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Training Command
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STUDENT OUTLINE

OPERATOR MAINTENANCE FOR A JAVELIN COMMAND LAUNCH UNIT

1. **TERMINAL LEARNING OBJECTIVE**

Given a SL-3 complete M98A1 Javelin command launch unit and cleaning gear, perform operator maintenance for a M98A1 Javelin command launch unit in accordance with TM 09397B-12/1. (51TR.02.01)

2. **ENABLING LEARNING OBJECTIVES**

a. Given a SL-3 complete, M98A1 Javelin command launch unit, clean and inspect a M98A1 Javelin command launch unit in accordance with TM 09397B-12/1. (51TR.02.01c)

b. Given a SL-3 complete, M98A1 Javelin command launch unit, perform a M98A1 Javelin command launch unit BIT test in accordance with TM 09397B-12/1. (51TR.02.01d)

1. **INSPECT THE CLU**. Before operation and during maintenance of the command launch unit, you should inspect all components for damage and serviceability. Any damage should be reported to the squad leader. This is the order in which you inspect components of the command launch unit:

a. Main Housing. Inspect the main housing for cracks and other obvious damage.

b. Absorbers. Inspect the absorbers for rips, tears, and serviceability.

(1) Inspect the face shield for signs of obvious damage and for serviceability.

c. Inspect the CLU Lenses and Lens Covers. Before inspecting the lenses, you should wash your hands with water and mild detergent. Natural oils produced by the skin are corrosive to lens coatings. Be careful not to touch lenses. Fingerprints may etch into the NVS lens and degrade the effectiveness of the Javelin NVS.

(1) Inspect the lens covers for dirt, cracks, and or damage, particularly at the hinges. Ensure the shock absorber on the NVS lens cover is securely attached and no pieces of material are missing.

(2) Open the day sight and Night Vision Sight (NVS) lens covers.

(3) Inspect the day sight and NVS lenses for dirt or signs of internal moisture. If internal moisture is evident, notify your squad leader.

d. Humidity Indicator. If the humidity indicator turns pink during a mission, continue the mission. Turn in the CLU at the next available time.

(1) If the humidity indicator is blue, the CLU's internal moisture level is acceptable.

(2) If the humidity indicator is white or pink, the CLU's internal moisture level is not acceptable. Notify your squad leader. During the training course, notify the Instructor.

e. Inspect the Round Interface Connector. If damage is found during the inspection, notify your squad leader. During the training course, notify your instructor.

(1) Position the CLU on its left side with the rear of the CLU facing forward. This allows access to the round interface connector.

(2) Ensure round interface connector cover and lanyard are present and the lanyard is not torn.

(3) Remove protective cover from the round interface connector. Pull on lanyard tab to snug protective cover against the side of the CLU. Position the protective cover so no interference exists when round is connected.

(4) Check the area around the connector for cracks.

(5) Inspect the round interface connector for dirt, corrosion, or damage. (If dirty, clean in accordance with Army TM 9-1425-688-12 / Marine Corps TM 09397B-12/1 paragraph 3-4.)

(6) Check the round interface connector for damaged or missing mounting screws.

f. Round Interface Bracket. Round interface catch, and alignment pin for damage.

g. Inspect CLU Switches. This portion of the check is done without a CLU battery installed. Visually inspect the switches to ensure that they are not broken or missing. Inspect the rubber boots for dry rot. Operate each of the switches listed below to test their mechanical operation. If any switch appears to have a problem, list the switch name on DA Form 2404 (Army only) or NAVMC Form 10245 Equipment Repair Order (Marine Corp only) and check it again during the CLU Built-In Test (BIT). If a switch does not function properly during CLU BIT, obtain a replacement CLU. If damage is found during the inspection, notify your squad leader. During the training course, notify your instructor.

(1) Right handgrip. The right handgrip is equipped with the following controls: the attack select (ATTK SEL) switch, gate adjust/contrast & brightness (GATE ADJ/CTRS & BRT) switch, and fire trigger. These controls are used to change the attack mode, adjust the track gates to lock the seeker on a target, adjust NVS contrast and brightness, and also to launch the

missile. Inspect the right handgrip for security and serviceability.

(2) Fire trigger. The fire trigger is located on the finger grip side of the right handgrip at the index finger position. When the missile is locked-on to the target, squeezing the fire trigger launches the missile. Inspect the fire trigger for noticeable damage and serviceability.

(3) Gate adjust/contrast and brightness (GATE ADJ/CTRS & BRT) switch.

(a) The GATE ADJ/CTRS & BRT switch is the center switch on the right handgrip. It is a self-centering switch that moves up, down, left, and right. It serves two functions depending on whether the CLU display image is from the NVS or the seeker. Ensure the GATE ADJ/ CTRS & BRT switch is not ripped or torn. Also inspect to ensure that there are no visible signs of dry rot.

(b) Brightness. Brightness is adjusted by moving the GATE ADJ/CTRS & BRT switch vertically (up-and-down). Brightness is decreased by pressing the ADJ/CTRS & BRT switch down and increased by pressing the switch up.

(c) Contrast. Contrast is adjusted by moving the GATE ADJ/CTRS & BRT switch horizontally (left-and-right). Contrast is decreased by pressing the ADJ/CTRS & BRT switch left and increased by pressing the switch right.

(4) Attack select (ATTK SEL) switch. The ATTK SEL switch is the right switch on the right handgrip. It is a pushbutton switch. It allows the gunner to select which missile flight profile (top attack or direct attack) to use for target engagement. The switch is active only after seeker activation and cool down. Top attack is the default mode. Direct attack mode can be selected by pressing the ATTK SEL switch. The appropriate indicator lighting on the CLU display indicates the mode selected. The switch is deactivated after seeker lock-on is commanded. Inspect the ATTK SEL switch for rips or tears. Inspect to ensure that there are no visible signs of dry rot.

h. Left Handgrip Switches. The left handgrip is equipped with the following controls: the focus (FOCUS) switch, sight select (SGT SEL) switch, filter (FLTR) switch, and seeker trigger. The controls on the left handgrip govern the CLU display target image. These controls allow the gunner to conduct surveillance, detect, classify, and recognize targets, activate the seeker, reacquire the target in seeker FOV, lock the seeker onto the target, perform battle damage assessment, and prevent the CLU from being detected by enemy countermeasures. Inspect the left handgrip switches in the same manner as the right handgrip switches. Inspect the right handgrip for security and serviceability.

(1) Filter (FLTR) switch. The FLTR SEL switch is the left switch on the left handgrip. It is a pushbutton switch used to select the NVS filter. The NVS filter is used to prevent the CLU from being detected by enemy countermeasures. Inspect the FLTR switch for rips or tears. Inspect to ensure that there are no visible signs of dry rot.

(2) Seeker trigger and trigger guard. The seeker trigger is located on the finger grip side of the left handgrip at the index finger position. A trigger guard, to prevent accidental activation of the seeker covers the

seeker trigger. This trigger is used to activate the seeker, to lock the seeker on a target, and to enable the fire trigger. Inspect the seeker trigger and trigger guard for noticeable damage and serviceability.

(3) Sight select (SGT SEL) switch. The SGT SEL switch is the right switch on the left handgrip. It is a pushbutton switch that is used to cycle through the day FOV, WFOV, or NFOV. The appropriate indicator (DAY, WFOV, NFOV) on the CLU display lights when the SGT SEL switch is pressed. This switch is only active after the NVS cools down. If the gunner is in seeker FOV and needs to return to the day sight or NVS, he can do so by pressing the SGT SEL switch. Inspect the SGT SEL switch for rips or tears. Inspect to ensure that there are no visible signs of dry rot.

(4) Focus (FOCUS) switch. The FOCUS switch is the center switch on the left handgrip. It is a spring-loaded, self-centering thumb switch that moves up and down. It is used to adjust focus of the NVS (WFOV or NFOV). Up focuses objects at a longer range. Down focuses objects at a closer range. It is not operational when in day or seeker FOV. Inspect the FOCUS switch for rips or tears. Inspect to ensure that there are no visible signs of dry rot.

i. CLU Power Switch. The power switch is a rotary switch that is located on the left-hand side of the CLU main housing at the lower, rear corner. The power switch controls the Javelin's mode of operation by its position. Each position brings different components of the Javelin into operation. The power switch has four positions: OFF, DAY, NIGHT, and TEST.

(1) OFF position. When the power switch is in the OFF position, the Javelin is in the OFF mode. In this mode, no battery power is applied to the Javelin. The CLU's day field of view (FOV) can be used for surveillance and target detection. The Night Vision Sight (NVS) cannot be used, the seeker cannot be activated, nor can the missile be launched.

(2) DAY position. When the power switch is in the DAY position, the Javelin is in the day mode. In the day mode, power is applied to the CLU. The gunner has use of the day FOV but has no NVS. He also has full missile capability. (He can activate the seeker, lock the missile onto a target, and launch the missile).

(3) NIGHT position. When the power switch is in the NIGHT position, the Javelin is in the night mode. This mode gives the gunner full Javelin capability. Once the NVS is cool enough (approximately 2.5 to 3.5 minutes, dependent on the temperature), he can select the NVS wide field of view (WFOV), the narrow field of view (NFOV), or the day FOV. Again, he has full missile capability.

(4) TEST position. When the power switch is in the TEST position, the Javelin enters a built-in-test (BIT) routine. The power switch does not stay in the TEST position when it is turned to the TEST position and released. The power switch is spring-loaded and returns to the NIGHT position.

(5) Prior to turning power switch to off, leave power switch in DAY position for at least one second to allow flipper mirror to move into day position.

(6) Inspect the CLU power switch for damage and serviceability. Ensure the switch can be turned to all four positions and that when it is placed in the TEST position it automatically returns to the NIGHT position.

j. Inspect the Battery Compartment. Improper handling of the battery cover can cause damage to the CLU. Do not jerk or use excessive force to remove the battery cover. If damage is found during the inspection, notify your squad leader. During the training course, notify your instructor.

(1) Remove the battery cover bail by pushing it toward the main housing using both hands with equal pressure.

(2) Inspect the bail to ensure it provides tension to the battery cover.

(3) Remove the battery cover and inspect it for corrosion, dirt, and physical damage. Suspend the battery cover by the strap from the bail. Do not let it swing or hit the CLU while it is suspended.

(4) Inspect the battery compartment cover strap for tears.

(5) Inspect inside the battery compartment using a flashlight. Look for signs of corrosion, dirt, physical damage, and bent or broken battery connector pins.

k. BA5590/U Battery. Inspect the battery for leaks, cracks and other external damage. Check the connector on the battery for serviceability.

l. Inspect the Eyepiece. Do not block the eyecup opening with the fingers during this check. If damage is found during the inspection, notify your squad leader. During the training course, notify your instructor.

(1) Inspect the outside surfaces of the eyecup. Look for cracks, tears, holes, and dry rot in the eyecup.

(2) Look for signs of excessive wear around the fold lines in the eyecup. (Fold lines are the indented areas of the eyecup, which allow the eyecup to be compressed.)

(3) Check the eyecup's operation. Place the fingers around the outside surface of the eyecup in the same place the eye meets the eyecup. Compress the eyecup toward the CLU.

(4) Ensure the eyecup compresses easily and smoothly.

(5) Ensure the internal eyecup shutter opens when the eyecup is compressed and closes completely when the eyecup is released. While the eyecup is compressed, check the eyepiece lens for cleanliness.

m. Diopter Adjust Ring. The diopter adjust ring is located on the CLU eyepiece. It is a hand-rotated ring that the gunner uses to adjust the focus of the CLU target image. The adjustment compensates for individual differences in vision. The ring is calibrated in steps known as "diopters" with an adjustment range from +2 to -6 diopters. This means that any gunner with vision correctable to 20/20 can use the CLU and see an in-focus image without using glasses. Once the gunner adjusts the focus, there is no need to readjust it until a different gunner uses the CLU. Ensure the diopter

adjust ring moves smoothly by rotating all the way left and back to the right.

n. Detector Dewar Cooler (DDC). Ensure that the Detector Dewar Cooler is present and attached to the main housing. Ensure there are no visible signs of damage.

o. Inspect the CLU Carry Bag. Inspect the carry bag for rips, tears, and holes. Check for dirt, excessive wear, and damaged or missing hardware. Inspect the straps, pockets, drawstring, velcro, buckles, and fittings for excessive wear and for damaged or missing hardware. If the carry bag shows excessive wear, obtain a replacement. If the carry bag straps show excessive wear or have damaged or missing hardware, obtain a replacement carry bag.

(1) Remove and inventory the contents of the Command launch unit carry bag. Ensure that the lens cleaning kit is present. The lens cleaning kit is in a small foil envelope consisting of lens paper approximately 1 1/2 inches square. If it is missing, obtain a new one and place it in the carry bag.

2. CLU BIT. The BIT is a test run on the CLU circuits by other internal circuits specifically built to insure that the CLU will operate. If the CLU develops a malfunction, these circuits detect the malfunction and light a status indicator to tell the gunner that a malfunction has occurred. Do not turn the power switch to TEST with a round or FTT attached to the CLU. The CLU BIT will not run with a round or FTT attached to the CLU.

a. Perform a CLU BIT

(1) Close the battery compartment.

(2) Set the power switch to the NIGHT position.

(3) Adjust diopter ring for clarity.

(4) Verify day indicators are lit.

(5) Allow 2.5 minutes for the night vision sight to cool down.

(6) Verify that night sight not ready indicator goes out.

(7) Turn power switch to TEST position and release.

(8) Observe all fourteen indicators being lit for about five seconds.

(9) Observe all fourteen indicators go out.

(10) Observe software version data display.

(11) Operate triggers as prompted.

(12) Observe checkerboard gray scale.

(13) Operate command launch unit switches.

(14) Observe corresponding indicator lights as switch is activated.

(15) Observe day indicator is lit.

(16) Turn off the command launch unit and set aside.

3. CLEAN THE CLU. After inspecting the Command Launch Unit, you should clean all components. This is the order in which you clean the components of the Command Launch Unit:

a. Main Housing. Remove all dirt from the main housing by wiping it with clean rags dampened with water. Wipe the main housing with clean, dry cloth.

b. Absorbers. Remove dirt and debris from the absorbers using clean rags dampened with water and wipe dry with a clean, dry cloth.

c. Lens Covers. Remove dirt and debris from the lens cover using clean rags dampened with water and wipe dry with a clean, dry cloth.

d. Lenses. CLU lenses require special care. Don't try to scrub lens surfaces, optical coating may be damaged. When cleaning the lenses, always follow the cleaning procedure. Before cleaning the lenses, you should wash your hands with water and mild detergent. Natural oils produced by the skin are corrosive to lens coatings. Be careful not to touch lenses. Fingerprints may etch into the NVS lens and degrade the effectiveness of the Javelin NVS.

(1) Clean hands of all dirt, oil, and contaminants with water and mild detergent.

(2) If the lens is covered with dirt, or mud, pour clean water over the lens until the dirt is loose. Repeat as necessary to remove the dirt from the lenses. Do not wipe the lenses when there is obvious dirt present on the lenses. Be sure to use extreme care when removing condensation from lenses.

(a) Do not wipe the surface of any lens if dirt or other foreign material is present. Failure to follow correct cleaning procedures can scratch the surfaces of a lens and degrade the effectiveness of one or both Javelin sights.

(3) Clean surface of a lens.

(a) Remove lens-cleaning kit from the carry bag.

(b) Remove lens paper from foil envelope.

(c) Place the lens paper in the center of the lens to be cleaned.

(d) Apply light pressure with the fingers and begin to wipe from center out in an expanding circular motion (spiral) to the edge of the lens.

(4) Re-inspect the lens.

(a) If the lens requires further cleaning, turn the lens paper over and repeat cleaning process. Do not use the same side of the lens paper more than once.

(b) If the lens requires further cleaning, throw away the used lens paper, get another lens paper and repeat cleaning process.

e. Round Interface Connector. Use an all purpose brush to remove all dirt from the round interface connector.

f. Round Interface Bracket. Use rags to remove all dirt from the round interface bracket and rinse with clean water. Dry the bracket with clean, dry cloth.

g. Clean CLU Handgrip, Triggers, and Switches. Clean all CLU switches by using rags and clean water. Wipe the switches with a clean, dry cloth.

h. CLU Power Switch. Clean all CLU power switch by using rags and clean water. Wipe the switches with a clean, dry cloth.

i. Clean the Battery Compartment and Battery. Wipe the inside and the outside of the battery compartment with a clean, dry cloth to remove dirt and debris. Wipe the battery with rags.

j. Diopter Adjust Ring. Wipe the diopter adjust ring clean with dry rags.

k. Inspect the Eyepiece. Wipe the eyepiece with damp rags to remove all dirt. Wipe with a clean, dry cloth.

l. Detector Dewar Cooler (DDC). Wipe the DDC with clean, dry rags to remove all dirt.

References: TM 09397B-12/1 Operator and Organizational Maintenance Manual for the Javelin M98A1, pages 2-24 through 2-32,and 2-36 through 2-44; JCH, Javelin Contractor Handout.