs by turning the friction locks upward.						
23. Grasp the top of the tripod and lift straight up until all three legs close.						
24. Lock down the friction locks.						