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Training Command
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AT1505
06 AUG 04

STUDENT OUTLINE

TOW2 WEAPON SYSTEM VEHICLE MOUNTING PROCEDURES

1. TERMINAL LEARNING OBJECTIVES

a. Given an SL-3 complete stowed M220E4 TOW2 weapon system, a M1045A2 HMMWV, and a direction of fire, as an anti-tank team, while wearing fighting loads, mount a M220E4 TOW2 weapon system to a M1045A2 HMMWV in accordance with TM 9-1425-450-12 and within 4 minutes. (52TR.03.03)

b. Given an SL-3 complete M220E4 TOW2 weapon system, a M-1045/46 HMMWV, as an anti-tank team, while wearing fighting loads, dismount a M220E4 TOW2 weapon system to travel mode in accordance with TM 9-1425-450-12 and within 4 minutes. (52TR.03.04)

2. ENABLING LEARNING OBJECTIVES

a. Given an SL-3 complete stowed M220E4 TOW2 weapon system, a M1045A2 HMMWV, 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.03.03a)

b. Given an SL-3 complete stowed M220E4 TOW2 weapon system, a M1045A2 HMMWV, 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.03.03b)

c. Given an SL-3 complete stowed M220E4 TOW2 weapon system, a M1045A2 HMMWV, and a direction of fire, as an anti-tank team, while wearing fighting loads, install the THERMAL NIGHT SIGHT vehicle power conditioner in accordance with TM 9-1425-450-12. (52TR.03.03c)

d. Given an SL-3 complete M220E4 TOW2 weapon system and a M1045A2 HMMWV, as an anti-tank team, while wearing fighting loads, stow the components of a M220E4 TOW2 weapon system in accordance with TM 9-1425-450-12. (52TR.03.04a)

BODY

1. STOWING THE SYSTEM. Before you learn how to place the M-220E4 (TOW) System the vehicle, you must first learn how the components are loaded inside the vehicle. This is called "Stowing" the system. Once the system has been properly stowed, the vehicle is in the "Extended Travel Mode". This mode is used when enemy contact not likely or during long, peacetime administrative convoys. Once the system is

assembled on the vehicle, the vehicle is in the "Ready To Fire" mode. (Taking the system from the extended travel mode to the ready to fire is called "Mounting". Taking the system from the armory, and placing the individual components in their special racks or compartments is called "Stowing".) Follow the procedure below to properly "Stow" the M-220E4 (TOW 2) system.

a. Stowing the BB-297 Battery Assemblies. The TOW 2 system has two organic battery assemblies. These are stowed in special battery racks in the left rear of the vehicle. (All "left" and "right" mounting and stowing directions are from the point of view of a driver, facing forward in the vehicle.) The battery assemblies are used as a back up power supply, as the vehicle mounted TOW uses a different device to supply power to the MGS. This device is called the Tow Vehicle Power Conditioner (TVPC), and will be covered in depth later in the lesson. Follow the procedures below to stow the two battery assemblies.

(1) Carefully open the cargo/loaders door from the rear. (This door has two set of pivot pins, and can be opened so the door faces to the front, or the rear.) Once this door is open, drop the tailgate.

(2) Locate the long, rectangular battery racks directly behind the left side rear passenger seat.

(3) Slide each battery assembly straight down into its rack in the same manner that they are installed into the MGS. Ensure the battery's electrical connector and plastic cap are facing to the rear of the vehicle.

(4) Secure each of the battery assemblies into the battery racks by turning the six wing nuts clockwise. (Do not over tighten them. This will result in damage.)

b. Stowing the TOW Vehicle Power Conditioner. The TVPC replaces the battery assembly for the vehicle mounted TOW system. It has the same dimensions of the battery assembly and fits into the MGS the exact same way. The TVPC converts power from the vehicle's two organic 12-volt batteries and allows the TOW system to operate. Follow the procedure below to stow the TVPC.

(1) Remove the MGS lid.

(2) Locate the guide rail on the TVPC, and then lower it into the battery well in the MGS, using the rail recess as a guide. Ensure it is fully seated.

(3) Press down on the TVPC and secure it to the MGS by turning the six wing nuts clockwise until they stop. (Do not over tighten them, or they will break.) Replace the MGS lid.

c. Stowing the M-83 Traversing Unit. Before stowing the TU on the vehicle, two additional components must be fitted to it. The first of these components is the "Elevation/Depression Limiter Assembly". This device slightly limits the systems ability to elevate and depress the launch tube. This prevents damage to the vehicle when a missile is fired. This ring-like device is mounted under the TU and is secured to

the TU by a screw. The other component is the "TU extension adapter." This device acts as the tripod when the system is mounted on the vehicle. It consists of two grooved coupling clamps mounted on both ends of a short, wide cylindrical pipe. The top clamp attaches to the TU and the bottom clamp attaches to the internal ring mount next to the gunner's platform or the external launcher mount on the vehicle's roof. (These two components are SL-3 to the individual TOW vehicle and not the individual TOW system.) Follow the procedures below to stow the TU.

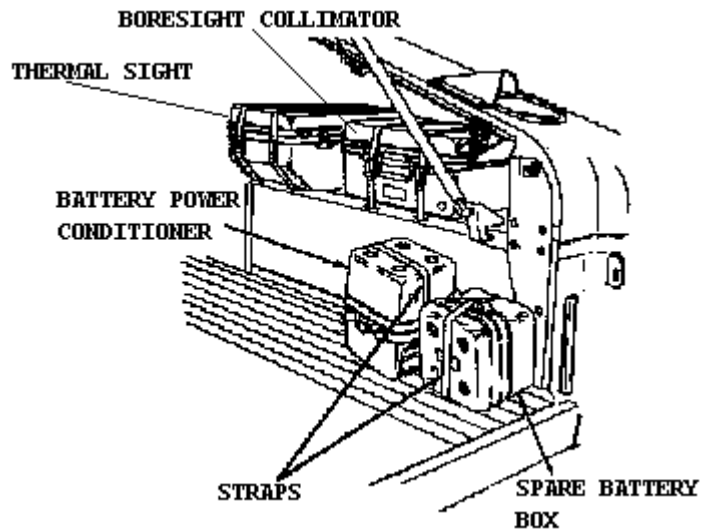
(1) Open the bottom grooved coupling clamp on the TU extension adapter. Place this over the internal ring mount adjacent to the gunner's platform. (There is a small notch in the bottom of the adapter and a small ridge on the lip of the mount to help you align them.) Close the lower grooved coupling clamp handle to secure the adapter to the ring mount and engage the bail safety.

(2) Open the top grooved coupling clamp on the TU extension adapter. (The clamp handles of the upper and lower clamps should be on opposite sides of the adapter. If they are not, notify your squad leader, so he can have it remedied. Never use an adapter that has both clamp handles on the same side.) Carefully lower the TU onto the TU extension adapter, ensuring that the azimuth lock is facing the driver's seat (inboard). Close the upper grooved coupling clamp handle to secure the TU to the adapter and engage the bail safety.

d. Stowing the AN/TSQ-136 Missile Guidance Set. The MGS (and the internally mounted TVPC), are stowed on top of the gunner's platform. Center the MGS on the platform ensuring the carrying handle is facing to the rear of the vehicle. The driver's side gunner's platform is fitted with two, long tie down straps. On the free ends of these straps are two "J" shaped fasteners. Attach these fasteners to the corresponding tie down brackets on the passenger side of the gunner's platform and tighten them securely.

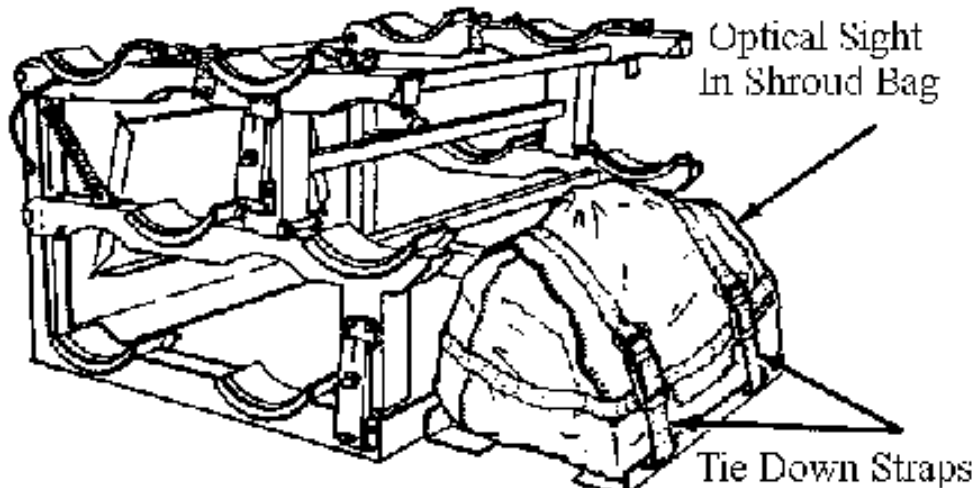
e. Stowing the SU-93/TAS Boresight/Collimator. The boresight collimator (in its case) is stowed to the right of the THERMAL NIGHT SIGHT on the same shelf. This shelf is fitted with an additional set of tie down straps. On the free end of these straps are two "J" shaped fasteners. Attach these fasteners to the corresponding tie down brackets in front of the boresight collimator on the face of the shelf and tighten them securely.

f. Stowing the AN/TAS 4A/C THERMAL NIGHT SIGHT. The THERMAL NIGHT SIGHT (in its case) is stowed perpendicular to the right rear of the vehicle, on a shelf. This shelf is fitted with two, long tie down straps. On the free end of these straps are two "J" shaped fasteners. Attach these fasteners to the corresponding tie down brackets in front of the THERMAL NIGHT SIGHT on the face of the shelf, and tighten them securely.



g. Stowing the Battery Power Conditioner. The BPC is stowed on the floorboards in front of the boresight collimator. A single, long tie down strap running parallel to the floorboards secures it. On the free end of this strap is a "J" shaped fastener. Attach this fastener to the corresponding tie down bracket, and tighten it securely.

h. Stowing the Spare Battery Pack. The spare battery pack is stowed on the floorboards in front of the boresight collimator, to the right of the BPC and is secured in the same manner as the BPC.



i. Stowing the M-9155 Optical Sight. The optical sight (in its shroud bag) is stowed on the floorboards to the right of the six place missile racks, in a rectangular bracket. This bracket is fitted with two, long tie down straps. On the free end of these straps are two "J" shaped fasteners. Attach these fasteners to the corresponding tie down brackets on the opposite side of the main bracket and tighten them securely.

j. Stowing the M-159E1 Tripod. The tripod is not used when firing the TOW system from the M-1045/46. (The system mounts to the TU

adapter extension.) However, should the need arise to ground mount the system, you will again need the tripod. The tripod is stowed to the extreme left rear of the vehicle. It mounts to a round disk that is the same size as the mounting ring on the bottom of the TU Use the following procedure to stow the tripod.

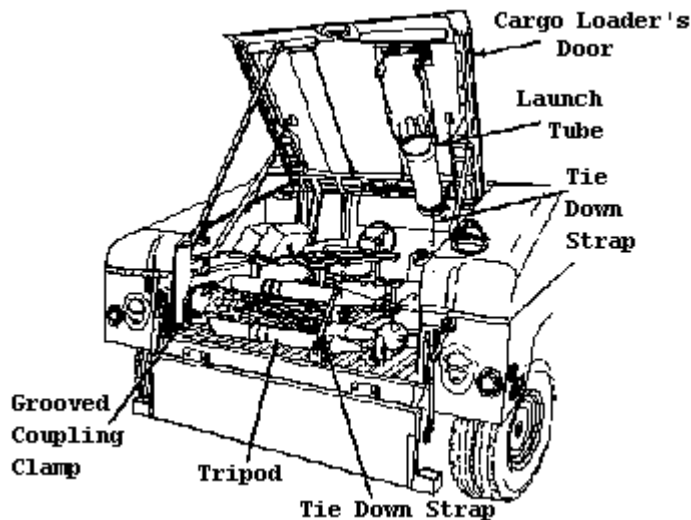
(1) Ensure all detent locks are engaged and that the tripod is fully collapsed.

(2) Open the grooved coupling clamp and turn the tripod on its side with the anchor feet to the right.

(3) Place the grooved coupling clamp up against the mounting ring and place the two bottom legs of the tripod in the "U" shaped holding brackets.

(4) Close the grooved coupling clamp over the mounting ring and engage the Bail safety.

(5) Locate the tie down strap behind the tripod's rear leg and loop it over the top leg. Secure the strap with the "J" shaped fastener on the tie down bracket in front of the tripod.



k. Stowing the M-22 Launch Tube. The launch tube is stowed on the underside of the cargo/loader's door. The open end of the launch tube faces down and the rear and front of the tube fit in special brackets. (The forward portion of the tube faces the front of the vehicle.) Secure the launch tube with the tie down strap by securing the "J" shaped fastener at the end of the strap to the tie down bracket opposite the strap base. (Ensure the launch tube is seated correctly before strapping it down. If the mounting brackets are too close together to permit this, notify your squad leader so he can remedy the situation.)

l. Vehicle Power Conditioner. The VPC does the same thing for the THERMAL NIGHT SIGHT that the TVPC does for the MGS It powers the THERMAL NIGHT SIGHT via the vehicles batteries. Normally, you would

not have to mount this component in the vehicle, as it is support to be permanently mounted to the vehicle. This is not always the case. Some FMF units store this component in the armory and consider it part of the TOW system for inventory purposes. It is not; it is actually SL-3 to the vehicle just like the elevation/depression limiter and the TU extension adapter.) The most convenient placement of this piece of gear (and the method that is in accordance with TM 9-1425-450-12), is underneath the right, front side of the radio mount. Another place you might find this component mounted is on the inside roof of the vehicle just above the center windshield frame. The VPC, VPC cable and THERMAL NIGHT SIGHT cable should all be connected to vehicle power during initial stowing. This conforms with the SL-3 status with the vehicle and is intended to reduce time for mounting the weapon system.

m. Power Conditioner cable. This main power cable is wired directly to the vehicle's two 12-volt batteries. It powers the TVPC and the VPC YOU ARE NOT AUTHORIZED TO REMOVE THIS CABLE FOR ANY REASON. It is stowed by being coiled on the cable bracket.

n. The TVPC cable. This short, thick cable transfers vehicle power to the TVPC (for the MGS). It is connected to the power conditioner cable and is stowed under the passenger rear seat. (All cables feeding from the main power cable are SL-3 to the vehicle and NOT the system.)

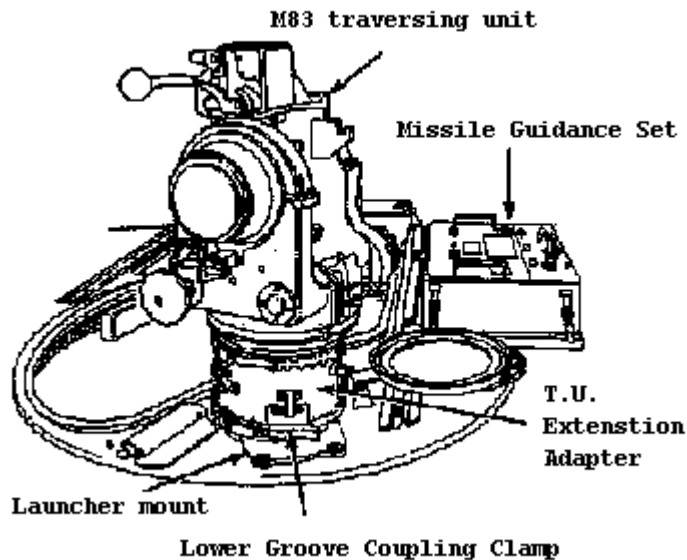
o. The VPC cable. This combination of fat end with a skinny cable transfers vehicle power to the VPC (to be transferred to the THERMAL NIGHT SIGHT). It is connected to a second cable end of the power conditioner cable (much like an outlet) mounted below the cable bracket directly behind the front passenger seat and is otherwise stowed under the loader's seat. (All cables feeding from the main power cable are SL-3 to the vehicle and NOT the system.) The VPC, VPC cable and THERMAL NIGHT SIGHT cable should all be connected to vehicle power during initial stowing. This conforms with the SL-3 status with the vehicle and is intended to reduce time for mounting the weapon system.

p. The THERMAL NIGHT SIGHT Power Cable. This extra long, skinny cable transfers power from the VPC to the THERMAL NIGHT SIGHT. It is stowed under the passenger side rear seat. (All cables feeding from the main power cable are SL-3 to the vehicle and not the system.) The VPC, VPC cable and THERMAL NIGHT SIGHT cable should all be connected to vehicle power during initial stowing. This conforms with the SL-3 status with the vehicle and is intended to reduce time for mounting the weapon system.

2. MOUNTING THE TOW SYSTEM ON THE M-1045/46. Mounting the TOW system on the vehicle is a two-man process (gunner and a-gunner). Each member of the two-man TOW vehicle crew has a specific function and are required to perform different duties during the vehicle mounting procedure. The gunner and a-gunner need to work as a team and ensure that they each know the others duties and tasks. To start the mounting procedure, the a-gunner must be in the driver's seat, and the gunner in a passenger's seat. Below is a list, by billet, of the individual crew tasks to mount the TOW 2 system on the M-1045/46.

a. Gunner and a-gunner responsibilities during mount.

- (1) Gunner unlocks all three hatch cover latches on the weapons station of the vehicle and opens the weapons station hatch cover by pushing upwards and outward.
- (2) Gunner secures the hatch cover by folding the hatch cover in half and turning the securing handles inboard, ensuring the missile guidance set (MGS) mounting tray is towards the front of the vehicle.
- (3) Driver/assistant gunner unlatches the MGS retaining straps that secure the MGS to the gunner's platform.
- (4) Driver/assistant gunner moves inside the vehicle to the back and opens the cargo shell door by pulling the cargo shell door forward latch and allowing it to rise to the open position.
- (5) Driver/assistant gunner stands up through the cargo shell door opening.
- (6) Gunner grabs the MGS handle and lifts the MGS up through the weapon station hatch, and places it on the MGS mounting tray ensuring the MGS handle is towards the gunner.
- (7) Gunner secures the MGS down to mounting tray by attaching at least two of the MGS retaining latches provided on the mounting tray.
- (8) Gunner unlocks the MGS cover, and then lifts the cover from the MGS placing the cover onto the left rear seat.
- (9) Gunner unlocks the weapons station pedestal mount cover on the weapon station, and opens the cover locking it into the open position.
- (10) Gunner unlocks the bottom grooved coupling clamp handle and the bail safety on the grooved coupling clamp extension.
- (11) Ensuring the azimuth lock on the traversing unit (TU) is towards the gunner; the gunner grabs the control knobs on the TU and lifts the TU up through the weapons station.
- (12) Driver/assistant gunner pulls the coil cable from the TU coil cable connector, and feeds the coil cable down through the weapons station pedestal mount.



(13) Gunner rotates the TU until the launch tube locking latch is positioned facing the direction of fire, and places the TU onto the weapons station pedestal mount.

(14) Gunner secures the TU to the weapons station pedestal mount by securing the bottom grooved coupling handle on the grooved coupling clamp extension and bail safety.

(15) Driver/assistant gunner removes the launch tube from its mount on the cargo shell door by unlatching the launch tube retaining strap, and hands the launch tube to the gunner.

(16) Gunner takes the launch tube from the assistant gunner and places the launch tube guide pins into the launch tube brackets on the TU.

(17) Gunner lifts up the launch tube latch on the TU and lowers the launch tube onto the TU securing the latch ensuring the launch tube is locked in place.

(18) Gunner grabs the post amplifier (PA) cable from the TU and places it in the launch tube.

(19) Driver/assistant gunner unlatches the optical sight retaining straps from the optical sight storage bracket, and places the optical sight on the roof of the vehicle

(20) Driver/assistant gunner holds the optical sight shroud bag while the gunner unlocks the optical sight locking latch and removes the sight from the shroud bag.

(21) Gunner sets the optical sight hook mount onto the optical sight mounting plate on the TU, and rotates the sight down onto the boresight mounting plate.

(22) Ensuring the gunner holds onto the optical sight with one hand, the gunner grabs the optical sight locking latch with a palms up grip, and pushes the latch up into the locked position.

(23) Ensure the optical sight is secured to the TU prior to releasing the optical sight.

(24) Driver/assistant gunner places the optical sight shroud bag onto the optical sight storage bracket.

(25) Driver/assistant gunner unlatches the THERMAL NIGHT SIGHT retaining straps from the THERMAL NIGHT SIGHT case mounting bracket, and places the THERMAL NIGHT SIGHT case on the roof of the vehicle.

(26) Driver/assistant gunner unlocks the THERMAL NIGHT SIGHT case and opens the case lid ensuring the case lid opens towards the driver/assistant gunner.

(27) Gunner removes the THERMAL NIGHT SIGHT from the THERMAL NIGHT SIGHT case.

(28) Gunner ensures that the THERMAL NIGHT SIGHT locking latch is in the rear position, and mounts the THERMAL NIGHT SIGHT onto the THERMAL NIGHT SIGHT mounting plate on the optical sight by lining up the vee ways on the THERMAL NIGHT SIGHT with the vee ways on the optical sight.

(29) Gunner pushes the THERMAL NIGHT SIGHT locking latch into the forward position, ensuring there is metal to metal contact.

(30) Driver/assistant gunner re-secures the THERMAL NIGHT SIGHT case into the THERMAL NIGHT SIGHT case mounting bracket in the vehicle.

(31) Gunner removes dust cover from the PA on the THERMAL NIGHT SIGHT.

(32) Gunner connects the PA cable from the TU to the PA on the THERMAL NIGHT SIGHT by aligning the keys and rails in the post-amplifier connectors on the THERMAL NIGHT SIGHT and the PA cable.

(33) Gunner rotates the outer ring on the PA connector clockwise until the PA cable is secured to the PA.

(34) Driver/assistant gunner moves through the cargo shell door opening and pulls the cargo shell door down until it is secured in place.

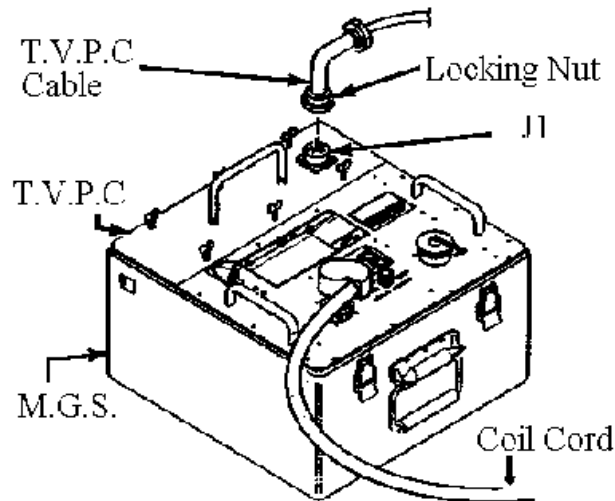
(35) Driver/assistant gunner moves inside the vehicle to the right rear seat, and opens the cable box.

(36) Driver/assistant gunner removes the TOW Vehicle Power Conditioner (TVPC) power cable from the cable box and removes the dust cover from the power conditioner cable.

(37) Driver/assistant gunner connects the TVPC power cable P2 connector to the power conditioner cable by aligning the keys and rails on the TVPC power cable and the power conditioner cable and then rotates the outer ring on the TVPC power cable connector clockwise until it is secured to the power conditioner cable.

(38) Driver/assistant gunner unwraps the power conditioner cable from the cable bracket on the vehicle, and passes the power conditioner cable to the gunner.

(39) Gunner connects the TVPC power cable to the TVPC power cable connector on the TVPC, by aligning the keys and rails on the cable and the TVPC.



(40) Gunner rotates the outer ring on the TVPC power cable connector clockwise until it is secured to the TVPC.

(41) Driver/assistant gunner passes the thin end of the THERMAL NIGHT SIGHT power cable 2W2 to the gunner.

(42) Driver/assistant gunner will move to the drivers seat ensuring that the VPC ON/OFF switch is set to the ON position.

(43) Gunner removes the dust covers from the THERMAL NIGHT SIGHT power cable 2W2 and the J1 connector on the THERMAL NIGHT SIGHT.

(44) Gunner rotates the outer ring on the THERMAL NIGHT SIGHT power cable 2W2 connector clockwise until it is secured.

(45) Gunner inspects the coil cable connector to ensure there are no bent or unserviceable pins on the connector.

(46) Gunner connects the coil cable from the TU onto the J1 connector by aligning the keys and rails on the coil cable connector and the J1 connector on the MGS.

(47) Gunner rotates the outer ring on the coil cable connector clockwise until the coil cable is secured, ensuring the coil cable connector has rotated down past the red line on the MGS J1 connector.

(48) Gunner ensures that the driver/assistant gunner is seated in the driver's seat, and sets the ON/OFF/STBY switch on the THERMAL NIGHT SIGHT to the ON position.

(49) Gunner sounds off, "GUN UP" to alert the crew that the system is mounted.

3. DISMOUNTING THE TOW SYSTEM FROM AN M-1045/46. The process of taking the vehicle from the "Ready To Fire" mode back into the "Extended Travel" mode is called dismounting. During this procedure, the system will be disassembled and the individual components will be placed back into their cases inside the vehicle. Dismounting the TOW system from the vehicle is a two-man process (gunner and a-gunner). Each member of the two man TOW vehicle crew has a specific function and are required to perform different duties during the vehicle dismounting procedure. The gunner and a gunner need to work as a team and ensure that they each know the others duties and tasks. To start the mounting procedure, the a gunner must be in the driver's seat, and the gunner in the weapons station. Below is a list, by billet, of the individual crew tasks to dismount the tow 2 system on the M-1045/46.

a. Gunner and A gunner Responsibilities during Dismount.

(1) Gunner sets the ON/OFF/STBY switch on the THERMAL NIGHT SIGHT to the OFF position.

(2) Gunner turns OFF the TOW Vehicle Power Conditioner (TVPC).

(3) Driver/assistant gunner turns OFF the vehicle power conditioner (VPC).

(4) Gunner removes the coil cable from the missile guidance set (MGS) by rotating the outer ring on the coil cable connector counterclockwise until the coil cable is unsecured.

(5) Gunner rotates the outer ring on the TVPC power cable connector counterclockwise until the cable is unsecured from the TVPC and hands it down to the Driver/assistant gunner.

(6) Gunner rotates the outer ring on the post amplifier (PA) connector counterclockwise until the PA cable is unsecured from the post amplifier on the THERMAL NIGHT SIGHT.

(7) Gunner removes the power cable 2W2 from the THERMAL NIGHT SIGHT by rotating the outer ring of the power cable 2W2 counterclockwise, replaces the dust cover and passes it down to the Driver/assistant gunner.

(8) Driver/assistant gunner moves inside the vehicle to the back and opens the cargo shell door by pulling the cargo shell door forward latch and allowing the cargo shell door to rise to the open position.

(9) Driver/assistant gunner places the THERMAL NIGHT SIGHT case on the roof of the vehicle.

(10) Driver/assistant gunner unlocks the THERMAL NIGHT SIGHT case and opens the THERMAL NIGHT SIGHT case lid ensuring the case lid opens towards the driver/assistant gunner.

(11) Gunner places the dust cover back onto the PA connector on the THERMAL NIGHT SIGHT, and unlocks the THERMAL NIGHT SIGHT by pulling the locking latch to the rear position.

(12) Gunner removes the THERMAL NIGHT SIGHT from the mounting plate on the optical sight and places it into the THERMAL NIGHT SIGHT case ensuring that it is positioned properly inside the case.

(13) Driver/assistant gunner locks the THERMAL NIGHT SIGHT case by using the case locking latches, and straps the THERMAL NIGHT SIGHT case down into the case mounting bracket inside the vehicle.

(14) Driver/assistant gunner places the optical sight shroud bag on the roof of the vehicle.

(15) Gunner holds onto the optical sight with the left hand, and grabs the optical sight locking latch with a palms up grip with the right hand.

(16) Gunner pulls the optical sight locking latch down until the sight is unlocked from the traversing unit (TU).

(17) Gunner removes the optical sight from the mounting plate on the TU by lifting the optical sight upward and out away from the TU.

(18) Gunner places optical sight into the optical sight shroud bag ensuring that the electrical connector portion is facing the padded portion of the shroud bag.

(19) Gunner places the optical sight locking latch into the locked position.

(20) Driver/assistant gunner secures the straps on the optical sight shroud bag and secures the shroud bag to the optical sight storage bracket inside the vehicle.

(21) Gunner unlocks the launch tube latch on the TU and removes the launch tube off of the TU by raising the nose end straight up and lifting the launch tube guide pins out of the launch tube brackets.

(22) Gunner hands the launch tube to the driver/ assistant gunner.

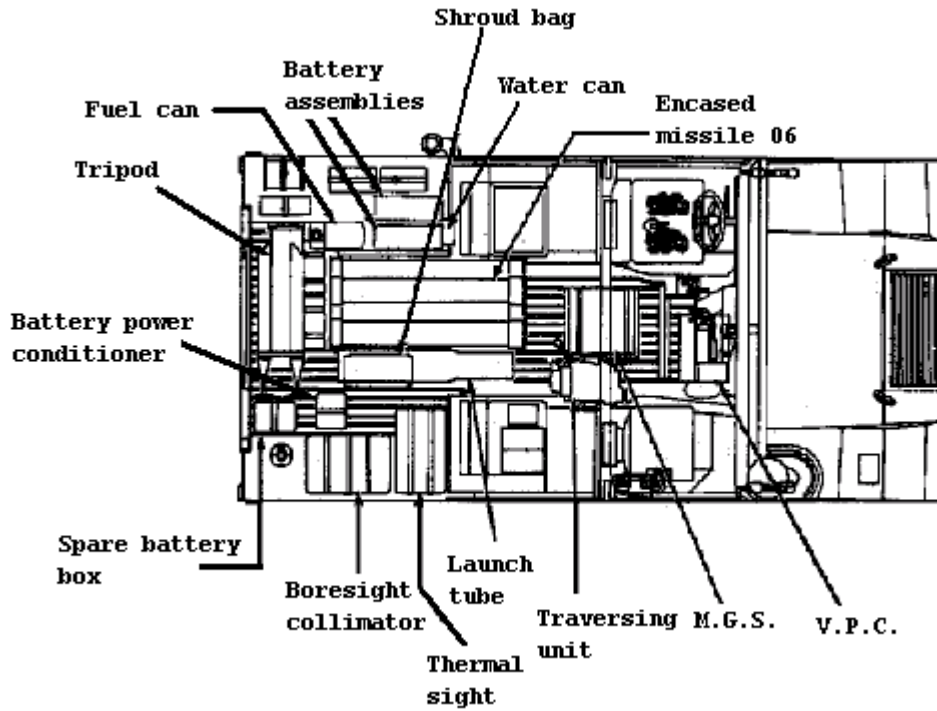
(23) Driver/assistant gunner places the launch tube into the launch tube mount on the cargo shell door and secures it with the launch tube strap.

- (24) Driver/assistant gunner moves down through the cargo shell door opening and pulls the cargo shell door down until it is secured in place.
- (25) Driver/assistant gunner moves inside the vehicle to the right rear seat, and opens the cable box.
- (26) Gunner unlocks the bottom grooved coupling clamp handle and bail safety on the grooved coupling clamp extension.
- (27) Gunner lifts the TU off of the weapons station pedestal mount and the driver/assistant gunner pulls the coil cable up through the weapons station pedestal mount.
- (28) Driver/assistant gunner places the coil cable connector into the coil cable receptacle on the TU.
- (29) Gunner secures the TU to the pedestal mount inside the vehicle by securing the bottom grooved coupling handle and bail safety on the grooved coupling clamp extension.
- (30) Gunner grabs the MGS cover and secures it to the MGS by seating the MGS cover onto the guides on the MGS and rotating the cover down securing the latches.
- (31) Gunner grabs the handle on the MGS and places the MGS on the gunner's platform inside the vehicle with the handle facing to the rear of the vehicle.
- (32) Driver/assistant gunner disconnects the TVPC power cable P2 connector from the power conditioner cable by rotating the outer ring on the TVPC power cable connector counterclockwise until the TVPC power cable can be removed from the power conditioner cable.
- (33) Driver/assistant gunner places the TVPC power cable into the cable box.
- (34) Driver/assistant gunner replaces the dust cover on the power conditioner cable and wraps the cable around the cable bracket.
- (35) Driver/assistant gunner replaces the dust cap on the THERMAL NIGHT SIGHT power cable 2W2 and wraps the cable around the cable bracket.
- (36) Driver/assistant gunner closes the lid on the cable box and moves back to the drivers seat.
- (37) Gunner closes weapon station pedestal mount and secures with the spring latch.
- (38) Gunner closes weapons station hatch cover by pulling the weapons station hatch cover handle up and over the weapons station hatch.
- (39) Gunner secures the weapon station hatch cover with the three hatch cover locking latches.

(40) Gunner secures the MGS to the gunner's platform by securing the two retaining straps over the top of the MGS.

(41) Gunner moves to the gunners seat and ensures that all gear is secured properly.

(42) Gunner yells, "GUN STOWED".



REFERENCES: TM 9-1425-450-12 Operator's and Organization Maintenance Manual for the TOW 2 Weapon System; pages 2-347 through 2-458. FM 23-24 TOW Weapons System; pages 3-3 through 3-13.

PERFORMANCE EXAMINATION CHECKLIST

EXAM TITLE: M220E4 TOW2 Weapon System Vehicle Mounting Procedures
Performance Examination (Mount the M220E4 TOW2)

EXAM ID: AGM1405P

TLO/ELO: 52TR.03.03

STUDENT INSTRUCTIONS:

1. You are an anti-tank team and must mount a M220E4 TOW2 weapon system on a M-1045 HMMWV.
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. Gunner unlocks all three hatch cover latches on the weapons station of the vehicle and opens the weapons station hatch cover by pushing upwards and outward.						
2. Gunner secures the hatch cover by folding the hatch cover in half and turning the securing handles inboard, ensuring the Missile Guidance Set (MGS) mounting tray is towards the front of the vehicle.						
3. Driver/assistant gunner unlatches the MGS retaining straps that secure the MGS to the gunner's platform.						
4. Driver/assistant gunner moves inside the vehicle to the back and opens the cargo shell door by pulling the cargo shell door forward latch and allowing it to rise to the open position.						
5. Driver/assistant gunner stands up through the cargo shell door opening.						
6. Gunner grabs the MGS handle and lifts the MGS up through the weapon station hatch, and places it on the MGS mounting tray ensuring the MGS handle is towards the gunner.						
7. Gunner secures the MGS down to mounting tray by attaching at least two of the MGS retaining latches provided on the mounting tray.						

8.	Gunner unlocks the MGS cover, and then lifts the cover from the MGS placing the cover onto the left rear seat.						
9.	Gunner unlocks the weapons station pedestal mount cover on the weapon station, and opens the cover locking it into the open position.						
10.	Gunner unlocks the bottom grooved coupling clamp handle and bell safety on the grooved coupling clamp extension.						
11.	Ensuring the azimuth lock on the Traversing Unit (TU) is towards the gunner; the gunner grabs the control knobs on the TU and lifts the TU up through the weapons station.						
12.	Driver/assistant gunner pulls the coil cable from the TU coil cable connector, and feeds the coil cable down through the weapons station pedestal mount.						
13.	Gunner rotates the TU until the launch tube locking latch is positioned facing the direction of fire, and places the TU onto the weapons station pedestal mount.						
14.	Gunner secures the TU to the weapons station pedestal mount by securing the bottom grooved coupling handle on the grooved coupling clamp extension and bell safety.						
15.	Driver/assistant gunner removes the launch tube from its mount on the cargo shell door by unlatching the launch tube retaining strap, and hands the launch tube to the gunner.						
16.	Gunner takes the launch tube from the assistant gunner and places the launch tube guide pins into the launch tube brackets on the TU.						
17.	Gunner lifts up the launch tube latch on the TU and lowers the launch tube onto the TU securing the latch ensuring the launch tube is locked in place.						
18.	Driver/assistant gunner unlatches the daysight retaining straps from the daysight storage bracket, and places the daysight on the roof of the vehicle.						
19.	Driver/assistant gunner holds the daysight shroud bag while the gunner unlocks the daysight locking latch and removes the sight from the shroud bag.						
20.	Gunner sets the daysight hook mount onto the daysight mounting plate on the TU, and rotates the sight down onto the boresight mounting plate.						

21. Ensuring the gunner holds onto the daysight with one hand, the gunner grabs the daysight locking latch with a palms up grip, and pushes the latch up into the locked position.						
22. Ensure the daysight is secured to the TU prior to releasing the daysight.						
23. Driver/assistant gunner places the daysight shroud bag onto the daysight storage bracket.						
24. Driver/assistant gunner unlatches the night sight retaining straps from the night sight case mounting bracket, and places the night sight case on the roof of the vehicle.						
25. Driver/assistant gunner unlocks the night sight case and opens the case lid ensuring the case lid opens towards the driver/assistant gunner.						
26. Gunner removes the night sight from the night sight case.						
27. Gunner ensures that the night sight locking latch is in the rear position, and mounts the night sight onto the night sight mounting plate on the daysight by lining up the vee ways on the night sight with the vee ways on the daysight.						
28. Gunner pushes the night sight locking latch into the forward position, ensuring there is metal to metal contact.						
29. Driver/assistant gunner re-secures the night sight case into the night sight case mounting bracket in the vehicle.						
30. Gunner removes dust cover from the PA on the night sight.						
31. Gunner connects the PA cable from the TU to the PA on the night sight by aligning the keys and rails in the post-amplifier connectors on the night sight and the PA cable.						
32. Gunner rotates the outer ring on the PA connector clockwise until the PA cable is secured to the PA.						
33. Driver/assistant gunner moves through the cargo shell door opening and pulls the cargo shell door down until it is secured in place.						
34. Driver/assistant gunner moves inside the vehicle to the right rear seat, and opens the cable box.						
35. Driver/assistant gunner removes the TVPC power cable from the cable box and removes the dust cover from the power conditioner cable.						

36. Driver/assistant gunner connects the TVPC power cable P2 connector to the power conditioner cable by aligning the keys and rails on the power conditioner power cable and the power conditioner.						
37. Driver/assistant gunner rotates the outer ring on the TVPC power cable by aligning the keys and rails on the power conditioner cable to the power conditioner cable.						
38. Driver/assistant gunner unwraps the power conditioner cable from the cable bracket on the vehicle, and passes the power conditioner cable to the gunner.						
39. Gunner connects the TVPC power cable to the TVPC power cable connector on the power conditioner, by aligning the keys and rails on the cable and the power conditioner.						
40. Gunner rotates the outer ring on the TVPC power cable connector clockwise until it is secured to the power conditioner.						
41. Driver/assistant gunner removes the thermal night sight power cable 2W2 from the cable box and removes the dust covers from both ends of the thermal night sight power cable 2W2.						
42. Driver/assistant gunner passes the thin end of the night sight power cable 2W2 to the gunner.						
43. Driver/assistant gunner removes the dust cover from the thermal night sight power cable 2W2 connector on the vehicle power conditioner.						
44. Driver/assistant gunner attaches the thick end of the thermal night sight power cable 2W2 to the thermal night sight power cable 2W2 connector on the thermal night sight vehicle power conditioner by aligning the keys and rails on the thermal night sight power cable 2W2 connector and the thermal night sight vehicle power conditioner connection.						
45. Driver/assistant gunner rotates the outer ring on the thermal night sight power cable 2W2 connector clockwise until it is secured.						
46. Driver/assistant gunner will move to the drivers seat ensuring that the VPC ON/OFF switch is set to the ON position.						
47. Gunner removes the dust covers from the night sight power cable 2W2 and the J1 connector on the night sight.						
48. Gunner rotates the outer ring on the night sight power cable 2W2 connector clockwise until it is secured.						

49. Gunner inspects the coil cable connector to ensure there are no bent or unserviceable pins on the connector.							
50. Gunner connects the coil cable from the TU onto the J1 connector by aligning the keys and rails on the coil cable connector and the J1 connector on the MGS.							
51. Gunner rotates the outer ring on the coil cable connector clockwise until the coil cable is secured, ensuring the coil cable connector has rotated down past the red line on the MGS J1 connector.							
52. Gunner ensures that the driver/assistant gunner is seated in the driver's seat, and sets the ON/OFF/STBY switch on the night sight to the ON position.							
53. Gunner sounds off, "GUN UP" to alert the crew that the system is mounted.							

PERFORMANCE EXAMINATION CHECKLIST

EXAM TITLE: M220E4 TOW2 Weapon System Vehicle Mounting Procedures
Performance Examination (Dismount the M220E4 TOW2)

EXAM ID: AGM1405P

TLO/ELO: 52TR.03.04

STUDENT INSTRUCTIONS:

1. You are an anti-tank team and must dismount a M220E4 TOW2 weapon system from a M-1045 HMMWV.
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 T		3 rd ATTEMPT	
	M	NM	M	NM	M	NM
1. Gunner sets the ON/OFF/STBY switch on the night sight to the OFF position.						
2. Gunner turns OFF the Power conditioner.						
3. Driver/assistant gunner turns OFF the vehicle power conditioner (VPC).						
4. Gunner removes the coil cable from the missile guidance set (MGS) by rotating the outer ring on the coil cable connector counterclockwise until the coil cable is unsecured.						
5. Gunner rotates the outer ring on the power conditioner power cable connector counterclockwise until the cable is unsecured from the power conditioner and hands it down to the Driver/assistant gunner.						
6. Gunner rotates the outer ring on the post amplifier (PA) connector counterclockwise until the PA cable is unsecured from the post amplifier on the night sight.						
7. Gunner removes the power cable 2W2 from the night sight by rotating the outer ring of the power cable 2W2 counterclockwise, replaces the dust cover and passes it down to the Driver/assistant gunner.						
8. Driver/assistant gunner moves inside the vehicle to the back and opens the cargo shell door by pulling the cargo shell door forward latch and allowing the cargo shell door to rise to the open position.						

9.	Driver/assistant gunner places the night sight case on the roof of the vehicle.						
10.	Driver/assistant gunner unlocks the night sight case and opens the night sight case lid ensuring the case lid opens towards the driver/assistant gunner.						
11.	Gunner places the dust cover back onto the PA connector on the night sight, and unlocks the night sight by pulling the locking latch to the rear position.						
12.	Gunner removes the night sight from the mounting plate on the daysight and places it into the night sight case ensuring that it is positioned properly inside the case.						
13.	Driver/assistant gunner locks the night sight case by using the case locking latches, and straps the night sight case down into the case mounting bracket inside the vehicle.						
14.	Driver/assistant gunner places the daysight shroud bag on the roof of the vehicle.						
15.	The gunner holds onto the daysight with the left hand, and grabs the daysight locking latch with a palms up grip with the right hand.						
16.	Gunner pulls the daysight locking latch down until the sight is unlocked from the traversing unit (TU).						
17.	Gunner removes the daysight from the mounting plate on the TU by lifting the daysight upward and out away from the TU.						
18.	Gunner places daysight into the daysight shroud bag ensuring that the electrical connector portion is facing the padded portion of the shroud bag.						
19.	Gunner places the daysight locking latch into the locked position.						
20.	Driver/assistant gunner secures the straps on the daysight shroud bag and secures the shroud bag to the daysight storage bracket inside the vehicle.						
21.	Gunner unlocks the launch tube latch on the TU and removes the launch tube off of the TU by raising the nose end straight up and lifting the launch tube guide pins out of the launch tube brackets.						
22.	Gunner hands the launch tube to the driver/ assistant gunner.						
23.	Driver/assistant gunner places the launch tube into the launch tube mount on the cargo shell door and secures it with the launch tube strap.						

24. Driver/assistant gunner moves down through the cargo shell door opening and pulls the cargo shell door down until it is secured in place.						
25. Driver/assistant gunner moves inside the vehicle to the right rear seat, and opens the cable box.						
26. Gunner unlocks the bottom grooved coupling clamp handle and bell safety on the grooved coupling clamp extension.						
27. Gunner lifts the TU off of the weapons station pedestal mount and the driver/assistant gunner pulls the coil cable up through the weapons station pedestal mount.						
28. Driver/assistant gunner places the coil cable connector into the coil cable receptacle on the TU.						
29. Gunner secures the TU to the pedestal mount inside the vehicle by securing the bottom grooved coupling handle and bell safety on the grooved coupling clamp extension.						
30. Gunner grabs the MGS cover and secures it to the MGS by seating the MGS cover onto the guides on the MGS and rotating the cover down securing the latches.						
31. Gunner grabs the handle on the MGS and places the MGS on the gunner's platform inside the vehicle with the handle facing to the rear of the vehicle.						
32. Driver/assistant gunner disconnects the power conditioner power cable P2 connector from the power conditioner cable by rotating the outer ring on the power conditioner power cable connector counterclockwise until the power conditioner power cable can be removed from the power conditioner cable.						
33. Driver/assistant gunner places the power conditioner power cable into the cable box.						
34. Driver/assistant gunner replaces the dust cover on the power conditioner cable and wraps the cable around the cable bracket.						
35. Driver/assistant gunner replaces the dust cap on the night sight power cable 2W2 and wraps the cable around the cable bracket.						
36. Driver/assistant gunner closes the lid on the cable box and moves back to the drivers seat.						
37. Gunner closes weapon station pedestal mount and secures with the spring latch.						

38. Gunner closes weapons station hatch cover by pulling the weapons station hatch cover handle up and over the weapons station hatch.							
39. Gunner secures the weapon station hatch cover with the three hatch cover locking latches.							
40. Gunner secures the MGS to the gunner's platform by securing the two retaining straps over the top of the MGS.							
41. Gunner moves to the gunners seat and ensures that all gear is secured properly.							
42. Gunner yells, "GUN STOWED"							