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Research Product 81-6

DEVELOPMENT OF TRAINING OBJECTIVES  
FOR XIII UCOFT

ARI FIELD UNIT AT FORT KNOX, KENTUCKY

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**Research Product 81-6**

**DEVELOPMENT OF TRAINING OBJECTIVES  
FOR XM1 UCFT**

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**Office, Deputy Chief of Staff for Personnel  
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**January 1980**

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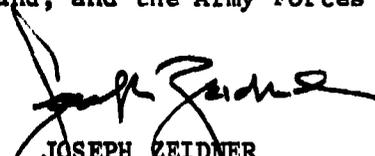
**Individual Training Technology**

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FOREWORD

The Fort Knox Field Unit of the Army Research Institute for the Behavioral and Social Sciences (ARI) carries out research and exploratory development in the area of Armor training. An objective of this work is to develop, through analytic and field research, tank crew and individual training methods that are effective and efficient.

The project of which this report is a part was conducted by personnel of the Human Resources Research Organization (HumRRO) under Contract No. MDA 903-79-C-0582 and monitored by Donald F. Haggard, Chief of ARI Field Unit at Fort Knox. The research was done under ARI FY 78 Work Program, Army Project 2Q762722A777, Individual Training Technology, Task D: Technology for Front-End Analysis of Armor Systems, Work Unit 3: Simulation Characteristics of Armor Systems. The work is responsive to requirements of the US Army Armor School at Fort Knox, the Army Training and Doctrine Command, and the Army Forces Command.

  
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Technical Director

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## SUMMARY

The objectives for the XM1 Unit Conduct of Fire Trainer (UCOFT) were developed for both the Gunner and the Tank Commander positions and include gunnery and gunnery related tasks whose learning is expected to be promoted by practice using the UCOFT. The objectives may be viewed as both specifying what the UCOFT is supposed to do and identifying expectations as seen by designers and prospective users.

After the tasks for each position were identified, they were grouped into functional areas (Modules) and arranged in a logical performance sequence. An objective, characterized by four parts, was written for each task. The four parts are:

1. Conditions/Stimulus
2. Action
3. Measurement
4. References

Conditions/Stimulus provides three items of information, as follows.

1. The system state is described.
2. The location of the soldier when the task begins is specified.
3. The stimulus for task performance is described.

Action describes the responses to be measured, from which control requirements for testing devices may be inferred.

Measurement provides both an identification of the events between which time is to be measured (Time) and a description of how to assess the accuracy of the response of interest (Accuracy). Measurement specifications are presented for both during training and end-of-training evaluations.

References indicates the documents and pages where the task description was found.

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1 Objective for "Prepare thermal imaging system for operation" . . . . .	8
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<sup>1</sup> The Tank Commander Modules, Tasks, and Tables were designated A through E during their development and initial review. The reader should not confuse them with any of the Gunner Modules, Tasks, and Tables designated A through E.

## INTRODUCTION

Recognizing both the potential benefits and the potential risks associated with the use of training devices and simulators as adjuncts and substitutes for operational equipment, the Army has evolved a multi-tiered assessment policy, in which plans and devices are evaluated at successive phases of development, from concept evaluation to operational testing. Certain parts of the Army's device-evaluation policy, namely the parts that deal with the design and preparation of specifications for elements of the training Test Support Packages (TSP), and the design of baseline and experimental courses of instruction in accordance with the Independent Evaluation Plan (IEP) concepts of evaluation require that objectives be specified for each device.

The purpose of this paper is to present the objectives for the XM1 Unit Conduct of Fire Trainer (UCOFT). The objectives were developed for both the Gunner and the Tank Commander (TC) positions and include gunnery and gunnery related tasks whose learning is expected to be promoted by practice using the UCOFT. The objectives may be viewed as both specifying what the UCOFT is supposed to do and identifying expectations as seen by designers and prospective users. The ideal statement of expectations about a training device would be in terms of dollars to be saved and amounts of transfer (the extent to which practice on alternatives to operational equipment will facilitate or degrade learning on operational equipment) to be achieved, given specified kinds and amounts of practice. (Considerations such as reliability, availability, and maintainability, (RAM), and safety are reflected in the cost figure.) Such ideal statements of expectations will not be found here. Expectations (objectives) are stated for the UCOFT in terms that permit objective comparison with study results during operational Test (OT) II.

## METHOD

The tasks for each position (Gunner and TC) were identified from an analysis of the activities described for the Gunner and TC under the headings "Gunner's Station" and "Commander's Station" in DEP 9-2350-255-10-1, Operator's Manual for Tank, Combat, Full-Track, 105-MM Gun, XM1,

October 1978 with changes 1 and 2. After the tasks were identified, they were grouped into functional areas (Modules) essentially matching their organization in the DEP and arranged in a logical performance sequence. The Modules, and the tasks in each Module, are shown in Tables 1 and 2. An objective, characterized by four parts, was written for each task. The four parts are:

1. Conditions/Stimulus\*
2. Action
3. Measurement
4. References

Conditions/Stimulus provides three items of information. First, the system state is described. System state information is the traditional "conditions" aspect of objectives and refers to any circumstances that might be expected to alter the quality or productivity of the task or activity that is to be performed. The system description for the beginning of task performance is referred to here but presented in tabular form at the front of each Module. Second, the location of the soldier when the task begins is specified; and, finally the stimulus for performing the task is described.

Action describes the responses to be measured, from which control requirements for testing devices may be inferred; and includes, as Notes, any information that will enhance task performance.

Measurement provides both an identification of the events between which time is to be measured (Time) and a description of how to assess the accuracy of the response of interest (Accuracy). Measurement specifications are presented for two stages of learning. First, during training when the principal concern, in terms of time, is that the soldier perform the task faster during successive performances until at the second stage, the end of training, the performance time meets the on-the-job time requirement. The accuracy requirement during training is simply

\*An exception is found in Gunner Module E (Troubleshoot Fire Control and Weapon Systems Malfunctions) where the Conditions/Stimulus part for each objective in the Module is presented for the Module in two tables. (Tables 1E and 2E, respectively).

**TABLE 1**  
**GUNNER MODULES AND TASKS**

**Module A. Prepare Gunner's Station For Operation**

- 1A. Enter Gunner's station.
- 2A. Adjust Gunner's seat, browpads, and chestrest.
- 3A. Operate intercommunications equipment.
- 4A. Perform before-operations maintenance checks and services on Gunner's station.

**Module B. Power Up Gunner's Station**

- 1B. Test GPS and TIS panel lights.
- 2B. Prepare Gunner's Primary Sight for operation.
- 3B. Prepare Thermal Imaging System for operation.
- 4B. Focus Thermal Imaging System picture.
- 5B. Prepare Laser Rangefinder for operation.
- 6B. Prepare Gunner's Auxiliary Sight for operation.
- 7B. Prepare Ballistic Computer for operation.

**Module C. Perform Pre-Operation Checks**

- 1C. Test Gunner's station caution and warning lights.
- 2C. Perform GPS functional check.
- 3C. Perform computer self-test.
- 4C. Perform thermal imaging system built-in test.
- 5C. Perform Gun/Turret drive--LOS tracking check.
- 6C. Perform lead system check.
- 7C. Perform firing circuit tests.
- 8C. Perform boresight check.
- 9C. Align muzzle reference sensor.
- 10C. Perform crosswind sensor check.

**Module D. Perform Detailed Checks**

- 1D. Perform computer data check.
- 2D. Perform cant unit check.
- 3D. Perform lead accuracy check.
- 4D. Perform superelevation check.

**Module E. Troubleshoot Fire Control And Weapon Systems Malfunctions**

- 1E. Identify the malfunction (see Table 2E).
- 2E. Take the recommended corrective actions.
- 3E. Notify TC if recommended corrective actions do not correct.

**Module F. Operate Power Control Handles**

- 1F. Traverse turret using power control handles.
- 2F. Elevate/depress main gun using power control handles.
- 3F. Range to target using LRF.

TABLE 1 (Cont'd.)

GUNNER MODULES AND TASKS

- Module G. Manually Input Fire Control Data Into Ballistic Computer
- 1G. Manually input fire control data for manual parameters into ballistic computer.
  - 2G. Manually input fire control data for auto parameters into ballistic computer.
  - 3G. Manually input fire control data for toggle input parameters into ballistic computer.
- Module H. Lay On Target Using Gunner's Auxiliary Sight (GAS)
- 1H. Lay on target using GAS.
- Module I. Perform Prepare to Fire Checks and Engage Targets With Main Gun (105MM)
- 1I. Prepare to fire main gun.
  - 2I. Engage targets with main gun - normal mode.
  - 3I. Engage targets with main gun - manual mode.
  - 4I. Perform main gun failure to fire procedures.
  - 5I. Engage targets with main gun - emergency mode.
- Module J. Operate Coaxial Machinegun (7.62MM)
- 1J. Remove coaxial machinegun.
  - 2J. Install coaxial machinegun.
  - 3J. Load coaxial machinegun.
  - 4J. Zero coaxial machinegun.
  - 5J. Fire coaxial machinegun.
  - 6J. Clear misfire in coaxial machinegun.
  - 7J. Stop runaway firing of coaxial machinegun.
  - 8J. Change barrel of coaxial machinegun.
  - 9J. Clear coaxial machinegun.
- Module K. Boresight Main Gun
- 1K. Boresight Gunner's primary sight.
  - 2K. Boresight muzzle reference sensor.
  - 3K. Boresight thermal imaging system.
  - 4K. Boresight Gunner's auxiliary sight.
- Module L. Zero Tank Main Gun
- 1L. Zero tank main gun.
  - 2L. Confirm tank main gun zero.
- Module M. Verify Tank Main Gun Zero
- 1M. Verify tank main gun zero.

**TABLE 1 (Cont'd.)**

**GUNNER MODULES AND TASKS**

**Module N. Power Down And Secure Gunner's Station**

**1N. Power down and secure Gunner's station.**

**Module O. Prepare Main Gun And Coax For Travel**

**10. Prepare main gun for travel.**

**20. Prepare coaxial machinegun for travel.**

**TABLE 2**

**TANK COMMANDER MODULES AND TASKS**

**Module A. Prepare Commander's Station For Operation**

- 1A. Operate Commander's hatch.
- 2A. Adjust TC seat and platform.
- 3A. Operate intercommunications equipment.
- 4A. Perform before operations maintenance checks and services on Commander's station.

**Module B. Power Up Commander's Station**

- 1B. Test Commander's panel lights and switches.
- 2B. Operate Commander's power control handle.
- 3B. Prepare GPS extension for operation.
- 4B. Operate Commander's weapon station in power mode.
- 5B. Operate Commander's weapon station in manual mode.

**Module C. Operate Commander's Machinegun (Caliber .50)**

- 1C. Clear Commander's machinegun.
- 2C. Remove Commander's machinegun.
- 3C. Install Commander's machinegun.
- 4C. Boresight Commander's machinegun.
- 5C. Check and adjust headspace on Commander's machinegun.
- 6C. Check and adjust timing on Commander's machinegun.
- 7C. Load Commander's machinegun.
- 8C. Zero Commander's machinegun.
- 9C. Clear misfire in Commander's machinegun.
- 10C. Prepare Commander's machinegun for travel.

**Module D. Operate Grenade Launcher**

- 1D. Load grenade launcher.
- 2D. Fire grenades.
- 3D. Take immediate action for misfire of grenade launcher.
- 4D. Unload grenade launcher.

**Module E. Power Down And Secure Commander's Station**

- 1E. Power down and secure Commander's station.

that the soldier perform the task exactly as described under Action. At the end of training, the requirement is essentially described as the product(s) of successful task performance. The reader is referred to Analyzing Tank Gunnery Engagements for Simulator-Based Process Measurement<sup>1</sup> for a thorough discussion of the measurement issue.

References indicates the documents and pages where the task description was found. For the most part, task descriptions came from DEP 9-2330-255-10-1, October 1978 with Changes 1 and 2.

The objective for the Gunner task, "Prepare thermal imaging system for operation" is at Figure 1.

#### ORGANIZATION

The objectives are organized as follows:

Appendix A Gunner Modules

Appendix B Tank Commander Modules

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<sup>1</sup>Boldovici, J.A. Analyzing Tank Gunnery Engagements for Simulator-Based Process Measurement. Fort Knox, Kentucky: Human Resources Research Organization (HumRRO), Final Report 78-4, 1978.

## TASK 3B: PREPARE THERMAL IMAGING SYSTEM FOR OPERATION

### CONDITIONS/STIMULUS

System State: Table B, Column 3B; and, a target that produces heat at a range near 1200 meters.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 2B is completed.

### ACTION

- Gunner will:
1. Open THERMAL ballistic door handle (see Task 2A, Step 1a).
  2. Turn FLTR/CLEAR/SHTR switch to SHTR.
  3. Turn THERMAL MODE switch to STANDBY until RCVR READY green light comes on (5 to 15 minutes).
  4. Turn THERMAL MODE switch to OFF for 3-5 seconds, then to ON.
  5. Move THERMAL MAGNIFICATION lever to 10X.  
NOTE A: A firing reticle appears only with 10X selection. The 3X selection provides a wider field of view with no firing reticle.
  6. View through GPS eyepiece and move POLARITY switch to BLACK HOT if target is hard to see because background is white; or to WHITE HOT if background is too dark.
  7. Turn SENSITIVITY or CONTRAST knobs so reticle and symbols are clear but do not interfere with thermal sight view.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 7.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 7.  
Accuracy - As indicated by:  
• Clear TIS reticle and symbols in picture and no interference with thermal sight view.

### REFERENCES

DEP 9-2350-255-10-1; pp. 2-117 to 2-118.

Figure 1. Objective for "Prepare thermal imaging system for operation."

**APPENDIX A**  
**Gunner Modules**

**MODULE A. PREPARE GUNNER'S STATION FOR OPERATION**

**CONDITIONS/STIMULUS**

**System State:** Table A, Column 1A; and, hatches closed and secure, and keys for hatch padlocks.  
**Gunner Location:** Outside tank.  
**Initiating Stimuli:** TC tells Gunner to prepare station for operation.

**ACTION**

**Gunner will:**

- 1A. Enter Gunner's station.
- 2A. Adjust Gunner's seat, browpads, and chestrest.
- 3A. Operate intercommunications equipment.
- 4A. Perform before-operations maintenance checks and services on Gunner's station.

TABLE A

POSITION OF CONTROLS FOR TASKS IN MODULE A  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS			
	TASK			
	1A	2A	3A	4A
Computer control panel power switch	OFF	OFF	OFF	OFF
GUN SELECT switch	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE
GUN/TURRET DRIVE switch	MANUAL	MANUAL	MANUAL	MANUAL
LRP RANGE switch	SAFE	SAFE	SAFE	SAFE
Ballistic door handles	CLOSED	OPEN OR CLOSED	OPEN OR CLOSED	OPEN OR CLOSED
Main gun elevation travel lock	LOCKED	LOCKED	LOCKED	LOCKED
Turret traverse lock	LOCKED	LOCKED	LOCKED	LOCKED
TURRET POWER switch	OFF	ON	ON	ON
VEHICLE MASTER POWER switch	OFF	ON	ON	ON
Domelight	OFF	ON	ON	ON

## TASK 1A: ENTER GUNNER'S STATION

### CONDITIONS / STIMULUS

**System State:** Table A, Column 1A; and, hatches closed and secure, and keys for hatch padlocks.  
**Gunner Location:** Outside tank.  
**Initiating Stimuli:** TC tells Gunner to prepare station for operation.

### ACTION

- Gunner will:**
1. Mount tank using step on left forward skirt panel and handhold.
  2. Unlock padlock on Loader's hatch.
  3. Grab handle on hatch and move hatch to full open position.
  4. Move hatch toward closed position to check that hatch-open lock is hooked.
  5. Enter tank through Loader's hatch, stepping on Loader's seat, then down to turret floor.
  - 6a. Turn VEHICLE MASTER POWER switch on Commander's control panel ON by pulling switch out and raising to ON position.
  - 6b. Turn TURRET POWER switch on Commander's control panel ON.
  7. Check that VEHICLE MASTER POWER light and TURRET POWER light on Commander's control panel come on.
  8. Verify that VEHICLE MASTER POWER light on Driver's master panel comes ON.
  9. Release VEHICLE MASTER POWER switch.  
NOTE A: Switch returns to center position.
  10. Turn domelight lever to white light (for day operations) by moving lever away from red mark on domelight housing; or, to red light (for night operations) by moving lever toward red mark on domelight housing.
  11. Turn domelight knob clockwise to increase light or counterclockwise to decrease or shut off light.  
NOTE B: Perform Steps 12, 13, 14, 15 if rest of crew is in the tank.
  12. Step up on loader's seat.
  13. Grasp hatch-closed latch handle.
  14. Pull hatch-open lock handle forward and pull hatch closed while stepping down from seat.
  15. Turn hatch-closed latch handle to LOCKED position.

## MEASUREMENT

**During Training:**

Time - Between end of initiating stimuli and completion of Step 11 (or Step 15 if rest of crew is in tank).

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**

Time - Between end of initiating stimuli and completion of Step 11 (or Step 15 if rest of crew is in tank).

Accuracy - As indicated by:

- . VEHICLE MASTER POWER lights ON.
- . Domelight ON.
- . Turret domelight lever on whitelight for day operations or red light for night operations.
- . Loader's hatch-closed latch handle LOCKED (if rest of crew is in tank).

## REFERENCES

DEP 9-2350-255-10-1; p. 2-111, p. 2-63.  
DEP 9-2350-255-10-2; pp. 2-27 to 2-29.

## TASK 2A: ADJUST GUNNER'S SEAT, BROWPADS, AND CHESTREST

### CONDITIONS/STIMULUS

System State: Table A, Column 2A.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 1A is completed.

### ACTION

- Gunner will:
1. Set desired height on Gunner's seat as follows:
    - a. Open DAYLIGHT and THERMAL ballistic door handles by grasping each handle, depressing finger levers on top side of each handle and rotating handles to OPEN.

NOTE A: DAYLIGHT door handle must be open for daylight viewing. THERMAL door handle must be open when using TIS.

NOTE B: When laser rangefinder is used with TIS, DAYLIGHT door handle must be open also.

NOTE C: THERMAL door handle must be closed when not using TIS.
    - b. Lift up on height lever (location to right on seat pedestal) to unlock spring.
    - c. Adjust seat height to view outside scene through GPS eyepiece by using body weight to lower seat or removing body weight to raise seat.
    - d. Release lever to lock seat at desired height.
    - e. Move seat forward or backward by pulling lever located at left of seat and sliding seat to desired position while seated.
    - f. Close THERMAL ballistic door handle.
  2. Adjust GPS and GAS browpads as follows:
    - a. Turn thumbscrew above browpad to the left until browpad can be moved.
    - b. Pull browpad out of holding groove.
    - c. Slide browpad arm to right or left groove (depending on whether right or left eye is used to view through eyepiece).
    - d. Turn thumbscrew above browpad to the right to lock browpad in place.

NOTE D: Browpad may be bent to fit contour of CVC helmet.
  3. Adjust chestrest with the adjusting knob so that, when firing, the Gunner will be braced with forehead against the GPS browpad, chest against chestrest, and lower back pressed into seat back and seat cushion.

## MEASUREMENT

**During Training:**                      Time - Between end of initiating stimuli and completion of Step 3.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**                      Time - Between end of initiating stimuli and completion of Step 3.  
Accuracy - As indicated by:  
    . Gunner's seat adjusted to permit viewing outside scene through GPS eyepiece.  
    . Browpads adjusted for right or left eye use.  
    . Chestrest adjusted to brace Gunner's forehead against GPS browpad, chest against chestrest, lower back pressed into seat back and seat cushion.  
    . THERMAL ballistic door handle closed.

## REFERENCES

DEP 9-2350-255-10-1; pp. 2-112 to 2-113.

## TASK 3A: OPERATE INTERCOMMUNICATIONS EQUIPMENT

### CONDITIONS/STIMULUS

**System State:** Table A, Column 3A; and, an operational radio intercommunications system, Gunner and TC CVC helmets, a predetermined frequency set on the radio.  
**Gunner Location:** In Gunner's station.  
**Initiating Stimuli:** Task 2A is completed.

### ACTION

**Gunner will:**

1. Turn ON amplifier, AM-1780/VRC, as follows:
  - a. Turn MAIN PWR switch to NORM.
  - b. Set POWER CKT BKR to ON.

NOTE A: POWER indicator light will come on.

- c. Reset POWER CKT BKR to ON if it trips to OFF.

NOTE B: If POWER CKT BKR trips to OFF after it has been reset, move MAIN PWR switch to OFF and notify organizational maintenance.

- d. Set INT ACCENT switch to ON or OFF.

NOTE C: With INT ACCENT OFF, intercom and radio sound levels are equal. With INT ACCENT ON, radio sound level is lower than intercom.

- e. Turn RADIO TRANS switch to CDR + CREW.
2. Put CVC helmet ON.
  3. Connect CVC cable to intercom control box.
  4. Press foot switch on footrest below Gunner's seat to talk.
  5. Release foot switch to hear.

NOTE D: Gunner can talk on intercom by using CVC microphone switch.

### MEASUREMENT

**During Training:**

**Time** - Between end of initiating stimuli and completion of Step 5.

**Accuracy** - As indicated by match between steps given above and steps performed by Gunner.



**TASK 4A: PERFORM BEFORE-OPERATIONS MAINTENANCE CHECKS  
AND SERVICES ON GUNNER'S STATION**

**CONDITIONS/STIMULUS**

**System State:** Table A, Column 4A; and, an operational radio intercommunications system, Gunner and TC CVC helmets, a predetermined frequency set on the radio, gas mask M25A1, TM 9-2350-255-10-1, and DA Form 2404.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** Task 3A is completed.

**ACTION**

- Gunner will:**
1. Adjust Gunner's seat, browpads, and chest-rest (see Task 2A).
  2. Check seat cushion for rips and tears.
  3. Operate intercommunications equipment (see Task 3A).
  4. Check Manual Gun/Turret Controls as follows:
    - a. Tell Loader to unlock turret traverse lock.
    - b. Unlock main gun elevation travel lock as follows:
      1. Press button on end of lock pin.
      2. Remove lock pin from lock pin holes on main gun breech.
      3. Swing elevation strut to turret roof.
      4. Lock elevation strut to turret roof with lock pin.

**NOTE A:** GUN TURRET DRIVE switch must be in MANUAL before unlocking or locking elevation travel lock.

- c. Turn AUX HYDR POWER switch to ON and check that hydraulic pressure gage stays between 1550 and 1650 psi.
- d. Elevate and depress main gun with manual elevation crank handle as follows:
  1. Look into GPS eyepiece.
  2. Turn FLTR/CLEAR/SHTR switch to FLTR or CLEAR.
  3. Grasp and squeeze manual elevation crank handle, depressing palm switch.
  4. Rotate manual elevation crank handle clockwise to elevate gun; counterclockwise to depress gun.
- e. Traverse turret right and left with manual traverse crankhandle as follows:
  1. Look into GPS eyepiece.
  2. Grasp and squeeze manual traverse crank handle clockwise to traverse turret to right; counterclockwise to traverse turret to left.

NOTE B: Manual traverse crank handle wheels when palm lever is released.

- f. Check all visible hydraulic lines for leaks.
- g. Check azimuth and elevation servo mechanisms filter pop-up buttons (only if popped out) as follows:
  - 1. Push pop-up buttons.
  - 2. Traverse turret and elevate main gun (see Task 4A, Steps 4d and 4e).
  - 3. Notify Tank Commander if either button pops out again.
- h. Lock main gun elevation lock as follows:
  - 1. Move main gun breech until elevation lock aligns with locking pin holes on breech.
  - 2. Push button on lock pin and push lock pin through breech and strut holes.
- i. Tell Loader to lock turret traverse lock.
- j. Turn AUX HYDR POWER switch to OFF.
- 5. Check Gunner's Gas Particle Filter Equipment as follows:
  - a. Take breakaway socket of air hose from mount by Gunner's seat.
  - b. Connect hose to canister of protective mask, M25A1.

NOTE C: GAS PARTICLE FILTER switch on Driver's master panel must be ON.

c. Turn air heater ON.

NOTE D: Air heater light should come on.

- d. Regulate air temperature with air heater control knob until comfortable air temperature is reached.
- e. Mask and check operation of filter, hose, and connector.
- f. Check microphone operation (see Task 3A).
- g. Unmask and turn air heater OFF.
- h. Disconnect hose from mask and connect breakaway socket to mount.
- i. Stow protective mask.
- 6. List any uncorrected deficiencies on DA Form 2404.

### MEASUREMENT

**During Training:**

**Time** - Between end of initiating stimuli and completion of Step 5 (or 6 if uncorrected deficiencies are found).

**Accuracy** - As indicated by match between steps given above and steps performed by Gunner.

Time - Between end of initiating stimuli and completion of Step 5 (or 6 if uncorrected deficiencies are found).  
End of Training:  
Accuracy - As indicated by:  
. Deficiencies corrected or listed on operator portion of DA Form 2404.

REFERENCES

DEP 9-2350-255-10-1; pp. 2-47 to 2-49, p. 2-141, p. 2-148, p. 2-149, p. 2-167, p. 2-88.  
Job Data Work Sheet No. FB127159.

## MODULE B. POWER UP GUNNER'S STATION

### CONDITIONS/STIMULUS

**System State:** Table B, Column 1B; and, Gunner's station prepared for operation.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** TC tells Gunner to power up Gunner's station.

### ACTION

**Gunner will:**

- 1B. Test GPS and TIS panel lights.
- 2B. Prepare Gunner's Primary Sight for operation.
- 3B. Prepare Thermal Imaging System for operation.
- 4B. Focus Thermal Imaging System picture.
- 5B. Prepare Laser Rangefinder for operation.
- 6B. Prepare Gunner's Auxiliary Sight for operation.
- 7B. Prepare Ballistic Computer for operation.

TABLE B

POSITION OF CONTROLS FOR TASKS IN MODULE B  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS						
	1B	2B	3B	4B	5B	6B	7B
Computer control panel power switch	OFF	OFF	OFF	OFF	OFF	OFF	OFF
GUN SELECT switch	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE
GUN/TURRET DRIVE switch	MANUAL	MANUAL	POWERED/ EL UNCPL	POWERED/ EL UNCPL	POWERED/ EL UNCPL	POWERED/ EL UNCPL	MANUAL
LRF RANGE switch	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE
Ballistic door handles	OPEN OR CLOSED	OPEN OR CLOSED	OPEN - DAYLIGHT	OPEN	OPEN - DAYLIGHT	OPEN - DAYLIGHT	OPEN - DAYLIGHT
Main gun elevation travel lock	LOCKED	LOCKED	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED	LOCKED
Turret traverse lock	LOCKED	LOCKED	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED	LOCKED
TURRET POWER switch	ON	ON	ON	ON	ON	ON	ON
VEHICLE MASTER POWER switch	ON	ON	ON	ON	ON	ON	ON
Daylight	ON	ON	ON	ON	ON	ON	ON
FIRE CONTROL MODE switch	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL

## TASK 1B: TEST GPS PANEL AND TIS PANEL LIGHTS

### CONDITIONS/STIMULUS

System State: Table B, Column 1B; and, Gunner's station prepared for operation.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC tells Gunner to power up Gunner's station.

### ACTION

Gunner will: 1. Push PANEL LIGHTS TEST pushbutton on GPS panel.  
Check that all lights on GPS panels and TIS panel light are on.  
Release PANEL LIGHTS TEST pushbutton.  
NOTE A: Do Steps 5 through 8 if any lights do not light. If all lights light, proceed to Step 8.  
Replace lamps that do not light as follows:  
a. Unscrew and take off lens.  
b. Pull lamp out of lens and throw lamp away.  
NOTE B: Throw away any lens that is cracked.  
c. Put new lamp into lens.  
d. Screw new lamp and lens into housing.  
Repeat Steps 2 and 3 to verify that all lights on GPS panels and TIS panel light are on.  
Release PANEL LIGHTS TEST pushbutton.  
Turn PANEL LIGHT knob clockwise to make panel lights brighter, counterclockwise to make panel lights dimmer, as appropriate.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 8.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 8.  
Accuracy - As indicated by:  
. GPS panels and TIS panel lights come on when PANEL LIGHTS test pushbutton is pushed.  
. PANEL LIGHT knob adjusted for panel light illumination.

REFERENCES

DEP 9-2350-255-10-1; p. 2-114.  
DEP 9-2350-255-10-2; p. 2-20.

## TASK 2B: PREPARE GUNNER'S PRIMARY SIGHT FOR OPERATION

### CONDITIONS/STIMULUS

**System State:** Table B, Column 2B; and, a target at a range near 1200 meters.  
**Gunner Location:** In Gunner's station.  
**Initiating Stimuli:** Task 1B is completed.

### ACTION

- Gunner will:**
1. Open DAYLIGHT ballistic door handle (if closed). (See Task 2A, Step 1a.)
  2. Tell Loader to unlock turret traverse lock.
  3. Unlock main gun elevation lock (see Task 4A, Step 4b).
  4. Check that GUN SELECT - TRIGGER SAFE light is on.

NOTE A: If GUN SELECT - TRIGGER SAFE light is not on, see Task 1B, Step 5.

5. Turn FIRE CONTROL MODE switch to EMER.
6. Check that FIRE CONTROL MODE - EMER light is on.

NOTE B: If FIRE CONTROL MODE - EMER light is not on, see Task 1B, Step 5.

7. View through GPS eyepiece and adjust RETICLE knob on GPS upper panel for comfortable GPS brightness reticle.

NOTE C: Set DEFROSTER switch on GPS upper panel to ON when frost affects vision.

8. Determine if reticle is moving, as follows:
  - a. Turn FIRE CONTROL MODE switch to NORMAL.
  - b. Check that FIRE CONTROL MODE - NORMAL light is on.

NOTE D: If FIRE CONTROL MODE - NORMAL light is not on, see Task 1B, Step 5.

- c. Tell Loader to move GUN/TURRET DRIVE switch on Loader's panel to POWERED or EL UNCPL position.
- d. Squeeze power control handle palm switches and hold control handles centered.

NOTE E: FLTR/CLEAR/SHTR switch should be in FLTR or CLEAR position. SHTR position is used only with TIS.

- e. View through GPS eyepiece to see if reticle is moving.

**NOTE F:** If reticle is moving, proceed to Step 9.  
If reticle is not moving, proceed to Step 10.

9. Null (stop) GPS reticle drift (movement), as follows:
  - a. Keep palm switches on power control handles squeezed.
  - b. Push in and turn round AZ knob clockwise to null right drift, counterclockwise to null left drift.
  - c. Release AZ knob when drift stops.
  - d. Push in and turn hex EL knob clockwise to null down drift, counterclockwise to null up drift.
  - e. Release EL knob when drift stops.
10. Turn GUN SELECT switch to MAIN.

**NOTE G:** GUN SELECT switch must be in MAIN position for AMMUNITION SELECT switch and lights to work.

11. Check that GUN SELECT - MAIN light is on.

**NOTE H:** If GUN SELECT - MAIN light is not on, see Task 1B, Step 5.

12. Turn AMMUNITION SELECT switch to each position (APDS, HEP, BH, HEAT) to verify that green light comes on for each.

**NOTE I:** If any AMMUNITION SELECT light does not come on, see Task 1B, Step 5.

13. Turn GUN SELECT switch to TRIGGER SAFE.
14. Check that GUN SELECT - TRIGGER SAFE light is on (see NOTE A).
15. Move MAGNIFICATION lever to 10X.
16. Focus GPS for clear view by turning knurled eyepiece housing right or left.
17. Note reference pointer setting (when view of target is sharp and clear) for future use.

## MEASUREMENT

- During Training:**
- Time - Between end of initiating stimuli and completion of Step 17.
  - Accuracy - As indicated by match between steps given above and steps performed by Gunner.
- End of Training:**
- Time - Between end of initiating stimuli and completion of Step 17.
  - Accuracy - As indicated by:
    - GPS reticle adjusted for brightness.
    - GPS reticle not moving.
    - GPS focused.

REFERENCES

DEP 9-2350-255-10-1; pp. 2-115 to 2-117.

## TASK 3B: PREPARE THERMAL IMAGING SYSTEM FOR OPERATION

### CONDITIONS/STIMULUS

**System State:** Table B, Column 3B; and, a target that produces heat at a range near 1200 meters.  
**Gunner Location:** In Gunner's station.  
**Initiating Stimuli:** Task 2B is completed.

### ACTION

- Gunner will:**
1. Open THERMAL ballistic door handle (see Task 2A, Step 1a).
  2. Turn FLTR/CLEAR/SHTR switch to SHTR.
  3. Turn THERMAL MODE switch to STANDBY until RCVR READY green light comes on (5 to 15 minutes).
  4. Turn THERMAL MODE switch to OFF for 3-5 seconds, then to ON.
  5. Move THERMAL MAGNIFICATION lever to 10X.

**NOTE A:** A firing reticle appears only with 10X selection. The 3X selection provides a wider field of view with no firing reticle.

6. View through GPS eyepiece and move POLARITY switch to BLACK HOT if target is hard to see because background is white; or to WHITE HOT if background is too dark.
7. Turn SENSITIVITY or CONTRAST knobs so reticle and symbols are clear but do not interfere with thermal sight view.

### MEASUREMENT

**During Training:**

Time - Between end of initiating stimuli and completion of Step 7.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**

Time - Between end of initiating stimuli and completion of Step 7.  
Accuracy -- As indicated by:  
Clear TIS reticle and symbols in picture and no interference with thermal sight view.

### REFERENCES

DEP 9-2350-255-10-1; pp. 2-117 to 2-118.

## TASK 4B: FOCUS THERMAL IMAGING SYSTEM PICTURE

### CONDITIONS/STIMULUS

System State: Table B, Column 4B; and, a target that produces heat at a range near 1200 meters.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 3B is completed.

### ACTION

- Gunner will:
1. Turn UNIT TEST PATTERN switch to ICU.
  2. Push and turn CONTRAST, SENSITIVITY, and FOCUS knobs for sharpest pictures.
  3. Rotate RETICLE and SYMBOLS knobs to adjust RETICLE and SYMBOLS in sight picture.
  4. Turn UNIT TEST PATTERN switch to PCU.
  5. Turn POLARITY switch to WHITE HOT (if not previously done in Task 3B, Step 6).
  6. Adjust SENSITIVITY and CONTRAST knobs so that block-bar in test pattern is clear and sharp, and remainder of scene is comfortable.

NOTE B: Reticle and symbols should be clear.

7. Turn UNIT TEST PATTERN switch to OFF.
8. Make fine adjustments with SENSITIVITY and CONTRAST knobs for best picture and easy target identification

NOTE C: Small video and contrast adjustments may be necessary when polarity is changed or over long periods of time when temperature changes.

9. Turn THERMAL MODE switch to STANDBY to keep TIS ready for use.
10. Close THERMAL ballistic door handle.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 10.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 10.  
Accuracy - As indicated by:  
. Clear target scene with sharp focus.

REFERENCES

DEP 9-2350-255-10-1; pp. 2-118 to 2-119.

## TASK 5B: PREPARE LASER RANGEFINDER FOR OPERATION

### CONDITIONS/STIMULUS

System State: Table B, Column 5B.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 4B is completed.

### ACTION

- Gunner will:
1. Verify that LRF RANGE switch is in SAFE.
  2. View through GPS eyepiece and verify that F symbol in GPS picture is out.
  3. Notify Tank Commander if F symbol appears in GPS picture.

NOTE A: When turret power is turned ON, and LRF RANGE switch is not in SAFE position, the LRF goes into safe condition, F symbol appears in GPS sight picture, and FIRE CONTROL MALF light on Tank Commander's panel comes on.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 2 (or Step 3 if required).  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiation stimuli and completion of Step 2 (or Step 3 if required).  
Accuracy - As indicated by:  
. LRF RANGE switch in SAFE.  
. F symbol in GPS icture is out.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-119.

## TASK 6B: PREPARE GUNNER'S AUXILIARY SIGHT FOR OPERATION

### CONDITIONS/STIMULUS

System State: Table B, Column 6B; and, a target at a range near 1200 meters.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 5B is completed.

### ACTION

- Gunner will:
1. Set POWER switch on GAS panel to ON.
  2. Turn RETICLE switch to SABOT/HEP.
  3. View through GAS eyepiece and aim at target using main gun manual controls (see Task 4A, Steps 4d and 4e).

NOTE A: Hydraulic power to gun and turret actuators is shut off when the manual crank handle palm switch is squeezed.

4. Rotate focusing ring to obtain sharpest possible image.

NOTE B: Notify Tank Commander if traversing new correction unable to focus.

5. Move FILTER knob to IN to reduce glare in field-of-view.
6. Turn brightness knob to adjust brightness as needed.
7. Verify that APFSDS and SM735 and HEP-T and M393 legends appear above reticle.

NOTE C: Notify Tank Commander if legends do not appear above reticle.

8. Turn RETICLE switch to HEAT.
9. Verify that HEAT-T/SM456 legend appears above reticle.

NOTE D: Notify Tank Commander if legend does not appear above reticle.

10. Tell Loader to move GUN/TURRET DRIVE switch on Loader's panel to MANUAL position.
11. Lock main gun elevation lock (see Task 4A, Step 4h).
12. Tell Loader to lock turret traverse lock.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 12.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.



## TASK 7B: PREPARE BALLISTIC COMPUTER FOR OPERATION

### CONDITIONS/STIMULUS

System State: Table B, Column 7B.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 6B is completed.

### ACTION

- Gunner will:
1. Turn computer power switch to ON.
  2. Check that FWR indicator light is on.

NOTE A: If FWR indicator light does not come on, see Task 1B, Step 5.

3. Push and hold TEST button and verify that the following indicator lamps are lit:
  - . L . ZERO
  - . R . BORESIGHT
  - . U . 8.8.8.8.8 shows in display
  - . D . NO GO
  - . all INPUT KEYS

NOTE B: If all lights are lit, the computer is prepared for operation. If any or all lights are not lit, perform Steps 4 and 5 as required.

4. Replace lamps that do not light (see Task 1B, Step 5).
5. If no lamps light, proceed as follows:
  - a. Verify that computer power switch is set to ON.
  - b. Reset COMPUTER, CANT SENSOR circuit breaker on turret networks box (located in Loader's station).
  - c. If malfunction is not corrected, check if all cables are properly connected.
    1. If no, properly connect cables and repeat Step 3.
    2. If yes, notify Tank Commander.

### MEASUREMENT

Time - Between end of initiating stimuli and completion of Step 3 (or Steps 4 and 5 as required).

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:

Time - Between end of initiating stimuli and completion of Step 3 (or Steps 4 and 5 as required).

Accuracy - As indicated by:

- . All indicator lamps on ballistic computer light when computer power switch is ON and TEST button pushed.
- . Tank Commander notified if no lamps light.

REFERENCES

DEP 9-2350-255-10-1; p. 2-120, p. 3-22.

**MODULE C. PERFORM PRE-OPERATION CHECKS**

**CONDITIONS/STIMULUS**

System State: Table C, Column 1C.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC tells Gunner to perform pre-operation checks.

**ACTION**

Gunner will:

- 1C. Test Gunner's station caution and warning lights.
- 2C. Perform GPS functional check.
- 3C. Perform computer self-test.
- 4C. Perform thermal imaging system built-in test.
- 5C. Perform Gun/Turret drive--LOS tracking check.
- 6C. Perform lead system check.
- 7C. Perform firing circuit tests.
- 8C. Perform boresight check.
- 9C. Align muzzle reference sensor.
- 10C. Perform crosswind sensor check.

TABLE C

POSITION OF CONTROLS FOR TASKS IN MODULE C  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS									
	1C	2C	3C	4C	5C	6C	7C	8C	9C	10C
Computer control panel power switch	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
GUN SELECT switch	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE
GUN/TURRET DRIVE switch	POWERED	POWERED	POWERED	POWERED	POWERED	POWERED	POWERED	POWERED	POWERED	POWERED
LRF RANGE switch	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE
Ballistic door handles	OPEN/DAYLIGHT	OPEN/DAYLIGHT	OPEN/DAYLIGHT	OPEN/DAYLIGHT	OPEN/DAYLIGHT	OPEN/DAYLIGHT	OPEN/DAYLIGHT	OPEN/DAYLIGHT	OPEN/DAYLIGHT	OPEN/DAYLIGHT
Main gun elevation travel lock	LOCKED	LOCKED	UNLOCKED							
Turret traverse lock	LOCKED	LOCKED	UNLOCKED							
TURRET POWER switch	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
VEHICLE MASTER POWER switch	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Domelight	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
FIRE CONTROL MODE switch	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
THERMAL MODE switch	STANDBY	STANDBY	STANDBY	STANDBY	STANDBY	STANDBY	STANDBY	STANDBY	STANDBY	STANDBY

## TASK 1C: TEST GUNNER'S STATION CAUTION AND WARNING LIGHTS

### CONDITIONS/STIMULUS

System State: Table C, Column 1C.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC tells Gunner to perform pre-operations checks.

### ACTION

Gunner will:

1. Notify Tank Commander if FAULT EU and FAULT RCVR lights on TIS are on.
2. Test GPS and TIS panel lights (see Task 1B).
3. Turn controls on other turret panels OFF or to SAFE unless they are being used.

### MEASUREMENT

During Training:                      Time - Between end of initiating stimuli and completion of Step 3.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:                      Time - Between end of initiating stimuli and completion of Step 3.  
Accuracy - As indicated by:  
    . GPS panels and TIS panel light come on when PANEL LIGHTS TEST push-button is pushed.

### REFERENCES

DEP 9-2350-255-10-1; pp. 2-121 to 2-122, p. 3-18.

## TASK 2C: PERFORM GPS FUNCTIONAL CHECK

### CONDITIONS/STIMULUS

System State: Table C, Column 2C.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 1C is completed.

### ACTION

- Gunner will:
1. Tell Loader to unlock turret traverse lock.
  2. Unlock main gun elevation lock (see Task 4A, Step 4b).
  3. Determine if GPS reticle is moving (see Task 2B, Step 8).
  4. Null GPS reticle drift (see Task 2B, Step 9).
  5. Turn GUN SELECT switch to COAX then to MAIN.
  6. Check that GUN SELECT - COAX then GUN SELECT - MAIN lights come on.  
  
NOTE A: If either or both GUN SELECT lights do not come on, see Task 1B, Step 5.
  7. Turn AMMUNITION SELECT switch to each position (APDS, HEP, BH, HEAT) to verify that green light comes on for each.  
  
NOTE B: If any AMMUNITION SELECT light does not come on, see Task 1B, Step 5.
  8. Turn GUN SELECT switch to TRIGGER SAFE.
  9. Check that GUN SELECT - TRIGGER SAFE light is on.  
  
NOTE C: If GUN SELECT - TRIGGER SAFE light is not on, see Task 1B, Step 5.
  10. View through GPS eyepiece and turn FLTR/CLEAR/SHTR switch to FLTR then CLEAR to verify operation of each.
  11. Open THERMAL ballistic door handle (see Task 2A, Step 1a).
  12. View through GPS eyepiece and turn FLTR/CLEAR/SHTR switch to SHTR to verify operation of SHTR position.
  13. Close THERMAL ballistic door handle.
  14. Check operation of PANEL LIGHT knob (see Task 1B, Step 8).
  15. Notify TC if FLTR/CLEAR/SHTR switch fails to operate at one or more positions, or PANEL LIGHT knob fails to adjust illumination, or both.

## MEASUREMENT

**During Training:**

**Time** - Between end of initiating stimuli and completion of Step 14 (or Step 15 if any action fails to verify).

**Accuracy** - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**

**Time** - Between end of initiating stimuli and completion of Step 14 (or Step 15 if any action fails to verify).

**Accuracy** - As indicated by:

- . GPS reticle not moving.
- . AMMUNITION SELECT lights come on at each position.
- . GUN SELECT lights come on at each position.
- . TC is notified if FLTR/CLEAR/SHTR switch fails to operate at one or more positions.
- . TC is notified if PANEL LIGHT knob fails to adjust illumination.

## REFERENCES

DEP 9-2350-255-10-1; p. 2-122.

## TASK 3C: PERFORM COMPUTER SELF TEST

### CONDITIONS/STIMULUS

System State: Table C, Column 3C.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 2C completed.

### ACTION

- Gunner will:
1. Insure hydraulic pressure gage reads 1550 to 1650 psi.
  2. Insure turret traverse lock is unlocked.
  3. Insure main gun elevation travel lock is unlocked.
  4. Have Loader insure GUN/TURRET DRIVE switch is set to POWERED (light is lit).
  5. Insure FIRE CONTROL MODE switch is set to NORMAL (light is lit).
  6. Insure stabilization drift is nulled out (see Task 2B, Steps 8 & 9).
  7. Insure computer power switch is set to ON (PWR light is lit).

NOTE A: Computer power must be on for 90 seconds before starting computer self test.

8. Squeeze and hold power control handle palm switch throughout self test.

NOTE B: Do not move Gunner's or TC's control handles during self test.

9. Push and release TEST button on computer panel.

NOTE C: TEST button will light and remain lit throughout self test. If computer will not perform self test (TEST light does not light), continue with Step 10.

NOTE D: Self test will stop if palm switch is released. After releasing palm switch, self test may not be continued, but may be started over (Step 8).

NOTE E: If TEST light goes out, and display panel reads PASS, self test is completed with no failures encountered.

NOTE F: If a failure is encountered during the self test, the NO GO light (red) will light, and the display panel will read FAIL (flashing) for 4 seconds. Then a failure number will appear in the display for 10 seconds. The self test will stop.

If an AUTO INPUT key (CROSSWIND, CANT, LEAD, or RANGE) is lit and flashing, continue with Step 11.

If no keys are flashing, continue with Step 13.

10. If computer will not perform self test, take corrective action as follows:
  - a. Perform checks in Steps 5, 7, and 8 again.
  - b. If computer display panel shows numbers, press ENTER key.
  - c. Insure turret cables are connected.
  - d. Insure circuit breaker on panel in turret networks box is set to ON.

**NOTE G:** After taking corrective action, begin self test again (Step 8). If self test still does not run, notify organizational maintenance.

11. To bypass failed AUTO INPUT component and continue self test:
  - a. Push and release flashing AUTO INPUT key.

**NOTE H:** Key will remain lit, not flashing. Display value will be 0 (zero) for cant, crosswind, or lead failures; display will show battle range value for range failure.

- b. Press ENTER key.

**NOTE I:** Input to computer from failed component is cancelled, and self test continues. After self test is completed, take corrective action (Step 12). To return to automatic input for component, press lighted AUTO INPUT key.

12. For AUTO INPUT failures, discontinue self test and take corrective action as follows:
  - a. Failure 2 - Cant sensor.
    - 1) Insure tank is on level ground.
    - 2) Insure cant sensor cables are connected.
  - b. Failure 3 - Crosswind sensor.
    - 1) Insure crosswind sensor cables are connected.
    - 2) Check crosswind sensor (see Task 10C).
    - 3) Cover crosswind sensor during test if wind is gusting.
  - c. Failure 4 - Lead (Azimuth rate).
    - 1) Insure hydraulic pressure gage reads 1550-1650 psi.
    - 2) Insure turret traverse lock is unlocked.
    - 3) Insure stabilization drift (azimuth) is nulled out.
    - 4) Insure gunner's and TC's control handles were not moved during self test.
    - 5) Insure GUN/TURRET DRIVE POWERED light is lit.
    - 6) Insure FIRE CONTROL MODE NORMAL light is lit.

- d. Failure 8 - Range (laser rangefinder).
- 1) Insure LRF RANGE switch is set to SAFE.
  - 2) Insure LRF buttons on gunner's and TC's control handles were not pressed during self test.
  - 3) With LRF RANGE switch set to SAFE, turn TURRET POWER switch to OFF and back to ON to reset laser.

NOTE J: After taking corrective actions, begin self test again (Step 8). If failure still appears, notify organizational maintenance. Input data manually as required (see Task 2G).

13. For computer failures (other than AUTO INPUT) take corrective action as follows:
- a. Failure 1 - Computer.
    - 1) Enter AMMO TEMP (see Task 1G) and repeat self test.
    - 2) If failure 1 occurs again, enter all manual inputs (Task 1G) and recharge computer battery by leaving TURRET POWER switch set to ON for one hour.
  - b. Failure 5 - Sight stabilization (elevation rate).
    - 1) Insure main gun elevation travel lock is unlocked.
    - 2) Insure stabilization drift (elevation) is nulled out.
    - 3) Insure gunner's and TC's control handles were not moved during self test.
    - 4) Insure GUN/TURRET DRIVE POWERED light is lit.
    - 5) Insure FIRE CONTROL MODE NORMAL light is lit.
  - c. Failure 6 - GPS reticle servo.
    - 1) Inform TC of failure.
  - d. Failure 7 - Data link (sight-gun link).
    - 1) Insure main gun is at least 3 degrees away from maximum depression/elevation.
    - 2) Insure palm switches were released after previous self test.
    - 3) Insure turret traverse and gun elevation locks are unlocked.
    - 4) Insure GUN/TURRET DRIVE POWERED light is lit.
    - 5) Insure FIRE CONTROL MODE NORMAL light is lit.
    - 6) With FIRE CONTROL MODE set to EMER, if stabilization drift occurs (see Task 2B, Step 8), notify organizational maintenance.

NOTE K: After taking corrective action(s) run self test again (Step 8). If same failure still appears, notify organizational maintenance.

## MEASUREMENT

### During Training:

Time - Between end of initiating stimulus and completion of Step 9 (after corrective action(s) taken as required).

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

### End of Training:

Time - Between end of initiating stimulus and completion of Step 9 (after corrective actions taken as required).

Accuracy - As indicated by:

- . Before self test is started (Step 8):
  - Hydraulic pressure gage reads 1550-1650 psi.
  - Turret traverse and main gun elevation locks are unlocked.
  - GUN/TURRET DRIVE POWERED light is lit.
  - FIRE CONTROL MODE NORMAL light is lit.
  - Stabilization drift (azimuth and elevation) is nulled out.
  - Computer PWR light is lit for 90 seconds.
- . Self test ends with no failures encountered, or . After corrective actions are taken, components still failing self test are reported to organizational maintenance.

## REFERENCES

DEP 9-2350-255-10-1; pp. 2-123 to 2-125, p. 3-18, pp. 3-20 to 3-22.

## TASK 4C: PERFORM THERMAL IMAGING SYSTEM BUILT-IN REST

### CONDITIONS/STIMULUS

**System State:** Table C, Column 4C; and, a target that produces heat at a range near 1200 meters.  
**Gunner Location:** In Gunner's station.  
**Initiating Stimuli:** Task 3C is completed.

### ACTION

- Gunner will:**
1. Set magnification switch to 10X.
  2. Turn THERMAL MODE switch to ON.
  3. Open THERMAL ballistic door handle (see Task 2A, Step 1a).
  4. Turn FLTR/CLEAR/SHTR switch to SHTR.
  5. View through GPS eyepiece and turn UNIT TEST PATTERN switch to each position. The pictures that should appear in the GPS eyepiece are as follows:
    - . PCU - view with no image test pattern. Range already in computer will appear at bottom of view.
    - . ICU - test pattern with darkened upper right quarter of picture.
    - . EU - test pattern with eight reticles. All number/symbol indicators with light at bottom of pattern.
    - . TRU - test pattern with reticle centered and vertical bar left of reticle. Range already in computer will appear at bottom of picture.
  6. Notify TC if incorrect display appears for any switch position.
  7. Focus thermal imaging system picture (see Task 4B, Steps 1 through 9).
  8. Close THERMAL ballistic door handle.
  9. Turn FLTR/CLEAR/SHTR switch to CLEAR.

### MEASUREMENT

**During Training:**  
**Time** - Between end of initiating stimuli and completion of Step 9.  
**Accuracy** - As indicated by match between steps given above and steps performed by Gunner.

**During Training:**  
**Time** - Between end of initiating stimuli and completion of Step 9.  
**Accuracy** - As indicated by:

- . TC is notified if incorrect display appears for any UNIT TEST PATTERN switch position.
- . Clear target scene with sharp focus.

REFERENCES

DEF 9-2350-255-10-1; p. 2-126.

**TASK 5C: PERFORM GUN/TURRET DRIVE - LOS TRACKING CHECK**

**CONDITIONS/STIMULUS**

**System State:** Table C, Column 5C; and, a target at a range near 1200 meters.  
**Gunner Location:** In Gunner's station.  
**Initiating Stimuli:** Task 4C is completed.

**ACTION**

- Gunner will:**
1. View through GPS eyepiece and track target slowly in both elevation and azimuth with power control handles (see Tasks 1F and 2F).
  2. Observe reticle motion relative to scene.  
**NOTE A:** Reticle should move smoothly at any fixed angle of handle position.
  3. Notify TC if reticle does not move smoothly.  
**NOTE B:** TC will track slowly in both elevation and azimuth with Commander's power control handle (after Gunner completes tracking).
  4. Null reticle drift, if required (see Task 1B, Step 9).
  5. Turn FIRE CONTROL MODE switch to EMER.
  6. View through GPS eyepiece, grasp Gunner's power control handles and squeeze palm switches.  
**NOTE C:** Reticle will rise, then stabilize.
  7. Notify TC if drift is more than 0.1 mil in 10 seconds.
  8. Turn FIRE CONTROL MODE switch to NORMAL.

**MEASUREMENT**

**During Training:**  
**Time** - Between end of initiating stimuli and completion of Step 8.  
**Accuracy** - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**  
**Time** - Between end of initiating stimuli and completion of Step 8.  
**Accuracy** - As indicated by:

- . TC is notified if drift is more than 0.1 mil in 10 seconds when FIRE CONTROL MODE switch is in EMER.
- . TC is notified if reticle does not move smoothly at any fixed angle of handle position.
- . GPS reticle not moving.

REFERENCES

DEP 9-2350-255-10-1; p. 2-127.

## TASK 6C: PERFORM LEAD SYSTEM CHECK

### CONDITIONS/STIMULUS

System State: Table C, Column 6C; and, a target at a range near 1200 meters.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 5C is completed.

### ACTION

- Gunner will:
1. Turn AMMUNITION SELECT switch to HEAT.
  2. Squeeze and hold Gunner's power control handle palm switch.
  - 3a. Manually enter 2000-meter range into computer (see Task 2G), view through GPS eyepiece, and slowly rotate power control handles (see Tasks 1F and 2F).
  - or
  - 3b. Range on the target with laser rangefinder view through GPS eyepiece, and slowly rotate power control handles (see Tasks 1F and 2F).

NOTE A: Reticle will move relative to edge of eyepiece scene as handles are rotated.

4. Reverse direction of handle rotation.

NOTE B: Reticle motion in scene will reverse.

5. Center power control handles.

NOTE C: Reticle will go to center of scene.

6. Notify TC if reticle motions are not as described (Notes A, B, C).
7. Track in one direction, then quickly center power control handles.
8. Notify TC if turret motion is not felt after power control handles are centered.

### MEASUREMENT

Time - Between end of initiating stimuli and completion of Step 7 (or Step 8 if turret motion is not felt after power control handles are centered).  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:

Time - Between end of initiating stimuli and completion of Step 7 (or Step 8 if turret motion is not felt after power control handles are centered).

Accuracy - As indicated by:

- . GPS reticle not moving.
- . TC is notified if reticle motions are not as described.
- . TC is notified if turret motion is not felt after power control handles are centered.

REFERENCES

DEP 9-2350-255-10-1; p. 2-128.

## TASK 7C: PERFORM FIRING CIRCUIT TESTS

### CONDITIONS/STIMULUS

System State: Table C, Column 7C; and, firing circuit tester, spent case ejection guard in ARMED; and DA Form 2404.

Gunner Location: In Gunner's station.

Initiating Stimuli: Task 6C is completed.

### ACTION

Gunner will: A. FIRING CIRCUITS CHECK, CIRCUIT TESTER SHOULD LIGHT

1. Place firing circuit tester between rear of gun tube and face of breechblock.
2. Turn GUN SELECT switch to MAIN.
3. Turn manual firing handle (blasting machine) clockwise vigorously two to four times.

NOTE A: Light in firing circuit tester will light.

4. Grasp manual elevation crank handle, squeeze palm switch, and press trigger.

NOTE B: Light in firing circuit tester will light.

5. Squeeze power control handle palm switches and triggers.

NOTE C: Light in firing circuit tester will light.

6. Note on DA Form 2404 anytime light in firing circuit tester does not light.

B. FIRING CIRCUITS CHECK, CIRCUIT TESTER SHOULD NOT LIGHT

1. Tell Loader to lock turret traverse lock.
2. Squeeze power control handle palm switches and triggers while rotating Gunner's handles in azimuth a small amount.

NOTE A: Light in firing circuit tester will not light.

3. Lock main gun elevation travel lock (see Task 4A, Step 4h).
4. Tell Loader to unlock turret traverse lock.
5. Squeeze power control handle palm switches and triggers while rotating Gunner's handles in elevation a small amount.

NOTE B: Light in firing circuit tester will not light.

6. Turn GUN SELECT switch to TRIGGER SAFE.
7. Squeeze power control handle palm switches and triggers.

NOTE C: Light in firing circuit tester will not light.

8. Tell Loader to move GUN/TURRET DRIVE switch to MANUAL.
9. Squeeze power control handle palm switches and triggers.

NOTE D: Light in firing circuit tester will not light.

10. Unlock main gun elevation travel lock (see Task 4A, Step 4b).
11. Tell Loader to move GUN/TURRET DRIVE switch to POWERED.
12. Remove firing circuit tester.
13. Note on DA Form 2404 any time light in firing circuit tester lights.

#### MEASUREMENT

##### During Training:

Time - Between end of initiating stimuli and completion of Step 12, Part B (or Step 13 if deficiencies are noted on DA Form 2404).

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

##### End of Training:

Time - Between end of initiating stimuli and completion of Step 12, Part B (or Step 13 if deficiencies are noted on DA Form 2404).

Accuracy - As indicated by:

- . Light in firing tester lights during Part A tests.
- . Light in firing tester does not light during Part B tests.
- . Deficiencies are noted on DA Form 2404.

#### REFERENCES

DEP 9-2350-255-10-1; pp. 2-129 to 2-130.

## TASK 8C: PERFORM BORESIGHT CHECK

### CONDITIONS/STIMULUS

**System State:** Table C, Column 8C; and, a boresight target at a range near 1200 meters, and a muzzle borescope inserted in main gun muzzle so that top and bottom witness marks on gun muzzle are aligned with marks on borescope, and eyepiece is on right of gun tube.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** Task 7C is completed.

### ACTION

- Gunner will:**
1. Turn GUN SELECT switch to MAIN.
  2. Turn FIRE CONTROL MODE switch to EMER.
  - 3a. Insert 1200 meters range into computer manually (see Task 2G).
  - or 3b. Insert 1200 meters range by lasing on target (see Task ).
  4. Press BORESIGHT key on computer control panel.
  5. Turn FLTR/CLEAR/SHTR switch to FLTR or CLEAR.
  6. View through GPS eyepiece and lay borescope reticle dot on clearly defined point on target by laying gun from low to high and from left to right.

NOTE A: Do not overshoot and return.

7. Verify that GPS and borescope reticles are  $\pm$  0.3 mils.

NOTE B: Complete GPS boresight procedure (see Task 1K) and boresight muzzle reference sensor (see Task 2K) if GPS and borescope reticles are not  $\pm$  0.3 mils.

8. Turn GUN SELECT switch to TRIGGER SAFE.
9. Turn FIRE CONTROL MODE switch to NORMAL.

### MEASUREMENT

**During Training:**

Time - Between end of initiating stimuli and completion of Step 9.

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**

Time - Between end of initiating stimuli and completion of Step 9.

Accuracy - As indicated by GPS and borescope reticles  $\pm$  0.3 mils.

REFERENCES

DEP 9-2350-255-10-1; p. 2-130, pp. 2-158 to 2-159.

## TASK 9C: ALIGN MUZZLE REFERENCE SENSOR

### CONDITIONS / STIMULUS

System State: Table C, Column 9C; and, a target that produces heat at a range near 1200 meters.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 8C is completed.

### ACTION

Gunner will: 1. Set MRS switch to IN.  
2. Squeeze palm switches on power control switches and hold until main gun moves to zero elevation.

NOTE A: Main gun may move abruptly when palm switches are squeezed.

NOTE B: Do not press range buttons on power control handles. MRS reticle will be damaged if LRF is fired while MRS key is lit.

3. View through GPS eyepiece and release palm switches.  
4. Move RETICLE ADJUST toggle on computer control panel as necessary to center GPS reticle in MRS reticle.  
5. Set MRS switch to OUT.

NOTE C: MRS key light will go out. MRS data is now entered in the computer for use in ballistic solutions.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 5.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 5.  
Accuracy - As indicated by:  
. MRS reticle centered with GPS reticle.  
. MRS data entered into computer ballistic solutions.

### REFERENCES

DEP 9-2350-255-10-1; pp. 2-131 to 2-132.

## TASK 10C: PERFORM CROSSWIND SENSOR CHECK

### CONDITIONS/STIMULUS

System State: Table C, Column 10C; and, Crosswind Sensor erected and covered.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 9C is completed.

### ACTION

- Gunner will:
1. Manually insert 5 degrees cant into computer (See Task 2G).
  2. Press CROSSWIND key on computer control panel.

NOTE A: Light in CROSSWIND key will come on and crosswind sensor output value in miles per hour will appear in computer display.

3. Clean crosswind sensor if value in computer display is greater than 0 mph.
4. Notify TC if value does not go to zero after cleaning crosswind sensor.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 2 (or Step 3 or 4 or both, if required).  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 2 (or Step 3 or 4 or both, if required).  
Accuracy - As indicated by:

- . Crosswind sensor value in computer display is 0.
- . TC is notified if value in computer display does not go to zero after cleaning crosswind sensor.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-132.1

**MODULE D. PERFORM DETAILED CHECKS**

**CONDITIONS/STIMULUS**

**System State:** Table D, Column 1D.  
**Gunner Location:** In Gunner's station.  
**Initiating Stimuli:** TC tells Gunner to perform detailed checks.

**ACTION**

**Gunner will:**

- 1D. Perform computer data check.**
- 2D. Perform cent unit check.**
- 3D. Perform lead accuracy check.**
- 4D. Perform super-elevation check.**

TABLE D

POSITION OF CONTROLS FOR TASKS IN MODULE D  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS			
	TASK			
	1D	2D	3D	4D
Computer control panel power switch	ON	ON	ON	ON
GUN SELECT switch	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE
GUN/TURRET DRIVE switch	POWERED	POWERED	POWERED	POWERED
LRP RANGE switch	SAFE	SAFE	SAFE	SAFE
Ballistic door handles	OPEN/ DAYLIGHT	OPEN/ DAYLIGHT	OPEN/ DAYLIGHT	OPEN/ DAYLIGHT
Main gun elevation travel lock	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED
Turret traverse lock	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED
TURRET POWER switch	ON	ON	ON	ON
VEHICLE MASTER POWER switch	ON	ON	ON	ON
Domelight	ON	ON	ON	ON
FIRE CONTROL MODE switch	NORMAL	NORMAL	NORMAL	NORMAL
THERMAL MODE switch	STANDBY	STANDBY	STANDBY	STANDBY

## TASK 1D: PERFORM COMPUTER DATA CHECK

### CONDITIONS/STIMULUS

**System State:** Table D, Column 1D; and, boresight and zero data stored in the computer and logged in the equipment maintenance folder on DA Form 2408-10, tube wear data stored in the computer and logged in the equipment maintenance folder on DA Form 2408-4, and current barometric pressure and air temperature.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** TC tells Gunner to perform detailed checks.

### ACTION

- Gunner will:**
1. Check ammunition temperature.
    - a. Press and release AMMO TEMP key
    - b. Enter remote thermometer temperature (in bustle ammunition storage) in computer by pressing numbered keys, if different from display.
    - c. Press ENTER key.
  2. Check barometric pressure.
    - a. Press BARO PRESS key.
    - b. Enter current barometric pressure in computer by pressing numbered keys, if different from display.
    - c. Press ENTER key.
  3. Check air temperature.
    - a. Press AIR TEMP key.
    - b. Enter current air temperature in computer by pressing numbered keys, if different from display.
    - c. Press ENTER key.
  4. Check tube wear.
    - a. Press TUBE WEAR key.
    - b. Compare display with last tube wear data on DA Form 2408-4.
    - c. Enter current tube wear data in computer by pressing numbered keys, if different from display.
    - d. Press ENTER key.
  5. Set GUN SELECT switch to MAIN.
- NOTE D: Do Steps 6 through 9 for each setting of AMMUNITION SELECT switch.
6. Set AMMUNITION SELECT switch to SABOT, HEP, BH, or HEAT.
  7. Check ammunition subtype designation.

- a. Press AMMO SUBDES key.
  - b. Compare display with ammo subtype to be used for ammo type selected (refer to chart on computer control panel door).
  - c. Enter correct ammo subtype in computer by pressing numbered keys, if necessary.
  - d. Press ENTER key.
8. Check battlesight range for each ammunition type.
- a. Press BR ADJUST key.
  - b. Compare display with battlesight range for ammo type selected.
  - c. Enter correct battlesight range for ammo type selected in computer by pressing numbered keys, if necessary.
  - d. Press ENTER key.
9. Check zero of main gun.
- a. Press ZERO key.
  - b. Compare display with recorded zero numbers on DA Form 2408-10 for ammo type selected.

NOTE E: One zero for each ammo type--subtype designation does not change value.

- c. Enter correct zero numbers by using RETICLE ADJUST toggle, if necessary (see Task 3G).
  - d. Press ENTER key.
10. Check MRS boresight.
- a. Turn MRS switch to IN.
  - b. Press BORESIGHT key.
  - c. Compare display with recorded MRS boresight numbers on DA Form 2408-10.
  - d. Enter correct MRS boresight numbers using RETICLE ADJUST toggle, if necessary (see Task 3G).
  - e. Press ENTER key.
  - f. Turn MRS switch to OUT.
11. Check boresight of main gun.
- a. Press BORESIGHT key.
  - b. Compare display with recorded main gun boresight numbers on DA Form 2408-10.

NOTE E: If display is not identical with recorded numbers, boresight the GPS and MRS (see Tasks K1 and K2).

- c. Press ENTER key.
12. Set GUN SELECT switch to coax.
13. Check coax zero.
- a. Press ZERO key.
  - b. Compare display with recorded coax zero.
  - c. Enter correct zero numbers by using RETICLE ADJUST toggle, if necessary (see Task 3G).
  - d. Press ENTER key.
14. Set GUN SELECT switch to TRIGGER SAFE.

## MEASUREMENT

**During Training:**                   Time - Between end of initiating stimuli and completion of Step 14.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**                   Time - Between end of initiating stimuli and completion of Step 14.  
Accuracy - As indicated by:  
    . Match between boresight and zero data logged in equipment maintenance folder on DA Form 2408-10 and data stored in the computer.  
    . Match between current ammunition temperature, barometric pressure, air temperature and the tube wear that stored in computer (upon completion of Step 17).

## REFERENCES

DEP 9-2350-255-10-1; pp. 2-133 to 2-135, 2-143 to 2-145.

## NOTE

The procedure described differs from that of the DEP with regard to the MRS data check (Step 9). The computer panel has been re-designed such that the M/S press key was changed to an IN/OUT switch.

## TASK 2D: PERFORM CANT UNIT CHECK

### CONDITIONS / STIMULUS

System State: Table D, Task 2D; and, a gunner's quadrant, boresight and zero data stored in the computer, and tank parked on level ground.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 1D is completed.

### ACTION

- Gunner will:
1. Measure trunnion cant with gunner's quadrant.
  2. Press CANT key on computer control panel.
  3. Verify that cant value in computer display is +0.5 degrees (5 mils) of gunner's quadrant reading.
  4. Notify TC if values are not +0.5 degrees (5 mils) of each other.

### MEASUREMENT

During Training:

Time - Between end of initiating stimuli and completion of Step 3 [or Step 4 if values are not +0.5 degrees (5 mils) of each other].

Accuracy - As indicated by match between steps given above and steps performed by gunner.

End of Training:

Time - Between end of initiating stimuli and completion of Step 3 [or Step 4 if values are not +0.5 degrees (5 mils) of each other].

Accuracy - As indicated by:

- . Cant value in computer display is +0.5 degrees (5 mils) of gunner's quadrant reading.
- . TC is notified if cant value in computer display is not +0.5 degrees (5 mils) of gunner's quadrant reading.

### REFERENCES

DEP 9-2350-255-10-1; p. 135.

### TASK 3D: PERFORM LEAD ACCURACY CHECK

#### CONDITIONS/STIMULUS

System State: Table D, Column 3D; and, boresight and zero data stored in the computer, a gridboard at 500 meters, and tank engine not running.

Gunner Location: In Gunner's station.

Initiating Stimuli: Task 2D is completed.

#### ACTION

- Gunner will:
1. Raise AUX HYDR POWER switch on Commander's control panel to ON, then to OFF, to shut off hydraulic system.
  2. Remove any hydraulic pressure in system by moving Gunner's power control handles.
  3. Turn GUN SELECT switch to MAIN.
  4. Turn AMMUNITION SELECT switch to SABOT.
  5. Manually input the following values into computer (see Tasks 1G and 2G).

. RANGE - 1451	AIR TEMP - 59.0° F
. CANT - 0	AMMO TEMP - 69.8° F
. CROSSWIND - 0	BARO PRESS - 29.92
. LEAD - 0	TUBE WEAR - .0
. SUBDES - 0	

NOTE A: Do not change ZERO, BORESIGHT, or MRS values.

6. Squeeze Gunner's power control handle palm switch for about 30 seconds to induce solution.

NOTE B: Gyco Reticle Compensation (GRC) must decay to zero.

7. View through GPS eyepiece and lay GPS reticle with manual crank handles on fixed reference point (center of 500 meter grid board).
8. Squeeze and hold Gunner's power control handle palm switch.
9. Press LEAD key on computer control panel.
10. Manually input +2.5 mil/sec rate (see Task 2G).
11. Press ENTER key on computer control panel.
12. Press RANGE key (to call up range of 1451).
13. Press ENTER key (to re-enter range).
14. Wait 30 seconds to induce solution, then view through GPS eyepiece to verify that reticle has moved 2.5 mils (or 5 blocks on grid-board).

NOTE C: Aim point on gridboard has shifted 2.5 mil; that is, edge of center reticle line is now aim point.

NOTE D: Range must be 1451 to provide one second time of flight.

NOTE E: 1 block = 9.84 inches = 0.5 mils @  
500 meters  
1 block = 10.0 inches = 0.5 mils @  
508 meters

15. Press LEAD key.
16. Manually input -2.5 mil/sec rate (see Task 2G).
17. Press ENTER key.
18. Press RANGE key (to call up range of 1451).
19. Press ENTER key (to re-enter range).
20. Wait 30 seconds to induce solution; then, view through GPS eyepiece to verify that reticle has moved 5.0 mil (or 10 + 0.5 blocks on gridboard).
21. Release Gunner's power control handle palm switch.
22. Press CROSSWIND, CANT, LEAD and RANGE keys to place functions back in automatic.
23. Turn GUN SELECT switch to TRIGGER SAFE.

#### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 23.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 23.  
Accuracy - As indicated by:  
. GPS reticle is 2.5 mils (5 blocks on gridboard) to left of center of 500 meter gridboard.

#### REFERENCES

DEP 9-2350-255-10; pp. 2-136 to 2-137.

## TASK 4D: PERFORM SUPERELEVATION CHECK

### CONDITIONS/STIMULUS

System State: Table D, Column 4D; and, zero target at a range near 1200 meters, a gunner's quadrant, and Table A (Computer's Solution), TM 9-2350-255-10-1.

Gunner Location: In Gunner's station.

Initiating Stimuli: Task 3D is completed.

### ACTION

- Gunner will:
1. Raise AUX HYDR POWER switch on Commander's control panel to ON to restart auxiliary hydraulic system (if tank engine not running).
  2. Select one of the 20 lines in Table A as information input line.

NOTE A: The first column of Table A (O TYPE) references ammo type. Ammo type codes used for computer manual input are on inside of computer control panel door. The last two columns of Table A are answer columns.

3. Manually enter all data except RANGE METERS from selected line of Table A into computer (see Tasks 1G and 2G).
4. Enter 1200 meters for range.
5. Press BORESIGHT key.
6. View through GPS eyepiece and lay GPS reticle on zero target using manual controls.
7. Place gunner's quadrant on breech gunner quadrant pads.
8. Write down gun elevation angle (Angle #1).
9. Remove gunner's quadrant.
10. Squeeze Gunner's power control handle palm switch.
11. Manually enter the RANGE METERS from selected line of Table A (see Task 2G).
12. View through GPS eyepiece, hold Gunner's power control handle palm switch closed 5 seconds and re-lay on zero target.
13. Adjust to final aim point manually.
14. Place gunner's quadrant on breech gunner quadrant pads.
15. Write down gun elevation angle (Angle #2).
16. Subtract Angle #1 from Angle #2 (Angle #2 - Angle #1).

NOTE B: The answer is positive and equal to the number under ELEV MILS from selected line of Table A.

17. Press CROSSWIND, CANT, LEAD, and RANGE keys to place functions back in automatic.
18. Return all manual inputs to computer to their appropriate values (see Tasks 1G and 2G).

### MEASUREMENT

During Training:                      Time - Between end of initiating stimuli and completion of Step 18.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:                      Time - Between end of initiating stimuli and completion of Step 18.  
Accuracy - As indicated by:  
    . Difference between Angle #2 and Angle #1. is equal to the number under ELEV MILS from selected line of Table A.

### REFERENCES

DEP 9-2350-255-10-1; pp. 2-138 to 2-140.

## **MODULE E. TROUBLESHOOT FIRE CONTROL AND WEAPON SYSTEMS MALFUNCTIONS**

### **CONDITIONS/STIMULUS**

**System State:** Table 1E and any one or more malfunctions listed in Table 2E.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** Any one of the 22 malfunctions listed on Table 2E occurs.

### **ACTION**

**Gunner will:**

- E1. Identify the malfunction (see Table 2E).**
- E2. Take the recommended corrective actions.**
- E3. Notify TC if recommended corrective actions do not correct.**

**TABLE 1E****POSITION OF CONTROLS FOR MALFUNCTIONS IN MODULE E  
WHEN ANY MALFUNCTION OCCURS**

<b>CONTROLS</b>	<b>POSITION</b>
Computer control panel power switch	ON
GUN SELECT switch	TRIGGER SAFE
GUN/TURRET DRIVE switch	POWERED
LRF RANGE switch	SAFE
Ballistic door handles	OPEN/ DAYLIGHT
Main gun elevation travel lock	UNLOCKED
Turret traverse lock	UNLOCKED
TURRET POWER switch	ON
VEHICLE MASTER POWER switch	ON
Domelight	ON
FIRE CONTROL MODE switch	NORMAL
THERMAL MODE switch	STANDBY

TABLE 2E

## FIRE CONTROL AND WEAPON SYSTEMS MALFUNCTIONS

<u>SYSTEM</u>	<u>MALFUNCTION</u>
COMPUTER	1. Computer control panel does not operate: No lights on panel.
	2. Computer control panel light test does not work.
	3. Computer does not perform self test.
	4. Computer failure: Failure number 1 on computer control panel display.
	5. Gant sensor failure: Failure number 2 on computer control panel display.
	6. Crosswind sensor failure: Failure number 3 on computer control panel.
	7. Lead (azimuth rate) failure: Failure number 4 on computer control panel display.
	8. Elevation rate failure: Failure number 5 on computer control panel display.
	9. Data link failure: Failure number 7 on computer control panel display.
	10. Laser rangefinder failure: Failure number 8 on computer control panel display.
GPS	11. GPS poor or no reticle.
	12. GPS F symbol appears in GPS.
GAS	13. GAS poor or no reticle.
TIS	14. TIS does not work when THERMAL MODE switch turned from STANDBY to ON.
	15. TIS fault lights ON.
LRF	16. Laser rangefinder incorrect or no range
WEAPONS	17. Stabilization does not work.
	18. Turret will not traverse/elevate, rough tracking, or large inhibit delays.
	19. Zeroing error more than 0.5 mils.
	20. Main gun rounds do not hit target.
	21. Main gun cannot be fired from power control handles.
	22. Coaxial machinegun does not fire.

**MALFUNCTION #1:** Computer control panel does not operate: No lights on panel.

**ACTION**

Gunner will: 1. Set LRF RANGE switch to ARM 1ST RTN or ARM LAST RTN.  
2. Set TURRET POWER switch on commander's panel to ON.  
3. Check computer cables for proper connection; and,  
4a. Notify TC if cables are properly connected.  
or 4b. Properly connect cables.

NOTE A: Panel lights should come on after Step 4b is performed.

**MEASUREMENT**

During Training: Time - Between end of initiating stimuli and completion of Step 4.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 4.  
Accuracy - As indicated by:  
. Panel lights come on.  
. TC is notified if cables are properly connected (Step 4a or 4b) and panel lights do not come on.

**REFERENCES**

DEP 9-2350-255-10-1; p. 3-23, #46.

MALFUNCTION #2: Computer control panel light test does not work.

ACTION

Gunner will: 1. Check that computer power switch is ON.  
2. See Task 7B, Steps 2, 3, 4, and 5.

MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 2.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 2.  
Accuracy - As indicated by:  
. All indicator lamps on ballistic computer light when computer power switch is ON and TEST button pushed.  
. TC notified if no lamps light.

REFERENCES

DEP 9-2350-255-10-1; p. 3-22, #45.

**MALFUNCTION #3: Computer does not perform self test.**

**ACTION**

- Gunner will:
1. Turn computer power switch ON.
  2. Turn FIRE CONTROL MODE switch to NORMAL.
  3. Squeeze power control handle palm switches.
  4. Press ENTER button on computer panel.
  5. Connect loose computer cables.
  6. Re-set any circuit breakers in circuit breaker
  7. Notify TC if circuit breakers do not stay ON.

**MEASUREMENT**

- During Training:
- Time - Between end of initiating stimuli and beginning self test again (or completion of Step 7 if circuit breakers do not stay on).
  - Accuracy - As indicated by match between steps given above and steps performed by Gunner.
- End of Training:
- Time - Between end of initiating stimuli and beginning self test again (or completion of Step 7 if circuit breakers do not stay on).
  - Accuracy - As indicated by:
    - . Computer performs self test.
    - . TC is notified if circuit breakers do not stay on.

**REFERENCES**

DEP 9-2350-255-10-1; p. 3-20, #37.

MALFUNCTION #4: Computer failure: Failure number 1 on computer control panel display.

ACTION

- Gunner will:
1. Enter AMMO TEMP (see Task 1G) and re-run test.
  2. If failure number 1 occurs again, enter all manual inputs (Task 1G) and recharge computer battery by leaving TURRET POWER switch set to ON for one hour.

MEASUREMENT

During Training:                   Time - Between end of initiating stimuli and beginning self test again.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:                   Time - Between end of initiating stimuli and beginning self test again.  
Accuracy - As indicated by:  
                                      . Computer performs self test.

REFERENCES

DEP 9-2350-255-10-1; p. 3-20, #38.

MALFUNCTION #5: Cant sensor failure: Failure number 2 on computer panel display.

ACTION

- Gunner will:
1. Tell Driver to move tank to level ground if tilt is more than 17 degrees left or right.
  2. Connect any loose cables to cant sensor.
  3. Notify TC if none of the cables was loose.

MEASUREMENT

During Training:                      Time - Between end of initiating stimuli and beginning self test again (or notifying TC if none of the cables was loose).  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:                      Time - Between end of initiating stimuli and beginning self test again (or notifying TC if none of the cables was loose).  
Accuracy - As indicated by:  
    . Computer performs self test.  
    . TC is notified if circuit breakers do not stay on.

REFERENCES

DEP 9-2350-255-10-1; p. 3-21, #39.

**MALFUNCTION #6:** Crosswind sensor failure: Failure number 3 on computer control panel display.

**ACTION**

- Gunner will:
1. Connect any loose crosswind sensor cables.
  2. Check crosswind sensor (see Task 10C).
  3. Cover crosswind sensor during test if wind is gusting.
  4. Notify TC if failure still appears.

**MEASUREMENT**

During Training: Time - Between end of initiating stimuli and beginning self test again (or notifying TC if failure still appears).

Accuracy - As indicated by match between steps given above and steps performed by Gunnar.

End of Training: Time - Between end of initiating stimuli and beginning self test again (or notifying TC if failure still appears).

Accuracy - As indicated by:  
. Computer performs self test.  
. TC is notified if failure still appears.

**REFERENCES**

DEP 9-2350-255-10-1; p. 3-21, #40.

MALFUNCTION #7: Lead (azimuth rate) failure: Failure number 4 on computer control panel display.

ACTION

- Gunner will:
1. If Gunner's (TC's) power control handles were rotated in azimuth during test, run self test again, keeping the power control handles centered.
  2. Null GPS reticle drift (see Task 1B, Step 9).
  3. Insure GUN/TURRET DRIVE - POWERED light is lit.
  4. Insure FIRE CONTROL MODE - NORMAL light is lit.
  5. Notify TC if failure still appears.

MEASUREMENT

During Training:                      Time - Between end of initiating stimuli and beginning self test again (or notifying TC if failure still appears).  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:                      Time - Between end of initiating stimuli and beginning self test again (or notifying TC if failure still appears).  
Accuracy - As indicated by:  
    . Computer performs self test.  
    . TC is notified if failure still appears.

REFERENCES

DEP 9-2350-255-10-1; p. 3-21, #41; p. 3-18, #33.

MALFUNCTION #8: Elevation rate failure: Failure number 5 on computer control panel display.

ACTION

- Gunner will:
1. If Gunner's (TC's) power control handles were rotated in elevation during test, run self test again, keeping the power control handles centered.
  2. Null GPS reticle drift (see Task 1B, Step 9).
  3. Insure GUN/TURRET DRIVE - POWERED light is lit.
  4. Insure FIRE CONTROL MODE - NORMAL light is lit.
  5. Notify TC if failure still appears.

MEASUREMENT

Time - Between end of initiating stimuli and beginning self test again (or notifying TC if failure still appears).

During Training: Accuracy - As indicated by match between steps given above and steps performed by Gunner.

Time - Between end of initiating stimuli and beginning self test again (or notifying TC if failure still appears).

End of Training: Accuracy - As indicated by:

- . Computer performs self test.
- . TC is notified if failure still appears.

REFERENCES

DEP 9-2350-255-10-1; p. 3-22, #42; p. 3-18, #33.

**MALFUNCTION #9:** Data link failure: Failure number 7 on computer control panel.

**ACTION**

- Gunner will:
1. Move main gun at least 3 degrees away from maximum elevation or depression.
  2. Insure GUN/TURRET DRIVE - POWERED light is lit.
  3. Insure FIRE CONTROL MODE - NORMAL light is lit.
  4. If stabilization drift occurs with FIRE CONTROL MODE set to EMER (see Task 2B, Step 8), notify TC.

**MEASUREMENT**

Time - Between end of initiating stimuli and beginning self test again (or notifying TC if failure still appears).

During Training:

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

Time - Between end of initiating stimuli and beginning self test again (or notifying TC if failure still appears).

End of Training:

Accuracy - As indicated by:  
. Computer performs self test.  
. TC is notified if failure still appears.

**REFERENCES**

DEP 9-2350-255-10-1; p. 3-22, #43; p. 3-18, #33.

MALFUNCTION #10: Laser rangefinder failure: Failure number 8 on computer panel display.

ACTION

- Gunner will:
1. Set LRF RANGE switch to SAFE.
  2. Turn TURRET POWER switch OFF and back ON to reset laser.
  3. Notify TC if failure still appears.

MEASUREMENT

During Training:                      Time - Between end of initiating stimuli and beginning self test again (or notifying TC if failure still appears).  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:                      Time - Between end of initiating stimuli and beginning self test again (or notifying TC if failure still appears).  
Accuracy - As indicated by:  
    . Computer performs self test.  
    . TC is notified if failure still appears.

REFERENCES

DEP 9-2350-255-10-1; p. 3-22, #44.

**MALFUNCTION #11: GPS poor or no reticle.**

**ACTION**

- Gunner will:
1. Adjust RETICLE knob on upper GPS panel.
  2. Clean GPS window and lens.
  3. Notify TC if GPS reticle cannot be lit.

**MEASUREMENT**

**During Training:**

Time - Between end of initiating stimuli and completion of Step 2 (or Step 3 if GPS reticle cannot be lit).

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**

Time - Between end of initiating stimuli and completion of Step 2 (or Step 3 if GPS reticle cannot be lit).

Accuracy - As indicated by:

- . GPS reticle clear.
- . TC notified if GPS reticle cannot be lit.

**REFERENCES**

DEP 9-2350-255-10-1; p. 3-19, #35.

MALFUNCTION #12: GPS F symbol appears in GPS.

ACTION

- Gunner will:
1. Set LRF RANGE switch to SAFE.
  2. Run computer manual self test (see Task 3C).  
NOTE A: If it has a failure, auto test failure symbols will stay on.
  3. Re-set any circuit breakers in circuit breaker panel on turret networks box (located in Loader's station).
  4. Connect loose turret cable connections.
  5. Clean crosswind sensor (see Task 10C) if, with wind sensor covered, computer control panel CROSSWIND value reads more than 3 mph.
  6. Notify TC if TIS yellow FAULT light is ON.

MEASUREMENT

During Training: Time - Between end of initiating stimuli and F symbol not on in GPS (or TC notified if TIS yellow FAULT light is ON).  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and F symbol not on in GPS (or TC notified if TIS yellow FAULT light is ON).  
Accuracy - As indicated by:  
. GPS F symbol does not appear in GPS.  
. TC is notified if TIS yellow FAULT light is ON.

REFERENCES

DEP 9-2350-255-10-1; p. 3-20, #36.

MALFUNCTION #13: GAS poor or no reticle.

ACTION

- Gunner will:
1. Clear and clean front of GAS.
  2. Adjust GAS focus (see Task 6B).
  3. Adjust RETICLE knob on GAS panel.
  4. Clean lens.
  5. Notify TC if reticle cannot be adjusted.

MEASUREMENT

- During Training:
- Time - Between end of initiating stimuli and reticle adjusted (or TC notified if reticle cannot be adjusted).
  - Accuracy - As indicated by match between steps given above and steps performed by Gunner.
- End of Training:
- Time - Between end of initiating stimuli and reticle adjusted (or TC notified if reticle cannot be adjusted).
  - Accuracy - As indicated by:
    - . GAS reticle adjusted.
    - . TC notified if reticle cannot be adjusted.

REFERENCES

DEP 9-2350-255-10-1; p. 3-17, #29.

MALFUNCTION #14: TIS does not work when THERMAL MODE switch turned from STANDBY to ON.

ACTION

- Gunner will:
1. Turn THERMAL MODE switch back to STANDBY then to OFF for 3 seconds.
  2. Turn THERMAL MODE switch back to ON.
  3. Notify TC if TIS does not work.

MEASUREMENT

During Training:                      Time - Between end of initiating stimuli and completion of Step 2 (or Step 3 if TIS does not work).  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:                      Time - Between end of initiating stimuli and completion of Step 2 (or Step 3 if TIS does not work).  
Accuracy - As indicated by:  
    . TIS works when THERMAL MODE switch turned from STANDBY to ON.  
    . TC notified if TIS does not work.

REFERENCES

DEP 9-2350-255-10-1; p. 3-18, #31.

MALFUNCTION #15: TIS fault lights ON.

ACTION

Gunner will: 1. Notify TC if EU (electronics unit), or RCVR (receiver), or both lights come ON.

MEASUREMENT

During Training:                   Time - Between end of initiating stimuli and notification of TC that one or both lights are on.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:                   Time- Between end of initiating stimuli and notification of TC that one or both lights are on.  
Accuracy - TC is notified if EU, or RCVR, or both lights come ON.

REFERENCES

DEP 9-2350-255-10-1; p. 3-18, #32.

**MALFUNCTION #16: Laser rangefinder incorrect or no range.**

**ACTION**

- Gunner will:
1. Press RANGE button on computer control panel if RANGE light is lit.
  2. Set LRF RANGE switch to SAFE then back to either ARM 1ST RTN or ARM LAST RTN.
  3. Re-set any circuit breakers in circuit breaker panel on turret networks box (located in Loader's station).
  4. Turn FIRE CONTROL MODE switch to EMER or NORMAL.
  5. Verify that GPS and TIS reticles are on same aiming point.
  6. Notify TC if laser rangefinder still incorrect or no range.

**MEASUREMENT**

- Time - Between end of initiating stimuli and laser rangefinder correct (or TC notified if rangefinder incorrect or no range).
- During Training:
- Accuracy - As indicated by match between steps given above and steps performed by Gunner.
- Time - Between end of initiating stimuli and laser rangefinder correct (or TC notified if rangefinder incorrect or no range).
- End of Training:
- Accuracy - As indicated by:
- . Laser rangefinder correct.
  - . TC notified if laser rangefinder incorrect or no range.

**REFERENCES**

DEP 9-2350-255-10-1; pp. 3-17 to 3-18, #30.

**MALFUNCTION #17: Stabilization does not work.**

**ACTION**

- Gunner will:
1. Notify TC if yellow POWERED light on Loader's panel is not ON.
  2. Tell Driver to pivot steer and run over a bump.
  3. Perform computer manual self test (see Task 3C).
  4. Notify TC if stabilization still does not work.

**MEASUREMENT**

- During Training:
- Time - Between end of initiating stimuli and stabilization working (or TC notified if stabilization still does not work).
  - Accuracy - As indicated by match between steps given above and steps performed by Gunner.
- End of Training:
- Time - Between end of initiating stimuli and stabilization working (or TC notified if stabilization still does not work).
  - Accuracy - As indicated by:
    - . Stabilization works.
    - . TC notified if stabilization does not work.

**REFERENCES**

DEP 9-2350-255-10-1; p. 3-17, #28.

**MALFUNCTION #18:** Turret will not traverse/elevate, rough tracking, or large inhibit delays.

**ACTION**

- Gunner will:
1. Remove any material jammed between turret and hull or in gun shield.
  2. Operate manual traverse handle to make sure palm lever is fully released. (See Task 4A, Step 4).
  3. Notify TC if Gunner's power control handles are inoperative.
  4. Notify TC if malfunction still exists.

**MEASUREMENT**

During Training:

Time - Between end of initiating stimuli and correction of the malfunction (or TC notified if malfunction still exists).

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:

Time - Between end of initiating stimuli and correction of the malfunction (or TC notified if malfunction still exists).

Accuracy - As indicated by:

- . Turret traverses, elevates, tracks smooth, with no large inhibit delays.
- . TC notified if malfunction still exists.

**REFERENCES**

DEP 9-2350-255-10-1; p. 3-18, #33.

**MALFUNCTION #19:** Zeroing error more than 0.5 mils.

**ACTION**

- Gunner will:
1. Perform computer self test (See Task 3C).
  2. Boresight main gun (See Module K).
  3. Zero main gun (See Module L).
  4. Notify TC if zeroing error still more than 0.5 mils.

**MEASUREMENT**

- During Training:
- Time - Between end of initiating stimuli and completion of Step 3 (or Step 4 if zeroing error remains more than 0.5 mils).
  - Accuracy - As indicated by match between steps given above and steps performed by Gunner.
- End of Training:
- Time - Between end of initiating stimuli and completion of Step 3 (or Step 4 if zeroing error remains more than 0.5 mils).
  - Accuracy - As indicated by:
    - . Zeroing error less than 0.5 mils.
    - . TC notified if zeroing error remains more than 0.5 mils.

**REFERENCES**

DEP 9-2350-255-10-1; p. 3-24, #50.

**MALFUNCTION #20:** Main gun rounds do not hit target.

**ACTION**

- Gunner will:
1. Perform computer self test (See Task 3C).
  2. Align muzzle reference sensor (See Task 9C).
  3. Recall zero values entered in computer for each ammunition type and compare with values recorded in equipment maintenance folder on DA Form 2408-10.
  4. Enter recorded values for any ammunition type different than entered values.
  5. Notify TC if unable to enter recorded zero values.

**MEASUREMENT**

During Training:

Time - Between end of initiating stimuli and completion of Step 4 (or Step 5 if unable to enter recorded zero values).

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:

Time - Between end of initiating stimuli and completion of Step 4 (or Step 5 if unable to enter recorded zero values).

Accuracy - As indicated by:

- . Zero values entered in computer for each ammunition type are same as values recorded in equipment maintenance folder on DA Form 2408-10.
- . TC notified if unable to enter recorded zero values.

**REFERENCES**

DEP 9-2350-255-10-1; p. 3-19, #34.

**MALFUNCTION #21: Main gun cannot be fired from power control handles.**

**ACTION**

- Gunner will:
1. Attempt to fire main gun using MANUAL FIRING device.
  2. Notify TC if main gun fires.
  3. Tell Loader to check firing pin, spring, and firing contact breechblock components for damage, dirt, or oil and replace damaged components and clean dirty and oily ones.
  4. Tell Loader to check for carbon buildup in firing pin hole and clean carbon with reamer assembly.
  5. Notify TC if main gun still cannot be fired from power control handles.

**MEASUREMENT**

During Training:

Time - Between end of initiating stimuli and completion of Step 4 (or Step 5 if main gun cannot be fired from power control handles).

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:

Time - Between end of initiating stimuli and completion of Step 4 (or Step 5 if main gun cannot be fired from power control handles).

Accuracy - As indicated by:

- . Main gun can be fired from power control handles.
- . TC notified if main gun cannot be fired from power control handles.

**REFERENCES**

DEP 9-2350-255-10-1; p. 3-24, #49.

**MALFUNCTION #22: Coaxial machinegun does not fire.**

**ACTION**

- Gunner will:
1. Connect electrical lead to machinegun solenoid if disconnected.
  2. Attempt to fire machinegun from power control handles (See Task 5J).
  3. Attempt to fire machinegun using manual trigger (See Task 5J).
  4. Notify TC if machinegun fires using manual trigger but not from power control handles.

**MEASUREMENT**

Time - Between end of initiating stimuli and firing of machinegun from power control handles or firing machinegun using manual trigger and notifying TC.

During Training: Accuracy - As indicated by match between steps given above and steps performed by Gunner.

Time - Between end of initiating stimuli and firing of machinegun from power control handles or firing machinegun using manual trigger and notifying TC.

Accuracy - As indicated by:

- . Machinegun fires from power control handles.
- . TC notified if machinegun fires using manual trigger but not from power control handles.

**REFERENCES**

DEP 9-2350-255-10-1; p. 3-26, #56.

## MODULE F. OPERATE POWER CONTROL HANDLES

### CONDITIONS/STIMULUS

System State: Table F, Column 1F; and, Module A completed.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Requirement to operate power control handles to traverse turret, or elevate/depress main gun, or both.

### ACTION

Gunner will:

- 1F. Traverse turret using power control handles.
- 2F. Elevate/depress main gun using power control handles.
- 3F. Range to target using LRF.

TABLE F

POSITION OF CONTROLS FOR TASKS IN MODULE F  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASK	
	1F	2F
Computer control panel power switch	OFF	OFF
GUN SELECT switch	TRIGGER SAFE	TRIGGER SAFE
GUN/TURRET DRIVE switch	POWERED	POWERED
LRP RANGE switch	SAFE	SAFE
Ballistic door handles	OPEN OR CLOSED	OPEN OR CLOSED
Main gun elevation travel lock	UNLOCKED	UNLOCKED
Turret traverse lock	UNLOCKED	UNLOCKED
TURRET POWER switch	ON	ON
VEHICLE MASTER POWER switch	ON	ON
Domelight	ON	ON
FIRE CONTROL MODE	NORMAL	NORMAL

## TASK 1F: TRAVERSE TURRET USING POWER CONTROL HANDLES

### CONDITIONS/STIMULUS

System State: Table F, Column 1F.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Tank Commander tells Gunner to traverse turret 90° in either direction and in opposite direction until gun tube is centered over front deck, using power control handles.

### ACTION

- Gunner will:
1. Grasp power control handles and squeeze either or both power control handle palm switches.
  2. With palm switches squeezed, turn power control handles to traverse turret.

NOTE A: Turret traverses clockwise while handles are turned clockwise of center position; turret traverses counterclockwise while handles are turned counterclockwise of center position.

NOTE B: Traversing speed increases as handles are turned further and slows as handles are turned toward center position.

NOTE C: Releasing palm switches causes turret to stop moving. When power control handles are released, handles return to center position.

### MEASUREMENT

During Training:

Time - Between end of initiating stimuli and return of gun tube to center position over front deck.

Accuracy - As indicated by match between steps given above and actions performed by Gunner.

End of Training:

Time - Between end of initiating stimuli and return of gun tube to center position over front deck.

Accuracy - As indicated by:

- . Turret is traversed at least 90° either direction.
- . Turret is traversed opposite direction until gun is centered over front deck.

### REFERENCES

DEP 9-2350-255-10-1; pp. 2-141 to 2-143.

## TASK 2F: ELEVATE AND DEPRESS MAIN GUN USING POWER CONTROL HANDLES

### CONDITIONS/STIMULUS

System State: Table F, Column 2F.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Tank Commander tells Gunner to elevate main gun 10° above zero elevation, depress main gun 10° below zero elevation, and return main gun to zero elevation, using power control handles.

### ACTION

- Gunner will:
1. Grasp power control handles and squeeze either or both power control handle palm switches.
  2. With palm switches squeezed, rotate power control handles to elevate or depress main gun.

NOTE A: Main gun is elevated while power control handles are rotated toward gunner; main gun is depressed while handles are rotated away from gunner.

NOTE B: Rate of movement of main gun increases as handles are rotated further and slows as handles are rotated toward center position.

NOTE C: Releasing palm switches causes main gun to stop moving. When power control handles are released, handles return to center position.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and return of gun tube to zero elevation.  
Accuracy - As indicated by match between steps given above and actions performed by Gunner.

End of Training: Time - Between end of initiating stimuli and return of gun tube to zero elevation.  
Accuracy - As indicated by:  
. Gun is elevated a minimum of 10° above zero elevation.  
. Gun is depressed a minimum of 10° below zero elevation.  
. Gun is returned to zero elevation.

### REFERENCES

DEF 9-2350-255-10-1; pp. 2-141 to 2-143.

## TASK 3F: RANGE TO TARGET USING LRF

### CONDITIONS/STIMULI

System State: Table F, Column 1F; target at 200-8000 meters.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Requirement to range to target using LRF.

### ACTION

- Gunner will:
1. Prepare GPS (or TIS) for operation (see Tasks 2B, 3B, 4B).
  2. Set LRF RANGE switch to ARM LST RTN.
  3. View through GPS eyepiece and lay GPS (or TIS) reticle on target using power control handles (see Tasks 1F, 2F).
  4. Press one or both laser buttons and release.
  5. If target is moving, keep reticle on target for at least three seconds while tracking smoothly for lead angle.
  6. Check bottom of GPS view for: ready to fire symbol, range in meters, multiple returns bar, fault symbol
    - a. If ready to fire symbol appears, and multiple returns bar does not appear (or appears and range is valid), task is completed.
    - b. If multiple returns bar appears and range is not valid, range to target again; set LRF RANGE switch to ARM LST RTN if necessary.
    - c. If valid range cannot be obtained, range (estimated) must be input to computer manually (see Task 2G), or indexed by TC.

NOTE A: If range in meters is flashing, main gun should not be fired because target is out of range. (Less than 200 meters or more than 4000 meters).

NOTE B: If fault symbol appears, place LRF RANGE in SAFE. Do not use LRF until cause is determined and corrected.

### MEASUREMENT

During Training:

- Time - Between end of initiating stimuli and completion of Step 6.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**

**Time** - Between end of initiating stimuli and completion of Step 6.  
**Accuracy** - As indicated by:

- . GPS reticle laid on target.
- . (if moving) Target tracked smoothly for at least 3 seconds.
- . Correct range entered into computer.

**REFERENCE**

DEP 9-2350-255-10-1. p. 2-143, pp. 2-115 to 2-119, p. F-6.

MODULE G. MANUALLY INPUT FIRE CONTROL DATA  
INTO BALLISTIC COMPUTER

CONDITIONS/STIMULUS

System State: Table G, Column 1G; and, Module A plus Task 3C completed.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC provides new information for manual inputs to ballistic computer.

ACTION

Gunner will:

- 1G. Manually input fire control data for manual parameters into ballistic computer.
- 2G. Manually input fire control data for auto parameters into ballistic computer.
- 3G. Manually input fire control data for toggle input parameters into ballistic computer.

**TABLE G**

**POSITION OF CONTROLS FOR TASKS IN MODULE G  
WHEN TASK PERFORMANCE BEGINS**

CONTROLS	POSITION OF CONTROLS	
	TASK	
	1G	2G
Computer control panel power switch	ON	ON
GUN SELECT switch	TRIGGER SAFE	MAIN OR COAX
GUN/TURRET DRIVE switch	POWERED	POWERED
LRF RANGE switch	SAFE	SAFE
Ballistic door handles	OPEN OR CLOSED	OPEN OR CLOSED
Main gun elevation travel lock	UNLOCKED	UNLOCKED
Turret traverse lock	UNLOCKED	UNLOCKED
TURRET POWER switch	ON	ON
VEHICLE MASTER POWER switch	ON	ON
Domelight	ON	ON
FIRE CONTROL MODE	NORMAL	NORMAL

**TASK 1G: MANUALLY INPUT FIRE CONTROL DATA FOR MANUAL  
PARAMETERS INTO BALLISTIC COMPUTER**

**CONDITIONS/STIMULUS**

**System State:** Table G, Column 1G; and, Module A plus Task 3C completed, and information for manual inputs provided.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** TC provides new information for manual input to ballistic computer.

**ACTION**

- Gunner will:**
1. Turn GUN SELECT switch to MAIN or COAX, as required.
  2. Turn AMMUNITION SELECT switch to appropriate ammunition type, if GUN SELECT switch is set to MAIN.
  3. Press MANUAL INPUT key for appropriate parameter.
    - AMMO TEMP
    - BARO PRESS
    - AIR TEMP
    - AMMO SUBDES
    - BR ADJUST
    - TUBE WEAR

**NOTE A:** MANUAL INPUT key will light and previously entered value for the parameter will display on computer control panel.

4. Enter new value for the parameter on the numeric keys.

**NOTE B:** The new value must be within the limits shown on inside of computer panel door.

- 5a. If new value (displayed on computer control panel) is not within limits, the MANUAL INPUT key will flash; if that happens, press CLEAR key and repeat Step 3.

or

- 5b. If new value (displayed on computer panel) is correct, press ENTER key.

**NOTE C:** Lighted MANUAL INPUT key and display will go out.

6. Repeat procedure for each position of AMMUNITION SELECT switch for AMMO SUBDES and BR ADJUST.

**NOTE D:** Input for AMMO SUBDES for each ammunition type is given in chart on computer control panel door.

## MEASUREMENT

**During Training:**

**Time** - Between end of initiating stimuli and completion of Step 5 for the final position of the AMMUNITION SELECT switch.

**Accuracy** - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**

**Time** - Between end of initiating stimuli and completion of Step 5 for the final position of the AMMUNITION SELECT switch.

**Accuracy** - As indicated by:

- Correct manual input information for each parameter appears on computer control panel when recalled.

## REFERENCES

DEF 9-2350-255-10-1; pp. 2-143 to 2-144.

**TASK 2G: MANUALLY INPUT FIRE CONTROL DATA FOR AUTO  
PARAMETERS INTO BALLISTIC COMPUTER**

**CONDITIONS/STIMULUS**

**System State:** Table G, Column 2G; and, Module A plus Task 3C completed, and information for manual entry into AUTO parameters.  
**Gunner Location:** In Gunner's station.  
**Initiating Stimuli:** TC provides manual data for entry into AUTO parameters.

**ACTION**

**Gunner will:** 1. Press AUTO INPUT key for appropriate parameter.  
CROSSWIND  
CANT  
LEAD  
RANGE

**NOTE A:** AUTO INPUT key will light and previous automatic data input value for the parameter will display on computer panel display.

2. Enter new value for parameter on the numeric keys.

**NOTE B:** The new value must be within the limits shown on inside of computer panel door.

3a. If new value (displayed on computer control panel) is not within limits, the AUTO INPUT key will flash; if that happens, press CLEAR key and repeat Step 2.

or  
3b. If new value entered (displayed on computer control panel) is correct, press ENTER key.

**NOTE C:** If new value is within parameter limits, display panel will go out. Auto input key will stay lit, indicating that the computer is not receiving automatic sensor data for the parameter, and is operating on the last manual input data.

4. Repeat procedure for each AUTO INPUT key.

**NOTE D:** To return to automatic input for parameter, press lighted AUTO INPUT key.

## MEASUREMENT

**During Training:**

Time - Between end of initiating stimuli and completion of Step 4 for final AUTO INPUT key.

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**

Time - Between end of initiating stimuli and completion of Step 4 for final AUTO INPUT key.

Accuracy - Correct manual input information for each AUTO INPUT parameter appears on computer control panel before ENTER button is pressed.

## REFERENCES

DEP 9-2350-255-10-1; pp. 2-143 to 2-145.

**TASK 3G: MANUALLY INPUT FIRE CONTROL DATA FOR TOGGLE  
INPUT PARAMETERS INTO BALLISTIC COMPUTER**

**CONDITIONS/STIMULUS**

**System State:** Table G, Column 1G; and, Module A plus Task 3C completed, and information for toggle input provided.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** TC provides data for entry into toggle input parameters.

**ACTION**

- Gunner will:**
1. Set GUN SELECT switch set to MAIN or COAX, as required.
  2. Set AMMUNITION SELECT to appropriate ammunition type.
  3. Press toggle input key for appropriate parameter:

ZERO

BORESIGHT

MRS (set switch to IN)

MRS (set switch to IN) and BORESIGHT

**NOTE A:** Key will light and previously entered value for the parameter will display on computer control panel.

4. Move toggle to U (up), D (down), L (left) and/or R (right) until display value reads the same as desired entry value.
5. Press ENTER key.

**NOTE B:** Lighted toggle input key and display will go out.

**MEASUREMENT**

**During Training:**

**Time -** Between end of initiating stimulus and completion of Step 5 for the final position of the AMMUNITION SELECT switch.

**Accuracy -** As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**

**Time -** Between end of initiating stimulus and completion of Step 5 for the final position of the AMMUNITION SELECT switch.

**Accuracy -** As indicated by:  
Correct data for each toggle input parameter appears on computer control panel when recalled.

REFERENCES

DEP 9- 2350-255-10-1, p. 2-145.

MODULE H. LAY ON TARGET GUNNER'S AUXILIARY SIGHT (GAS)

CONDITIONS/STIMULUS

System State: Table H, and Gunner's station prepared for operation.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: GPS during target engagement failure.

ACTION

Gunner will:

1H. Lay on target using GAS.

TABLE H

POSITION OF CONTROLS FOR TASKS IN MODULE H  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS 1H
Computer control panel power switch	ON
GUN SELECT switch	TRIGGER SAFE
GUN/TURRET DRIVE switch	POWERED
LRF RANGE switch	SAFE
Ballistic door handles	OPEN
Main gun elevation travel lock	UNLOCKED
Turret traverse lock	UNLOCKED
TURRET POWER switch	ON
VEHICLE MASTER POWER switch	ON
Domelight	ON
FIRE CONTROL MODE	NORMAL
GAS POWER switch	OFF

## TASK 1H: LAY ON TARGET USING GAS

### CONDITIONS/STIMULUS

System State: Table H, and Gunner's station prepared for operation.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: GPS failure during target engagement.

### ACTION

- Gunner will:
1. Set GAS POWER switch to ON.
  2. Calculate or estimate range to target.
  3. Select reticle using RETICLE switch.
    - a. For SABOT or HEP engagement, turn RETICLE switch to SABOT/HEP position.
    - b. For HEAT or APERS-T(BH) engagement, turn RETICLE switch to HEAT position.
  4. Look into GAS eyepiece.

NOTE A: If RETICLE switch is in SABOT/HEP position, APFSDS and SM735 and HEP-T and M393 legends appear above reticle. If RETICLE switch is in HEAT position, HEAT-T/SM456 legend appears above reticle.

5. Move FILTER knob to IN to reduce glare in field-of-view if necessary.
6. Rotate focusing ring to obtain sharp image of target if necessary.

NOTE B: On SABOT/HEP reticle, SABOT pattern is upper, smaller reticle pattern, and SABOT range marks are to right of pattern. HEP pattern is lower, larger reticle pattern, and range marks are to left of pattern.

7. Determine appropriate sighting point for range and ammunition, at zero lead.
  - a. For SABOT, HEP, and HEAT, locate sighting point on center vertical line opposite appropriate range mark.
  - b. For APERS-T (BH):
    - . Determine corrected sight range value in HEAT column of aiming data chart.
    - . Locate sighting point on center vertical line of HEAT reticle opposite appropriate (corrected) range mark.

8. Apply lead for moving target by locating sighting point to left of center vertical line for targets moving left to right, or locating sighting point to right of center vertical line for targets moving right to left.

NOTE C: Horizontal lines and dots on either side of center vertical line, dividing the pattern into four equal columns, are used to estimate lead when moving sighting point left or right.

9. Aim gun, using manual turret and elevation controls (see Task 4A, Step 4 and Task 3I) to move reticle sighting point to target aiming point.

### MEASUREMENT

- During Training:**
- Time - Between initiating stimuli and completion of Step 9.
  - Accuracy - As indicated by match between steps given above and steps performed by Gunner.
- End of Training:**
- Time - Between initiating stimuli and completion of Step 9.
  - Accuracy - As indicated by:
    - . GAS reticle matches ammunition.
    - . Sighting point for range and ammunition, at zero lead is:
      - On center vertical line opposite appropriate range mark for SABOT, HEP, or HEAT.
      - On center vertical line of HEAT reticle opposite appropriate (corrected) range mark.
    - . Lead for moving target is sighting point located:
      - Left of center vertical line for targets moving left to right.
      - Right of center vertical line for targets moving right to left.

### REFERENCES

DEP 9-2350-255-10-1; pp. 2-146 to 2-147.

**MODULE I. PREPARE TO FIRE MAIN GUN AND  
ENGAGE TARGETS WITH MAIN GUN (105MM)**

**CONDITIONS/STIMULUS**

**System State:** Table I, Column 1I; Gunner's station prepared for operation; before operations checks completed; main gun loaded (according to TC fire command); stationary and moving targets at more than 200 meters.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** TC issues command to perform prepare to fire checks.

**ACTION**

**Gunner will:**

- 1I. Prepare to fire main gun.
- 2I. Engage targets with main gun - normal mode.
- 3I. Engage targets with main gun - manual mode.
- 4I. Perform main gun failure to fire procedures.
- 5I. Engage targets with main gun - emergency mode.

TABLE I

POSITION OF CONTROLS FOR TASKS IN MODULE I  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	1I	POSITION OF CONTROLS TASKS		
		2I	3I	4I
Computer control panel power switch	ON	ON	ON	ON
GUN SELECT switch	TRIGGER SAFE	MAIN	MAIN	MAIN
GUN/TURRET DRIVE switch	MANUAL	POWERED	MANUAL	POWERED or MANUAL
IRF RANGE switch	SAFE	ARM	SAFE	SAFE or ARM
Main Gun Elevation Travel Lock	LOCKED	UNLOCKED	UNLOCKED	UNLOCKED
Turret Traverse Lock	LOCKED	UNLOCKED	UNLOCKED	UNLOCKED
TURRET POWER switch	ON	ON	ON	ON
VEHICLE MASTER POWER switch	ON	ON	ON	ON
AUX HYDR POWER switch	OFF	OFF	OFF	OFF
Dome light	ON	ON	ON	ON
FIRE CONTROL MODE switch	NORMAL	NORMAL or EMER	MANUAL	NORMAL or EMER or MANUAL
GAS POWER switch	OFF	ON	ON	ON
Turret Blower switch	OFF	HIGH	HIGH	HIGH
Ballistic door handles	OPEN	OPEN	OPEN	OPEN
AMMUNITION SELECT switch	APDS	(per TC fire command)	(per TC fire command)	(per TC fire command)
THERMAL MODE switch	OFF	STANDBY	STANDBY	STANDBY

## TASK 11: PREPARE TO FIRE MAIN GUN

### CONDITIONS/STIMULUS

**System State:** Table I, Column 11; before-operations checks completed.  
**Gunner Location:** In Gunner's station.  
**Initiating Stimuli:** TC tells Gunner to prepare to fire main gun.

### ACTION

- Gunner will:**
1. Tell Loader to unlock turret traverse lock.
  2. Unlock main gun elevation travel lock (See Task 4A, Step 4b) (See Task 1E).
  3. Tell Loader to move GUN/TURRET DRIVE switch on Loader's panel to POWERED.  
**NOTE A:** If power control handles are inoperative, GUN/TURRET DRIVE switch should be set to MANUAL.
  4. Insure FIRE CONTROL MODE switch is set to NORMAL and light is lit.  
**NOTE B:** If stabilization system is inoperative, FIRE CONTROL MODE switch should be set to EMER.  
**NOTE C:** If power control handles are inoperative, FIRE CONTROL MODE switch should be set to MANUAL.
  5. Tell Loader to turn turret blower ON.
  6. Turn GUN SELECT switch to MAIN and insure light is lit.
  7. Insure AMMUNITION SELECT switch is set to APDS, or as instructed by TC, and light is lit.  
**NOTE D:** Perform Steps 8 and 9 only if GPS is operative.
  8. Place GPS into operation.
    - a. Open ballistic DAYLIGHT doors.
    - b. Turn FLTR/CLR/SHTR switch to FLTR or CLR, as required.
    - c. Move MAGNIFICATION lever to 10X.
    - d. Look through GPS eyepiece and adjust focus and brightness, as required (see Task 2B, Steps 7 and 16).
  9. Prepare TIS for operation (see Tasks 3B and 4B).  
**NOTE E:** If daylight channel is to be used, close THERMAL doors, leave THERMAL MODE in STANDBY, and turn FLTR/CLR/SHTR to FLTR or CLR.

10. Prepare GAS for operation (see Task 6B, Steps 1, and Task 1H, Steps 3-6).
11. Set LRF RANGE to ARM LST RTN or ARM 1ST RTN, as required.

### MEASUREMENT

**During Training:**                      Time - Between end of initiating stimuli and completion of Step 11.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**                      Time - Between end of initiating stimuli and completion of Step 11.  
Accuracy - As indicated by:

- . GUN/TURRET DRIVE set to POWERED or MANUAL (light is lit), as required.
- . Turret traverse unlocked.
- . Main gun elevation unlocked.
- . Computer power set to ON.
- . FIRE CONTROL MODE set to NORMAL or EMER or MANUAL (light is lit), as required.
- . Turret blower ON.
- . GUN SELECT set to MAIN (light is lit).
- . AMMUNITION SELECT set to APDS or to position given by TC (light is lit).
- . Ballistic DAYLIGHT doors are open.
- . GPS reticle adjusted for brightness.
- . GPS focused.
- . THERMAL doors open (for TIS aiming).
- . Clear TIS reticle and symbols in picture and no interference with thermal sight view.
- . THERMAL MODE set to STANDBY.
- . GAS POWER set to ON.
- . GAS adjusted for brightness and focus.
- . GAS RETICLE switch set as required.
- . LRF RANGE set to ARM LST RTN or ARM 1ST RTN.

### REFERENCES

DEP 9-2350-255-10-1; pp. 2-190 to 2-191, pp. 2-115 to 2-119, 2-146 to 2-147.

## TASK 2I: FIRE MAIN GUN - NORMAL MODE

### CONDITIONS/STIMULUS

**System State:** Table I, Column 2I; prepare to fire check completed; target, stationary or moving, at more than 200 meters; TC has laid for direction.  
**Gunner Location:** In Gunner's station.  
**Initiating Stimuli:** TC issues fire command.

### ACTION

- Gunner will:**
1. Insure AMMUNITION SELECT switch is set according to TC fire command and light is lit.
  2. View through GPS eyepiece.
  3. Grasp power control handles.
  4. Squeeze palm switches.
  5. Locate target announced by TC.
  6. Announce "IDENTIFIED."

**NOTE A:** If TC made initial lay for direction with high rate of movement of turret or main gun, allow turret/main gun to stop, by holding power control handles centered, before tracking or lasing.

7. Using power control handles, lay GPS reticle on target aiming point.
8. Range to target (see Task 3F).
9. After Loader has announced "UP," announce "ON THE WAY."
10. Wait at least one second, or until TC announces "FIRE," if fire command included "AT MY COMMAND."
11. Squeeze triggers on one or both power control handles to fire main gun.

**NOTE B:** If gun fails to fire, perform failure to fire procedures (Task 4I).

**NOTE C:** Release palm switches and re-engage before laying on another target to dump automatic lead.

### MEASUREMENT

**Time -** Between end of initiating stimuli and completion of Step 6; between end of Step 6 and completion of Step 11.  
**Accuracy -** As indicated by match between Steps given above and steps performed by Gunner.

Time - Between end of initiating stimuli and completion of Step 6; between end of Step 6 and completion of Step 11.

End of Training:

Accuracy - As indicated by:

- . AMMUNITION SELECT switch is set according to TC fire command (light is lit).
- . Gunner announced "ON THE WAY" before firing.
- . First round hits target.

REFERENCES

DEP 9-2350-255-10-1; pp. 2-192 to 2-194; Appendix F.

## TASK 3I: FIRE MAIN GUN - MANUAL MODE

### CONDITIONS/STIMULI

**System State:** Table I, Column 3I; prepare to fire checks completed; power control handles, or GPS or both inoperative; target, stationary or moving at more than 200 meters.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** TC issues fire command.

### ACTION

A. GPS functional, but power control handles do not traverse turret or elevate/depress main gun.

**Gunner will:**

1. Insure AMMUNITION SELECT set according to TC fire command (light is lit).
2. View through GPS eyepiece.
3. Grasp and squeeze manual traverse crank handle and manual elevation crank handle.

4. Locate target identified by TC.
5. Announce "IDENTIFIED."

NOTE A: If TC made initial lay for direction with high rate of movement of turret/main gun, allow turret/main gun to stop before tracking or lasing.

6. Using manual traverse crank handle and manual elevation crank handle, lay GPS reticle on target aiming point.
  - a. Rotate traverse crank handle clockwise to traverse to right, counterclockwise to traverse to left.
  - b. Rotate elevation crank handle clockwise to elevate main gun, counterclockwise to depress main gun.
7. Grasp and squeeze power control handle palm switch with one hand.

NOTE B: Palm switch must be squeezed when aiming with GPS to insert ballistic offset into gun.

8. Range to target (see Task 3F).
9. After loader has announced "UP," announce "ON THE WAY."
10. Wait at least one second, or until TC announces "FIRE" if fire command included "AT MY COMMAND."
11. Squeeze trigger on manual elevation crank handle or on power control handle to fire main gun.

NOTE C: If main gun fails to fire, perform failure to fire procedures (Task 4I).

NOTE D: Release power control handle palm switches and reengage before laying on another target to dump automatic lead.

B. GPS not functional.

- Gunner will:
1. Insure AMMUNITION SELECT set according to TC fire command (light is lit).
  2. Set GAS RETICLE switch according to TC fire command (see Task 1H).
  3. View through GAS eyepiece.
  4. Grasp and squeeze manual traverse crank handle.
  5. Locate target identified by TC.

NOTE A: If TC made initial lay for direction with high rate of movement of turret/main gun, allow turret/main gun to stop before tracking or lasing.

6. Announce "IDENTIFIED."
7. Using manual traverse crank handle, lay GAS reticle vertical line on target (see Task 1H)
  - a. Rotate traverse crank handle clockwise to traverse right, counterclockwise to traverse left.
8. Ask TC for range.
9. Using manual elevation crank handle, lay proper horizontal range mark of GAS reticle on target (see Task 1H).
10. If target is moving:
  - a. Move reticle to apply lead angle (see Task 1H).
  - b. Track target using manual handles.
11. After loader has announced "UP", announce "ON THE WAY."
12. Wait one second or until TC announces "FIRE" if fire command included "AT MY COMMAND."
13. Squeeze trigger on manual elevation crank handle to fire main gun.

NOTE B: If main gun fails to fire, perform main gun failure to fire procedures (see Task 4I).

MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 11(A) or Step 13 (B).

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

Time - Between end of initiating stimuli and completion of Step 11(A) or Step 13 (B).

End of Training:

Accuracy - As indicated by:

- . AMMUNITION SELECT is set according to TC fire command (light is lit).
- . (B) GAS RETICLE switch set according to fire command.
- . Announces "ON THE WAY" before firing.
- . First round hits target.

#### REFERENCES

DEP 9-2350-255-10-1; pp. 2-195, pp. 2-146 to 2-147; Appendix F.

## TASK 4I: PERFORM MAIN GUN FAILURE TO FIRE PROCEDURES

### CONDITIONS/STIMULUS

System State: Table I, Column 4I; main gun fails to fire.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Main gun fails to fire.

### ACTION

- Gunner will:
1. Announce MISFIRE/ON THE WAY.
  2. Keep main gun aimed on target through Step 10.
  3. Try to fire using power control handle trigger other than the one that was tried when the misfire occurred.  
  
NOTE A: If main gun fires, task is completed.  
If not continue with Step 4.
  4. Announce MISFIRE.
  5. Request TC attempt to fire using TC control handle trigger.  
  
NOTE B: If main gun fires, task is completed.  
If not, continue with Step 6.
  6. Announce MISFIRE/ON THE WAY.
  7. Try to fire using manual elevation crank handle trigger.  
  
NOTE C: If main gun fires, task is completed.  
If not, continue with Step 8.
  8. Announce MISFIRE.
  9. Turn GUN SELECT switch to TRIGGER SAFE.
  10. Announce ON THE WAY.
  11. Try to fire using MANUAL FIRING handle (blasting machine) by turning handle clockwise vigorously 2-4 times.  
  
NOTE D: If main gun fires, task is completed.  
If not, continue with Step 12. (Second time, continue with Step 16).
  12. Announce MISFIRE.
  13. Tell Loader to open breech manually, turn round one half turn, and reload round into chamber.
  14. Turn GUN SELECT switch to MAIN.
  15. Repeat Steps 2-11 one time.
  16. If main gun does not fire, consider round faulty and tell Loader to remove round from breech.  
  
NOTE E: If gun is hot (water turns to steam or sizzles when put on tube near chamber) and rounds is not removed within one minute of last misfire, leave round in chamber. Have crew evacuate tank and take cover for two hours before removing round.

17. After round is removed, check firing circuits (see Task 7C).

### MEASUREMENT

Time - Between end of initiating stimuli and firing of main gun (Steps 3, 5, 7, or 11, first or second time).

or,

Between end of initiating stimuli and completion of Step 11 (second time), between end of Step 11 (second time) and completion of Step 16, and between end of Step 16 and completion of Step 17.

During Training:

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

Time - Between end of initiating stimuli and firing of main gun (Steps 3, 5, 7, or 11, first or second time).

or,

Between end of initiating stimuli and completion of Step 11 (second time), between end of Step 11 (second time) and completion of Step 16, and between end of Step 16 and completion of Step 17.

End of Training:

Accuracy - As indicated by:

- . Main gun is aimed at target when each trigger is tried.
- . MISFIRE announced when ever trigger is tried and gun does not fire.
- . ON THE WAY announced before trigger tried.
- . All triggers are tried before round is rotated.
- . Round is rotated.
- . All triggers are tried after round is rotated.
- . If gun does not fire, round is removed from chamber within one minute after last trigger tried; or if not within one minute, crew leaves tank for two hours.
- . Firing circuits tested after round is removed.

### REFERENCES

DEP 9-2350-250-10-1; pp. 2-149 to 2-150.

## TASK 3I: FIRE MAIN GUN - EMERGENCY MODE

### CONDITIONS/STIMULUS

System State: Table I, Column 2I; prepare to fire checks completed; stabilization system not operational; target, stationary or moving, at more than 200 meters; TC has laid for direction.

Gunner Location: In Gunner's station.

Initiating Stimuli: TC issues fire command.

### ACTION

- Gunner will:
1. Insure AMMUNITION SELECT switch set according to TC fire command and light is lit.
  2. View through GPS eyepiece.
  3. Grasp power control handles.
  4. Squeeze palm switches.
  5. Locate target announced by TC.
  6. Announce "IDENTIFIED".

NOTE A: If TC made initial lay for direction with high rate of movement of turret or main gun, allow turret/main gun to stop before tracking or lasing.

7. Using power control handles, lay GPS reticle on target aiming point.

NOTE B: Automatic lead will not be inserted into computer. Moving targets must have lead applied manually using the GPS.

8. Range to target (See Task 3F).
9. After Loader has announced "UP", announce "ON THE WAY".
10. Wait at least one second, or until TC announces "FIRE", if fire command included "AT MY COMMAND".
11. Squeeze triggers on one or both power control handles to fire main gun.

NOTE C: If gun fails to fire, perform failure to fire procedures (Task 4I).

### MEASUREMENT

Time - Between end of initiating stimuli and completion of Step; between end of Step 6 and completion of Step 11.

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

Time - Between end of initiating stimuli and completion of Step 6; between end of Step 6 and completion of Step 11.

End of Training:

Accuracy - As indicated by:

- . AMMUNITION SELECT switch is set according to TC fire command (light is lit).
- . Gunner announced "ON THE WAY" before firing.
- . First round hits target.

REFERENCES

TM 9-2350-255-10; p. 2-205.

MODULE J. OPERATE COAXIAL MACHINEGUN (7.62MM)

CONDITIONS/STIMULUS

System State: Table J, Column 1J; coaxial machinegun cleared.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC tells Gunner to remove coaxial machinegun.

ACTION

Gunner will:

- 1J. Remove coaxial machinegun.
- 2J. Install coaxial machinegun.
- 3J. Load coaxial machinegun.
- 4J. Zero coaxial machinegun.
- 5J. Fire coaxial machinegun.
- 6J. Clear misfire in coaxial machinegun.
- 7J. Stop runaway firing of coaxial machinegun.
- 8J. Change barrel of coaxial machinegun.
- 9J. Clear coaxial machinegun.

TABLE J

POSITION OF CONTROLS FOR TASKS IN MODULE J  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS								
	1J	2J	3J	4J	5J	6J	7J	8J	9J
Computer control panel power switch					OFF	OFF	OFF	OFF	OFF
GUN SELECT switch	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	TRIGGER SAFE	COAX	COAX	COAX	COAX	COAX
GUN/TURRET DRIVE switch	MANUAL	MANUAL	MANUAL	EL UNCLP	POWERED	POWERED	POWERED	POWERED	POWERED
LRF RANGE switch	SAFE	SAFE	SAFE	SAFE	ARM LST RTN				
Main gun elev. travel lock	LOCKED	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED
Turret traverse lock	LOCKED	LOCKED	LOCKED	LOCKED	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED
TURRET POWER switch	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON
VEHICLE MASTER POWER switch	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON
Dome light	ON	ON	ON	ON	ON	ON	ON	ON	ON
FIRE CONTROL MODE switch	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
GAS POWER switch	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Ballistic door handles	OPEN or CLOSED	OPEN or CLOSED	OPEN or CLOSED	OPEN or CLOSED	OPEN	OPEN	OPEN	OPEN	OPEN
Coax manual safety switch	S	S	S	F	F	F	F	S	S

## TASK 1J: REMOVE COAXIAL MACHINEGUN

### CONDITIONS/STIMULUS

System State: Table J, Column 1J; and, coaxial machinegun cleared.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC tells Gunner to remove coaxial machinegun.

### ACTION

- Gunner will:
1. Insure TURRET POWER switch is OFF.
  2. Insure coax safety switch is on S.
  3. Wear asbestos gloves if coax has been fired within past hour.
  4. Insure GUN/TURRET DRIVE is in MANUAL.
  5. Unlock main gun elevation travel lock (see Task 1E).
  6. Elevate main gun using manual controls (approximately 5 degrees above zero) so hole in main gun mount for coax front quick release pin is just above hydraulic pressure gage.
  7. Pull quick release pin from mount.
  8. Open smoke box doors.
  9. Slide receiver to rear and lift carefully.

NOTE A: Rear adapters will come out of mounting grooves, and barrel will come out of smoke enclosure tube.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 9.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 9.  
Accuracy - As indicated by:  
. TURRET POWER switch is OFF.  
. Coax is removed undamaged.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-157.

## TASK 2J: INSTALL COAXIAL MACHINEGUN

### CONDITIONS/STIMULUS

**System State:** Table J, Column 2J; and, coaxial machinegun removed and cleared.  
**Gunner Location:** In Gunner's station.  
**Initiating Stimuli:** TC tells Gunner to install coaxial machinegun.

### ACTION

- Gunner will:**
1. Insure TURRET POWER switch is OFF.
  2. Insure coax safety switch is on S.
  3. Wear asbestos mittens if gun is hot.
  4. Insert barrel muzzle into smoke enclosure tube.
  5. Push receiver forward into mount.
  6. Slide rear adapters into groove of mount.
  7. Push machinegun forward until forward mounting hole is aligned with receiver holes, and machinegun trigger is engaged with roller on operating lever, with no pressure on trigger.
  8. Insure main gun is elevated (approximately 5 degrees above zero) so hole in main gun mount for coax front quick release pin is just above hydraulic pressure gage.
  9. Push front quick release pin through holes in mount and gun until pin locks in hole.
  10. Close smoke box doors.

### MEASUREMENT

**During Training:** Time - Between end of initiating stimuli and completion of Step 10.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:** Time - Between end of initiating stimuli and completion of Step 10.  
Accuracy - As indicated by:  
• TURRET POWER switch is OFF  
• Coax is installed undamaged.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-151.

## TASK 3J: LOAD COAXIAL MACHINEGUN

### CONDITIONS/STIMULUS

System State: Table J, Column 3J; and, coax installed and cleared.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC tells Gunner to load coaxial machinegun.

### ACTION

- Gunner will:
1. Tell Loader to move GUN/TURRET DRIVE switch on Loader's panel to EL UNCPL.
  2. Tell Loader to insure MAIN GUN STATUS SAFE light is lit (GUN SELECT switch is in TRIGGER SAFE).
  3. Link together 24 7.72mm ammunition belts.
  4. Load coax ready ammunition box according to instructions on inside of box cover.
  5. Insure coax safety switch is on S.
  6. Pull edge of ammunition belt through chute or left side of coax, with double link end leading and open slot on links facing down.
  7. Set coax safety switch on F.
  8. Pull charging handle to rear and return it to normal position.
  9. Set coax safety switch on S.
  10. Open cover.
  11. Raise feed tray.
  12. Look in chamber to make sure it is empty.  
NOTE A: If chamber is not empty, clear coax (see Task 9J).
  13. Lower feed tray.
  14. Place belt in feed tray with first round against cartridge stop.
  15. Close cover.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 15.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 15.  
Accuracy - As indicated by:  
. GUN/TURRET DRIVE is set to EL UNCPL.  
. GUN SELECT switch is in TRIGGER SAFE.  
. Coax safety switch is on S.  
. Coax is loaded with double link end of belt leading into coax and open slots on links facing down.

REFERENCES

DEP 9-2350-255-10-1; p. 2-182.

## TASK 4J: ZERO COAXIAL MACHINEGUN

### CONDITIONS/STIMULUS

**System State:** Table J, Column 4J; and, coaxial machinegun mounted and loaded, turret blower ON, a zero target at approximately 800 meters, tank on level terrain, and vehicle log book with previous zero data recorded on DA Form 2408-D.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** TC tells Gunner to zero coaxial machinegun.

### ACTION

- Gunner will:**
1. Tell Driver or TC to turn TURRET POWER ON.
  2. Tell Loader to unlock turret traverse lock.
  3. Insure coax is loaded with at least 50 rounds ammunition (see Task 3J).
  4. Turn GUN SELECT switch to COAX.
  5. Set safety switch on coax to F.
  6. Select stationary aiming point (zero target) at approximately 800 meters.
  7. Open DAYLIGHT ballistic doors.
  8. Use power control handles to lay GPS aiming cross on furthest part of target aiming point (see Tasks 1F, 2F).
  9. Set LRF RANGE switch to ARM LST RTN.
  10. Turn computer control panel power switch to ON.
  11. Range to target by pressing either or both laser buttons on power control handles.
  12. Turn FIRE CONTROL MODE switch to NORMAL.
  13. Move GPS MAGNIFICATION lever to 10X.
  14. Use power control handles to lay GPS aiming cross on center of target aiming point.
  15. Fire a burst of 20-25 rounds (see Task 5J).

NOTE A: If reticle aiming cross is centered on bullet strike area on target aiming point, continue with Step 22. If not, continue with Steps 16-23.

16. Without disturbing lay of gun, push ZERO key on computer panel.

NOTE B: Zero key will light.

17. While viewing through GPS, move RETICLE ADJUST toggle switch on computer panel to U (up), D (down), L (left) or R (right) as needed to move GPS reticle aiming cross on to center of bullet strike area.

18. Record zero setting, displayed on computer panel in equipment maintenance folder on DA Form 2408-10.
19. Push ENTER key on computer display.  
NOTE C: Lighted zero key will go out.  
NOTE D: To enter known zero setting without firing coax, do Steps 4, 5, 11, 17, 18 and 20. In Step 18, move toggle until display reading is same as known zero setting.
20. Use power control handles to lay GPS aiming cross on center of target aiming point.
21. Fire a burst of 20-25 rounds.  
NOTE E: If reticle aiming cross is centered on bullet strike area, coax is zeroed. If not, repeat Steps 16 through 21.
22. Set coax safety switch to S.
23. Set LRF RANGE switch to SAFE.

#### MEASUREMENT

- During Training:                      Time - Between end of initiating stimuli and completion of Step 23.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.
- End of Training:                      Time - Between end of initiating stimuli and completion of Step 23.  
Accuracy - As indicated by:  
    . Zero values entered in computer.  
    . Zero values recorded in equipment maintenance folder on DA Form 2408-10.  
    . GPS aiming cross is centered on bullet strike area.

#### REFERENCES

DEF 9-2350-255-10-1; pp. 2-153 to 2-154; p. 2-145.

## TASK 5J: FIRE COAXIAL MACHINEGUN

### CONDITIONS/STIMULUS

System State: Table J, Column 5J; and, coax installed, loaded,  
and zeroed target at 300-800 meters, turret blower ON.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC issues coax fire command.

### ACTION

Gunner will:

1. Set safety switch on coax on F.
2. Turn GUN SELECT switch to COAX.

NOTE A: If GPS is inoperative, continue with Step 11.

3. Set LRF RANGE switch to ARM LST RTN.
4. View through GPS eyepiece and squeeze power control palm switches.
5. When target is located, announce "IDENTIFIED."
6. Use power control handles to lay reticle aiming cross on target (see Tasks 1F and 2F).
7. Range to target by pressing either or both laser buttons on power control handles.
8. If target is moving, track target for at least 3 seconds.
9. When ready to fire symbol appears in GPS view, announce "ON THE WAY."
10. When TC announces "FIRE," press firing trigger on one or both power control handles (keeping aiming cross on target).

NOTE B: Fire in 20-25 round bursts (4-5 tracers), with 4-5 seconds between bursts. For rapid fire, allow 2-3 seconds between bursts. Coax will fire as long as firing trigger is pressed.

NOTE C: Do Steps 11-17 only if GPS is inoperative.

11. Turn GAS POWER to ON.
12. View through GAS eyepiece.
13. When target is located announce "IDENTIFIED."
14. Using range given by TC and manual controls, lay GAS reticle on target (see Task 1H and Task 4A, Steps 4d and 4e).
15. Announce "ON THE WAY."
16. When TC announces "FIRE," press trigger on manual elevation control handle.

NOTE D: (Repeat NOTE B).

17. To fire coax manually, press black rubber section on rear of solenoid.

NOTE E: If misfire occurs, see Task 6J.  
If runaway firing occurs, see Task 7J. If barrel burns out (or every 10 minutes during sustained firing; or every two minutes during rapid firing).

### MEASUREMENT

**During Training:**

Time - Between end of initiating stimuli and completion of Step 10, Step 16, or Step 17.

Accuracy - As indicated by match between steps given above and steps performed by Gunnar.

**End of Training:**

Time - Between end of initiating stimuli and completion of Step 10, Step 16, or Step 17.

Accuracy - As indicated by:

- . At least 20-25 rounds are fired.
- . Target is hit.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-152; p. 1-8.

## TASK 6J: CLEAR MISFIRE IN COAXIAL MACHINEGUN

### CONDITIONS/STIMULUS

System State: Table J, Column 6J; and, coax installed, loaded; has been fired, target at 300-800 meters, turret blower ON, misfire occurs. .

Gunner Location: In Gunner's station.

Initiating Stimuli: Coaxial machinegun misfires.

### ACTION

- Gunner will:
1. Pull charger handle to rear and return it to normal position.
  2. Try to fire coax (see Task 5J, Steps 10, 17, and 18).
  3. Pull charger handle to rear while listening for cartridge to drop into spent case container.
  4. Return charger handle to normal position.

NOTE A: If cartridge did not drop into spent case container, clear coax (Task 9J) and continue with Step 12. If cartridge dropped into spent case container, continue with Step 5.

5. Set coax safety switch on S.
6. Open cover.
7. Remove ammunition.
8. Set coax safety switch on F.
9. Pull charger handle to rear and hold it there.
10. Squeeze manual trigger on bottom of coax.
11. Slowly return charging handle to normal position, allowing bolt to go forward.
12. Load coax (Task 3J, Steps 9-15).
13. Continue firing (see Task 5J).

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 13.

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 13.

Accuracy - As indicated by:  
Coaxial machinegun fires.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-155.

## TASK 7J: STOP RUNAWAY FIRING OF COAXIAL MACHINEGUN

### CONDITIONS/STIMULUS

System State: Table J, Column 7J; and, coax installed, loaded; target at 300-800 meters, turret blower ON, runaway firing occurs.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Runaway firing of coax occurs.

### ACTION

- Gunner will:
1. If near end of ammunition belt, let gun fire remaining rounds.
  2. If not near end of ammunition belt, grab belt and break belt by twisting firmly.

NOTE A: Keep hands clear of gun when grabbing belt.

3. If not able to grab belt:
  - a. Pull charging handle to rear and hold it there.

NOTE B: Gun will stop firing.

- b. Set coax safety switch on S.
  - c. Return charging handle to normal position.
4. Clear coax (see Task 9J).

NOTE C: Do not reload coax; send to organisational maintenance for repair.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 4.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 4.  
Accuracy - As indicated by:  
. Runaway firing ceases.  
. Coax is cleared.

### REFERENCES

DEP 9-2350-235-10-1; p. 2-156.

## TASK 8J: CHANGE BARREL OF COAXIAL MACHINEGUN

### CONDITIONS/STIMULUS

System State: Table J, Column 8J; coax installed and loaded.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Coax has been fired for ten minutes (rapid fire, every two minutes), or barrel burns out.

### ACTION

- Gunner will:
1. Set coax safety switch on F.
  2. Pull charger handle to rear and return it to normal.
  3. Set coax safety switch on S.
  4. Put on asbestos mittens.
  5. Open smoke box door.
  6. Push and hold barrel locking latch.
  7. Turn barrel release to straight up position.
  8. Release barrel unlocking latch.

NOTE A: If cartridge is in chamber, stay clear of muzzle.

9. Grasp barrel and push straight forward and lift out.
10. Stow hot barrel on floor in channel between main gun and gunner's left knee guard.
11. Insert new barrel all the way into barrel socket with barrel release straight up.
12. Move barrel release firmly to right until barrel locking latch locks.

NOTE B: Latch should lock after barrel release is moved between 3 and 7 clicks. If more than 7 or fewer than 3 clicks are required, notify Tank Commander.

13. Close smoke box doors.
14. Remove asbestos mittens.

### MEASUREMENT

Time - Between end of initiating stimuli and completion of Step 13.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.



## TASK 9J: CLEAR COAXIAL MACHINEGUN

### CONDITIONS/STIMULUS

System State: Table J, Column 9J; and, coax installed and loaded, and fired less than 200 rounds past 2 minutes.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Completion of firing.

### ACTION

- Gunner will:
1. Turn GUN SELECT switch to TRIGGER SAFE.
  2. Tell Loader to move GUN/TURRET DRIVE switch to MANUAL or EL UNCPL.
  3. Set coax safety switch on F.
  4. Pull charger handle to rear and return it to normal position.
  5. Set coax safety switch on S.
  6. Open cover.
  7. Remove ammunition belt from feed tray.
  8. Raise feed tray.
  9. Check for cartridge in chamber.
  10. Lower feed tray.
  11. Close cover.
  12. Set coax safety switch on F.
  13. Pull charger handle to rear and hold it there.
  14. Pull coax manual trigger on underside of coax.
  15. Slowly return charger handle to normal position, allowing bolt to close.  
NOTE A: If there was no cartridge in chamber (Step 9), coax is cleared. If a cartridge was in the chamber, continue with Step 16.  
NOTE B: If gun is hot (has fired 200 or more rounds within past 2 minutes) and conditions permit, wait 15 minutes before continuing with Step 16.
  16. Pull charger handle to rear, listening for cartridge to fall into spent case retainer.
  17. Return charger handle to normal position.
  18. Set coax safety switch on S.  
NOTE C: Repeat Steps 6 and 8-15. If cartridge is stuck in chamber, change barrel and (see TM 9-1005-313-10).



## MODULE K. BORESIGHT MAIN GUN

### CONDITIONS/STIMULUS

**System State:** Table K, Column K1; and, tank positioned on level ground, a boresight target at a range near 1200 meters, a muzzle borescope inserted in main gun muzzle so that top and bottom witness marks on gun muzzle are aligned with marks on borescope, and eyepiece is on right of gun tube.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** TC tells Gunner to boresight main gun.

### ACTION

**Gunner will:**

- 1K. Boresight Gunner's primary sight.
- 2K. Boresight muzzle reference sensor.
- 3K. Boresight thermal imaging system.
- 4K. Boresight Gunner's auxiliary sight.

TABLE K

POSITION OF CONTROLS FOR TASKS IN MODULE K  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS			
	TASK			
	1K	2K	3K	4K
Computer control power switch	ON	ON	ON	ON
GUN SELECT switch	TRIGGER SAFE	MAIN	MAIN	MAIN
GUN/TURRET DRIVE switch	POWERED	POWERED	POWERED	POWERED
LRF RANGE switch	SAFE	SAFE	SAFE	SAFE
Ballistic door handles	OPEN/ DAYLIGHT	OPEN/ DAYLIGHT	OPEN/ DAYLIGHT	OPEN/ DAYLIGHT
Main gun elevation travel lock	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED
Turret traverse lock	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED
TURRET POWER switch	ON	ON	ON	ON
VEHICLE MASTER POWER switch	ON	ON	ON	ON
Domelight	ON	ON	ON	ON
FIRE CONTROL MODE switch	NORMAL	EMER	NORMAL	NORMAL
THERMAL MODE switch	STANDBY	STANDBY	STANDBY	STANDBY

## TASK 1K: BORESIGHT GUNNER'S PRIMARY SIGHT

### CONDITIONS/STIMULUS

**System State:** Table K, Column 1K; and, tank positioned on level ground, a boresight target at a range near 1200 meters, a muzzle borescope inserted in main gun muzzle so that top and bottom witness marks on gun muzzle are aligned with marks on borescope, and eyepiece is on right of gun tube.

**Gunner Location:** In Gunner's Station.

**Initiating Stimuli:** TC tells Gunner to boresight main gun.

### ACTION

- Gunner will:**
1. Turn GUN SELECT switch to MAIN.
  2. Turn FIRE CONTROL MODE switch to EMER.
  3. Move MAGNIFICATION lever on GPS lower panel to 10X.
  - 4a. Insert 1200 meters range into computer (see Task 2G).
  - or 4b. Insert 1200 meters range by lasing on target (see Task 3F).

**NOTE A:** Lasing on target establishes range for boresighting more accurately.

5. Press BORESIGHT key on computer control panel.

**NOTE B:** Display will show last boresight

6. View through GPS eyepiece and lay borescope reticle dot on clearly defined point on boresight target by using manual traverse and elevation controls and laying gun smoothly on target from low to high and from left to right. (See Task 4A, Step 4 and Task 3I).

**NOTE C:** Do not overshoot and return.

7. Remove hands from power control handles.
8. View through GPS eyepiece and move RETICLE ADJUST toggle switch as needed to lay GPS reticle dot on same point as muzzle borescope is on (see Step 6).

**NOTE D:** Activation of RETICLE ADJUST toggle will set MRS to zero. MRS boresighting must be done after GPS boresighting.

9. Record boresight values from computer display in equipment maintenance folder on DA Form 2408-10.
10. Press ENTER key on computer control panel to store GPS boresight data in computer.

## MEASUREMENT

**During Training:**                      Time - Between end of initiating stimuli and completion of Step 10.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

**End of Training:**                      Time - Between end of initiating stimuli and completion of Step 10.  
Accuracy - As indicated by:  
    . GPS reticle converges on same aim point as main gun.  
    . GPS boresight data is stored in the computer.  
    . GPS boresight data is logged into the equipment maintenance folder on DA Form 2408-10.

## REFERENCES

DEP 9-2350-255-10-1; pp. 2-158 to 2-160.

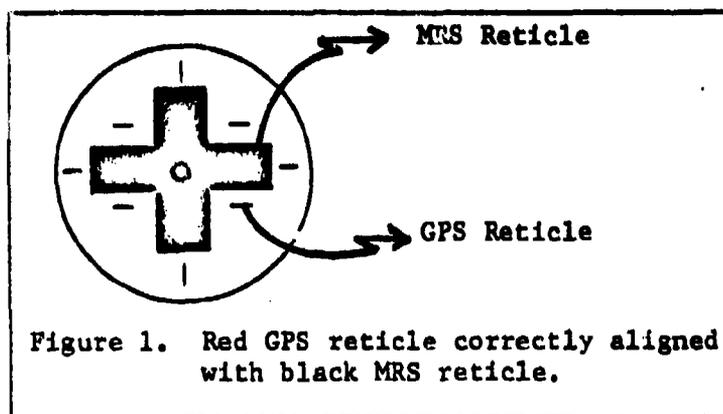
## TASK 2K: BORESIGHT MUZZLE REFERENCE SENSOR

### CONDITIONS/STIMULUS

**System State:** Table K, Column 2K; and, (see system state for Task 1K).  
**Gunner Location:** In Gunner's station.  
**Initiating Stimuli:** Task 1K is completed. This task should be done immediately after boresighting the GPS. Previous MRS boresight data was lost from computer during GPS boresighting.

### ACTION

- Gunner will:**
1. Turn FIRE CONTROL MODE switch to NORMAL.
  2. Press MRS key on computer control panel.
- NOTE A:** CAUTION - Do not press range buttons on power control handles. MRS reticle will be damaged if LRF is fired while MRS key is lit.
3. Press BORESIGHT key on computer control panel.
  4. Squeeze palm switches on power control handles and hold for about 5 seconds while main gun goes to zero elevation.
  5. Release power control handles.
  6. View through GPS eyepiece and move RETICLE ADJUST toggle switch as needed to align red GPS reticle with black MRS reticle.
- NOTE B:** When reticles are correctly aligned, they will appear as in Figure 1.



7. Record azimuth and elevation of MRS boresight displayed in mils in computer in equipment maintenance folder on DA Form 2408-10.
8. Press ENTER key on computer control panel to store MRS boresight data in computer.

## MEASUREMENT

During Training:                   Time - Between end of initiating stimuli and completion of Step 8.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:                   Time - Between end of initiating stimuli and completion of Step 8.  
Accuracy - As indicated by:  
    . MRS reticle converges on same aim point as GPS reticle and main gun.  
    . MRS boresight data is stored in the computer.  
    . MRS boresight data is logged into the equipment maintenance folder on DA Form 2408-10.

## REFERENCES

DEP 9-2350-255-10-1; pp. 2-160 to 2-161.

## TASK 3K: BORESIGHT THERMAL IMAGING SYSTEM

### CONDITIONS/STIMULUS

System State: Table K, Column 3K; and, (see system state for Task 1K).  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 2K is completed.

### ACTION

- Gunner will:
1. Press BORESIGHT key on computer control panel.
  2. View through GPS eyepiece and lay GPS reticle on same clearly defined point on boresight target as in Task 1K, Step 6.
  3. Open THERMAL ballistic door handle (see Task 2A, Step 1a).
  4. Turn FLTR/CLEAR/SHTR switch on GPS panel to SHTR.
  5. Turn THERMAL MODE switch to ON.
  6. View through GPS eyepiece and move TIS reticle to the GPS boresight aiming point using the TIS BORESIGHT AZ and EL knobs, as follows:
    - a. Use COARSE knobs to place reticle as close as possible; then,
    - b. Use FINE knobs to place reticle on aim point.
  7. Turn FLTR/CLEAR/SHTR switch on GPS panel to CLEAR.
  8. Verify that GPS reticle is still on aim point (Step 2).

NOTE A: If GPS reticle is not on aim point, repeat Step 2.
  9. Record TIS BORESIGHT knobs positions in equipment maintenance folder on DA Form 2408-10.
  10. Press ENTER key on computer control panel to store TIS boresight data in computer.
  11. Close THERMAL ballistic door handle.
  12. Turn THERMAL MODE switch to STANDBY.

### MEASUREMENT

Time - Between end of initiating stimuli and completion of Step 12.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

- End of Training:**
- Time** - Between end of initiating stimuli and completion of Step 12.
  - Accuracy** - As indicated by:
    - . TIS reticle converges on same aim point as GPS and MRS reticles and main gun.
    - . TIS boresight data is stored in the computer.
    - . TIS boresight data is logged into the equipment maintenance folder on DA Form 2408-10.

**REFERENCES**

DEP 9-2350-255-10-1; p. 2-162.

## TASK 4K: BORESIGHT GUNNER'S AUXILIARY SIGHT

### CONDITIONS/STIMULUS

System State: Table K, Column 4K; and, (see system state for Task 4K).  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 3K is completed.

### ACTION

- Gunner will:
1. Set POWER switch on GAS panel to ON.
  2. Turn GAS RETICLE switch to ammunition type used to zero main gun.
  3. Tell Loader to move GUN/TURRET DRIVE switch on Loader's panel to MANUAL.
  4. View through GAS eyepiece and focus GAS reticle on boresight target (see Task 6B, Steps 5, 6, 7, and 8).
  5. Lay GAS reticle on same clearly defined point on boresight target as GPS was in Task 1K, Step 6.
  6. Turn AZ and EL boresight knobs to align GAS reticle boresight cross with target aiming point.
  7. Rotate scales behind AZ and EL knobs so that index markers point to 0 on each scale.  
NOTE A: Do not allow AZ and EL knobs to turn.
  8. View through GAS to verify GAS reticle is still on aim point.  
NOTE B: If GAS reticle is not on aim point, repeat Steps 6 and 7.
  9. Record GAS boresight knob positions in equipment maintenance folder on DA Form 2408-10.
  10. Turn GUN SELECT switch to TRIGGER SAFE.
  11. Set POWER switch on GAS panel to OFF.
  12. Tell Loader to move GUN/TURRET DRIVE switch to POWERED.

### MAINTENANCE

Time - Between end of initiating stimuli and completion of Step 12.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:                    Time - Between end of initiating stimuli and completion of Step 12.

Accuracy - As indicated by:

- . GAS reticle converges on same aim point as GPS, MRS, and TIS reticles.
- . GAS boresight data is logged into the equipment maintenance folder on DA Form 2408-10.

REFERENCES

DEP 9-2350-255-10-1; p. 2-163.

## MODULE L. ZERO TANK MAIN GUN

### CONDITIONS/STIMULUS

**System State:** Table L, Column 1L; and, tank positioned on level ground, turret blower ON, information for manual inputs provided, vehicle log book with previous zero data recorded on DA Form 2408-10, and a zero target at a range near 1200 meters.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** TC tells Gunner to zero tank main gun and confirm zero for each ammunition type.

### ACTION

Gunner will:

- 1L. Zero tank main gun.
- 2L. Confirm tank main gun zero.

### NOTE:

Confirm main gun zero for ammunition seroed before seroing each remaining ammunition type; i.e.,

- . Zero APDS, confirm APDS zero; then,
- . Zero HEAT, confirm HEAT zero; then,
- . Zero HEP, confirm HEP zero; then,
- . Zero BH, confirm BH zero.

TABLE L

POSITION OF CONTROLS FOR TASKS IN MODULE L  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS	
	1L	2L
Computer control panel power switch	ON	ON
GUN SELECT switch	TRIGGER SAFE	MAIN
GUN/TURRET DRIVE switch	POWERED	POWERED
LRP RANGE switch	SAFE	SAFE
Ballistic door handles	OPEN/ DAYLIGHT	OPEN/ DAYLIGHT
Main gun elevation travel lock	UNLOCKED	UNLOCKED
Turret traverse lock	UNLOCKED	UNLOCKED
TURRET POWER switch	ON	ON
VEHICLE MASTER POWER switch	ON	ON
Domelight	ON	ON
FIRE CONTROL MODE switch	NORMAL	EMER
THERMAL CONTROL MODE switch	STANDBY	STANDBY

## TASK 1L: ZERO TANK MAIN GUN

### CONDITIONS/STIMULUS

**System State:** Table L, Column 1L; and, tank positioned on level ground, turret blower ON, information for manual inputs provided, vehicle log book with previous zero data recorded on DA Form 2408-10, and a zero target at a range near 1200 meters.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** TC tells Gunner to zero tank main gun for each type of ammunition.

### ACTION

- Gunner will:**
1. Turn GUN SELECT switch to MAIN.
  2. Turn AMMUNITION SELECT switch to first ammunition type to be zeroed.  
**NOTE A:** The normal sequence is APDS, HEAT, HEP, BH.
  3. Turn FIRE CONTROL MODE switch to EMER.
  4. Press ZERO key on computer control panel.  
**NOTE B:** Computer display should read last zero numbers (recorded on DA Form 2408-10 or 0.00 0.00). If neither shows in display, use RETICLE ADJUST toggle to set last zero numbers or 0.00 0.00.
  5. Press ENTER key on computer control panel.
  6. Turn FIRE CONTROL MODE switch to NORMAL.
  7. Enter manual inputs into the computer for (see Task 1G)
    - . AMMO TEMP
    - . AIR TEMP
    - . AMMO SUBDES
    - . TUBE WEAR
  8. Move MAGNIFICATION lever to 10X.
  9. Range on zero target with laser rangefinder (see Task 3F).
  10. View through GPS eyepiece and lay GPS reticle on center of zero target aiming point with power control handles, using G pattern (see Tasks 1F and 2F).
  11. Refine lay on target using manual controls (see Task 4A, Step 4 and Task 3I).
  12. Fire one round at the target.
  13. Check MRS alignment (see Task 9C).
  14. Repeat Steps 10-13 until five rounds have been fired.

15. Determine center of impact of five-round shot group either by target measurement or by estimating through the sight.
16. Re-lay GPS reticle on the aiming point using power control handles (see Step 10).
17. Refine lay on target using manual controls (see Step 11).
18. Turn FIRE CONTROL MODE switch to EMER.
19. Press ZERO key on computer control panel.
20. View through GPS eyepiece and use RETICLE ADJUST toggle switch to move reticle aiming point to either measured or estimated center of impact of five-round shot group (depending on method used in Step 15).
21. Record zero values in equipment maintenance folder on DA Form 2408-10.
22. Press ENTER key on computer control panel to enter zero data in computer.

NOTE C: Confirm tank main gun zero for ammunition zeroed (see Step 2) before zeroing each remaining ammunition type; i.e.,

- . Zero APDS, confirm APDS zero; then,
- . Zero HEAT, confirm HEAT zero; then,
- . Zero HEP, confirm HEP zero; then,
- . Zero BH, confirm BH zero.

#### MEASUREMENT

During Training:	<p>Time - Between end of initiating stimuli and completion of Step 22.</p> <p>Accuracy - As indicated by match between steps given above and steps performed by Gunner.</p>
End of Training:	<p>Time - Between end of initiating stimuli and completion of Step 22.</p> <p>Accuracy - As indicated by:</p> <ul style="list-style-type: none"> <li>. Zero values entered in computer.</li> <li>. Zero values recorded in equipment maintenance folder on DA Form 2408-10.</li> <li>. GPS reticle aiming point is on either measured or estimated center of impact of five-round shot group (depending on method used in Step 15).</li> </ul>

#### REFERENCES

DEP 9-2350-255-10-1; pp. 2-164 to 2-165.

## TASK 2L: CONFIRM TANK MAIN GUN ZERO

### CONDITIONS/STIMULUS

**System State:** Table L, Column 2L; and, tank positioned on level ground, turret blower ON, selected ammunition type zeroed, zero values entered in computer and recorded in equipment maintenance folder on DA Form 2408-10, and a zero target at a range near 1200 meters.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** Task 1L is completed.

### ACTION

- Gunner will:**
1. Turn FIRE CONTROL MODE switch to NORMAL.
  2. View through GPS eyepiece and lay GPS reticle on center of zero target aiming point with power control handles using G pattern (see Tasks 1F and 2F).
  3. Refine lay on target using manual controls (see Task 4A, Step 4 and Task 3I).
  4. Fire one round at a target.
  5. Check MRS alignment (see Task 9C).
  6. Repeat Steps 2-5 until three rounds have been fired.
  7. Measure distance between center of impact of the three-round shot group and the aiming point.
    - a. If distance is  $\pm 0.25$  mils (12 inches at 1200 meters) of the aiming point, main gun zero is confirmed; proceed to Step 8.
    - b. If distance is not  $\pm 0.25$  mils (12 inches at 1200 meters) of the aiming point, fire two additional rounds, determine the center of impact (see Task 1L, Step 15), and repeat Steps 2-7.
  8. Refer TIS to aiming point of GPS, as follows:
    - a. Open THERMAL ballistic door handle (see Task 2A, Step 1a).
    - b. Turn to FLTR/CLEAR/SHTR switch on GPS panel to SHTR.
    - c. Turn THERMAL MODE switch to ON.
    - d. View through GPS eyepiece and if TIS reticle is not on GPS reticle aiming point, adjust TIS BORESIGHT knobs to correct for error (see Task 3K, Step C).
    - e. Record TIS BORESIGHT knobs positions in equipment maintenance folder on DA Form 2408-10.
    - f. Fire one confirmation round.

**NOTE A:** See Step 7. (Measure distance between confirmation round and aiming point.)

- g. Close THERMAL ballistic door handle.
- h. Turn FLTR/CLEAR/SHTR switch on GPS panel to SHTR.
- i. Turn THERMAL MODE switch to STANDBY.
- 9. Refer GAS to aiming point of GPS, as follows:
  - a. Set POWER switch on GAS panel to ON.
  - b. Turn GAS RETICLE switch to ammunition type used to zero main gun.
  - c. Tell Loader to move GUN/TURRET DRIVE switch on Loader's panel to MANUAL.
  - d. View through GAS eyepiece and focus GAS reticle on zero target (see Task 6B, Steps 5, 6, 7, and 8).
  - e. If GAS reticle is not on same aiming point on zero target as GPS and TIS reticles are on, turn AZ and EL boresight knobs to correct for error.
  - f. Rotate scales behind AZ and EL knobs so that index markers point to 0 on each scale.

NOTE B: Do not allow AZ and EL knobs to turn.

- g. View through GAS to verify GAS reticle is still on aiming point.

NOTE C: If GAS reticle is not on aiming point, repeat Steps 9e and 9f.

- h. Record GAS boresight knob positions in equipment maintenance folder on DA Form 2408-10.
- i. Fire one confirmation round.

NOTE D: See Step 7. (Measure distance between confirmation round and aiming point.)

- j. Set POWER switch on GAS panel to OFF.
- k. Tell Loader to move GUN/TURRET DRIVE switch to POWERED.

- 10. Turn GUN SELECT switch to TRIGGER SAFE.

## MEASUREMENT

During Training:  
 Time - Between end of initiating stimuli and completion of Step 10.  
 Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:  
 Time - Between end of initiating stimuli and completion of Step 10.  
 Accuracy - As indicated by:  
 . Three confirming rounds of ammunition zeroed hit  $\pm$  0.25 mils (12 inches at 1200 meters) of the aiming point.

- . TIS BORESIGHT knob positions recorded in equipment maintenance folder on DA Form 2408-10.
- . TIS reticle referred to aiming point of GPS so that TIS confirmation round hits  $\pm 0.25$  mils (12 inches at 1200 meters) of the aiming point.
- . GAS boresight knob positions recorded in equipment maintenance folder on DA Form 2408-10.
- . GAS reticle referred to aiming point of GPS so that GAS confirmation round hits  $\pm 0.25$  mils (12 inches at 1200 meters) of the aiming point.

REFERENCES

DEP 9-2350-255-10-1; p. 2-166.

MODULE M. VERIFY TANK MAIN GUN ZERO

CONDITIONS/STIMULUS

System State: Table M, Column 1M; and, tank positioned on level ground, turret blower ON, information for manual inputs provided, vehicle log book with previous zero data recorded on DA Form 2408-10, and a zero target at a range near 1200 meters.

Gunner Location: In Gunner's station.

Initiating Stimuli: TC tells Gunner to verify main gun zero for each ammunition type zeroed.

ACTION

Gunner will:

1M. Verify tank main gun zero.

TABLE M

POSITION OF CONTROLS FOR TASKS IN MODULE M  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS TASK IM
Computer control panel power switch	ON
GUN SELECT switch	TRIGGER
GUN/TURRET DRIVE switch	POWERED
LRF RANGE switch	SAFE
Ballistic door handles	OPEN/ DAYLIGHT
Main gun elevation travel lock	UNLOCKED
Turret traverse lock	UNLOCKED
TURRET POWER switch	ON
VEHICLE MASTER POWER switch	ON
Domelight	ON
FIRE CONTROL MODE switch	NORMAL
THERMAL CONTROL MODE switch	STANDBY

## TASK 1M: VERIFY TANK MAIN GUN ZERO

### CONDITIONS/STIMULUS

**System State:** Table M, Column 1M; and, tank positioned on level ground, turret blower ON, information for manual inputs provided, vehicle log book with previous zero data recorded on DA Form 2408-10, and a zero target at a range near 1200 meters.

**Gunner Location:** In Gunner's station.

**Initiating Stimuli:** TC tells Gunner to verify main gun zero for each ammunition type zeroed.

### ACTION

- Gunner will:**
1. Turn GUN SELECT switch to MAIN.
  2. Turn AMMUNITION SELECT switch to first ammunition type to be zeroed.

**NOTE A:** The normal sequence is APDS, HEAT, HEP, BH.

3. Move FIRE CONTROL MODE switch to EMER.
4. Press ZERO key on computer control panel.

**NOTE B:** Computer display should read last zero numbers (recorded on DA Form 2408-10 or 0.00 0.00). If neither shows in display, use RETICLE ADJUST toggle to set last zero numbers or 0.00 0.00.

5. Press ENTER key on computer control panel.
6. Turn FIRE CONTROL MODE switch to NORMAL.
7. Enter manual inputs into the computer for (see Task 1G):
  - . AMMO TEMP
  - . AIR TEMP
  - . AMMO SUBDES
  - . TUBE WEAR
8. Move MAGNIFICATION lever to 10X.
9. Range on zero target with laser rangefinder (see Task 3F).
10. View through GPS eyepiece and lay GPS reticle on center of zero target aiming point with power control handles, using G pattern (see Tasks 1F and 2F).
11. Refine lay on target using manual controls (see Task 4A, Step 4 and Task 3I).
12. Fire one round at the target.
13. Check MRS alignment (see Task 9C).
14. Repeat Steps 10-13 until three rounds have been fired.

15. Measure distance between center of impact of the three-round shot group and the aiming point.
  - a. If distance is  $\pm 0.25$  mils (12 inches at 1200 meters) of the aiming point, main gun zero is confirmed; proceed to Step 8.
  - b. If distance is not  $\pm 0.25$  mils (12 inches at 1200 meters) of the aiming point, fire two additional rounds, determine the center of impact (see Task 1L, Step 15), and repeat Steps 2-7.
16. Refer TIS to aiming point of GPS, as follows:
  - a. Open THERMAL ballistic door handle (see Task 2A, Step 1a).
  - b. Turn FLTR/CLEAR/SHTR switch on GPS panel to SHTR.
  - c. Turn THERMAL MODE switch to ON.
  - d. View through GPS eyepiece and if TIS reticle is not on GPS reticle aiming point, adjust TIS BORESIGHT knobs to correct for error (see Task 3K, Step 6).
  - e. Record TIS BORESIGHT knobs positions in equipment maintenance folder on DA Form 2408-10.
  - f. Fire one confirmation round.

NOTE C: See Step 15. (Measure distance between confirmation round and aiming point).

- g. Close THERMAL ballistic door handle.
    - h. Turn FLTR/CLEAR/SHTR switch on GPS panel to SHTR.
    - i. Turn THERMAL MODE switch to STANDBY.
17. Refer GAS to aiming point of GPS, as follows:
  - a. Set POWER switch on GAS panel to ON.
  - b. Turn GAS RETICLE switch to ammunition type used to zero main gun.
  - c. Tell Loader to move GUN/TURRET DRIVE switch on Loader's panel to MANUAL.
  - d. View through GAS eyepiece and focus GAS reticle on zero target (see Task 6B, Steps 5, 6, 7, and 8).
  - e. If GAS reticle is not on same aiming point on zero target as GPS and TIS RETICLES are on, turn AZ to EL boresight knobs to correct for error.
  - f. Rotate scales behind AZ to EL knobs so that index markers point to 0 on each scale.

NOTE D: Do not allow AZ and EL knobs to turn.

- g. View through GAS to verify GAS reticle is still on aiming point.

NOTE E: If GAS reticle is not on aiming point, repeat Steps 17e and 17f.

- h. Record GAS boresight knob positions in equipment maintenance folder on DA Form 2408-10.

i. Fire one confirmation round.

NOTE F: See Step 15. (Measure distance between confirmation round and aiming point).

j. Set POWER switch on GAS panel to OFF.

k. Tell Loader to move GUN/TURRET DRIVE switch to POWERED.

18. Turn GUN SELECT switch to TRIGGER SAFE.

#### MEASUREMENT

##### During Training:

Time - Between end of initiating stimuli and completion of Step 18.

Accuracy - As indicated by match between steps given above and steps performed by Gunner.

##### End of Training:

Time - Between end of initiating stimuli and completion of Step 18.

Accuracy - As indicated by:

- . Three confirming rounds of ammunition zeroed hit  $\pm$  0.25 mils (12 inches at 1200 meters) of the aiming point.
- . TIS BORESIGHT knob positions recorded in equipment maintenance folder on DA Form 2408-10.
- . TIS reticle referred to aiming point of GPS so that TIS confirmation round hits  $\pm$  0.25 mils (12 inches at 1200 meters) of the aiming point.
- . GAS boresight knob positions recorded in equipment maintenance folder on DA Form 2408-10.
- . GAS reticle referred to aiming point of GPS so that GAS confirmation round hits  $\pm$  0.25 mils (12 inches at 1200 meters) of the aiming point.

#### REFERENCES

DEP 9-2350-255-10-1; p. 2-166.

**MODULE N. POWER DOWN AND SECURE GUNNER'S STATION**

**CONDITIONS/STIMULUS**

System State: Table N.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC tells Gunner to power down and secure Gunner's station.

**ACTION**

Gunner will:

1N. Power down and secure Gunner's station.

**TABLE N**  
**POSITION OF CONTROLS FOR MODULE N**  
**WHEN TASK PERFORMANCE BEGINS**

CONTROLS	POSITION OF CONTROLS
Computer control panel power switch	ON
GUN SELECT switch	MAIN
GUN/TURRET DRIVE switch	POWERED
LRF RANGE switch	ARM LST RTN
Main gun elevation lock	UNLOCKED
Turret traverse lock	UNLOCKED
TURRET POWER switch	ON
VEHICLE MASTER POWER switch	ON
Domalight	ON
FIRE CONTROL MODE switch	NORMAL
GPS Ballistic doors	OPEN
THERMAL MODE switch	STANDBY

## TASK 1N: POWER DOWN AND SECURE GUNNER'S STATION

### CONDITIONS/STIMULUS

System State: Table N  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC tells Gunner to power down and secure Gunner's station.

### ACTION

- Gunner will:
1. Turn computer control panel power switch to OFF.
  2. Close computer control panel doors.
  3. Turn GUN SELECT switch to TRIGGER SAFE.
  4. Tell Loader to place GUN/TURRET DRIVE switch on Loader's panel on MANUAL.
  5. Set LRF RANGE switch to SAFE.
  6. Close DAYLIGHT and THERMAL ballistic doors.
  7. Lock main gun elevation travel lock (see Task 4A, Step 4h).
  8. Traverse turret so loader can move into turret and lock turret traverse lock.
  9. Turn THERMAL MODE switch OFF.
  10. If all other personnel have exited tank, insure TURRET POWER and VEHICLE MASTER POWER are OFF.
  11. Exit through loader's hatch.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 11.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training: Time - Between end of initiating stimuli and completion of Step 11.  
Accuracy - As indicated by:

- . Computer panel power switch is OFF.
- . GUN SELECT switch is set to TRIGGER SAFE.
- . GUN/TURRET DRIVE set to MANUAL.
- . LRF RANGE switch set to SAFE.
- . DAYLIGHT and THERMAL ballistic doors closed.
- . Main gun elevation and turret traverse locked.
- . THERMAL MODE switch set to OFF.
- . TURRET POWER is OFF.
- . VEHICLE MASTER POWER is OFF.
- . Gunner exits tank.

REFERENCES

DEP 9-2350-255-10-1; p. 2-167.

**MODULE O. PREPARE MAIN GUN AND COAX FOR TRAVEL**

**CONDITIONS/STIMULUS**

System State: Table P, Column 1P.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC tells Gunner to prepare weapons for travel.

**ACTION**

Gunner will:

10. Prepare main gun for travel.
20. Prepare coaxial machinegun for travel.

TABLE O

POSITION OF CONTROLS FOR TASKS IN MODULE O  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS	
	10	20
Computer control panel power switch	ON	ON
GUN SELECT switch	MAIN or COAX	TRIGGER SAFE
GUN/TURRET DRIVE switch	POWERED	MANUAL
LRP RANGE switch	SAFE	SAFE
Main Gun Elevation Lock	UNLOCKED	LOCKED
Turret Traverse Lock	UNLOCKED	UNLOCKED
TURRET POWER switch	ON	ON
VEHICLE MASTER POWER switch	ON	ON
Domelight	ON	ON
FIRE CONTROL MODE switch	NORMAL	NORMAL
Coax manual safety switch	S	S
MAIN GUN STATUS light	SAFE	SAFE

## TASK 10: PREPARE MAIN GUN FOR TRAVEL

### CONDITIONS/STIMULUS

System State: Table 0, Column 10; main gun cleared.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: TC tells Gunner to prepare weapons for travel.

### ACTION

- Gunner will:
1. Insure Loader has cleared main gun.
  2. Insure breach is closed.
  3. Insure Loader has placed spent case ejection guard in safe (forward) position (MAIN GUN STATUS SAFE light is lit).
  4. Lock main gun elevation travel lock (see Task 4A, Step 4h).
  5. Turn GUN SELECT switch to TRIGGER SAFE.

### MEASUREMENT

During Training: Time - Between end of initiating stimulus and completion of Step 5.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner

End of Training: Time - Between end of initiating stimulus and completion of Step 5.  
Accuracy - As indicated by:  
. Main gun elevation travel lock is locked.  
. GUN SELECT switch set to TRIGGER SAFE.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-196.

## TASK 20: PREPARE COAXIAL MACHINEGUN FOR OPERATION

### CONDITIONS/STIMULUS

System State: Table O, Column 20; coax cleared.  
Gunner Location: In Gunner's station.  
Initiating Stimuli: Task 10 completed.

### ACTION

Gunner will:

1. Insure coax is cleared (see Task 9J).
2. Insure coax safety switch is set on S.
3. Remove ammunition feed belt from feed chute and stow in ready box.

### MEASUREMENT

During Training:

Time - Between end of initiating stimulus and completion of Step 3.  
Accuracy - As indicated by match between steps given above and steps performed by Gunner.

End of Training:

Time - Between end of initiating stimulus and completion of Step 3.  
Accuracy - As indicated by:  
. Coax is cleared.  
. Coax safety switch set on S.  
. Ammunition stowed in ready box.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-196.

**APPENDIX B**  
**Tank Commander Modules**

**MODULE A. PREPARE COMMANDER'S STATION FOR OPERATION**

**CONDITIONS/STIMULUS**

System State: Table A, Column 1A.  
TC Location: In Commander's station.  
Initiating Stimuli: Platoon leader tells TC to prepare station for operation.

**ACTION**

TC will:

- 1A. Operate Commander's hatch.
- 2A. Adjust TC seat and platform.
- 3A. Operate intercommunications equipment.
- 4A. Perform before operations maintenance checks and services on Commander's station.

**TABLE A****POSITION OF CONTROLS FOR TASKS IN MODULE A  
WHEN TASK PERFORMANCE BEGINS**

<b>CONTROLS</b>	<b>POSITION OF CONTROLS</b>			
	<b>TASK</b>			
	<b>1A</b>	<b>2A</b>	<b>3A</b>	<b>4A</b>
<b>VEHICLE MASTER POWER switch</b>	<b>ON</b>	<b>ON</b>	<b>ON</b>	<b>ON</b>
<b>TURRET POWER switch</b>	<b>ON</b>	<b>ON</b>	<b>ON</b>	<b>ON</b>
<b>Domelight</b>	<b>ON</b>	<b>ON</b>	<b>ON</b>	<b>ON</b>
<b>Commander's hatch</b>	<b>CLOSED</b>	<b>PROTECTED OPEN</b>	<b>FULL OPEN</b>	<b>FULL OPEN</b>

## TASK 1A: OPERATE COMMANDER'S HATCH

### CONDITIONS/STIMULUS

System State: Table A, Column 1A  
TC Location: In Commander's station.  
Initiating Stimuli: Platoon leader tells TC to prepare station for operation.

### ACTION

- TC will:
- NOTE A: The Commander's hatch must be in one of three positions when tank is in motion. The three positions are CLOSED, PROTECTED OPEN, and FULL OPEN.
- NOTE B: The Commander's hatch can only be operated from inside the turret.
- NOTE C: All location references to the TC left or right are determined from the TC weapon sight.
1. Raise hatch from CLOSED to PROTECTED OPEN position.
    - a. Squeeze release on top of operating handle.
    - b. Turn handle counterclockwise to unlock hatch.
    - c. Push up on hatch until locking lever is in protected open position.
    - d. Push up on rear of hatch to make sure that T-handle is locked.
  2. Raise hatch from PROTECTED OPEN to FULL OPEN position.
    - a. Place right hand in center of hatch.
    - b. Grasp locking lever and push up while pushing up on hatch.

NOTE D: Hatch will pivot to vertical locked position.

    - c. Pull hatch at top edge to make sure hatch is locked in position.
  3. Lower hatch to PROTECTED OPEN position.
    - a. Grasp operating handle with one hand and locking lever with the other hand.
    - b. Push up on locking lever to release lock.
    - c. Pull hatch down slowly with hand on operating handle while guiding hatch over opening.

NOTE E: Hatch will lock in protected open.

    - d. Push up and down on operating handle to make sure hatch is locked in position.

4. Close hatch.
  - a. Grasp T-bar locking pin to right of TC with one hand and push up on locking lever with other hand to release lock.
  - b. Release hand from locking lever and grasp operating handle.
  - c. Pull down on T-bar locking pin and operating handle to lower hatch below protected open position.
  - d. Pull T-bar locking pin toward TC and pull down on hatch.
  - e. Squeeze operating handle to depress release on top of handle.
  - f. Turn handle clockwise to lock hatch closed.

#### MEASUREMENT

- During Training:                      Time - Between end of initiating stimuli and completion of Step 4f.  
Accuracy - As indicated by match between steps given above and steps performed by TC.
- End of Training:                      Time - Between end of initiating stimuli and completion of Step 4f.  
Accuracy - As indicated by hatch being raised from closed to protected open; protected open to full open; and, lowered from full open to protected open, protected open to closed.

#### REFERENCES

DEP 9-2350-255-10-1; pp. 2-93 to 2-94.

**TASK 2A: ADJUST TC SEAT AND PLATFORMS**

**CONDITIONS / STIMULUS**

System State: Table A, Column 2A.  
TC Location: In Commander's station.  
Initiating Stimuli: Task 1A is completed.

**ACTION**

- TC will:
1. While sitting in TC seat, pull up on height adjustment knob to release seat.
  2. Adjust seat height to align eyes level with commander's weapon sight by using body weight to lower seat or removing body weight to raise seat.
  3. Move head to check view in GPS extension and unity periscope.

NOTE A: Caliber .50 machinegun front and rear sights should be seen.

4. Check for maximum viewing over caliber .50 machinegun by pushing down on seat pan and seat back and standing on folded-down seat back.
5. Readjust seat as necessary to permit use of commander's weapon sight, GPS extension, and unity periscope with least amount of head movement, and to permit maximum viewing over caliber .50 machinegun.

NOTE B: Both platforms are adjusted for height at the same time with one control knob. When TC steps to main platform, seat pan will flip up 90 degrees.

NOTE C: Commander's hatch must be in protected open position before adjusting platforms.

6. Stand on turret floor and pull platform height control knob to the up position.

NOTE D: Knob is located above right edge of main platform on post.

7. Position bottom platform by hand and let knob go.
8. Stand on bottom platform and look through opening between hatch and unity periscope.
9. Readjust bottom platform as necessary so that TC is at eye level with sights of caliber .50 machinegun and has 360 degree field of vision.

10. Open Commander's hatch to full open position (See Task 1A, Step 2).
11. Press intermediate platform down with toe of boot so that when standing on the platform the TC is "name tag high" to top opening of hatch and power control handles are within reach.

#### MEASUREMENT

**During Training:**                      Time - Between end of initiating stimuli and completion of Step 11.  
Accuracy - As indicated by match between steps given above and steps performed by TC.

**End of Training:**                      Time - Between end of initiating stimuli and completion of Step 11.  
Accuracy - As indicated by:

- . TC seat adjusted to permit use of commander's weapon sight, GPS extension, and unit periscope with least amount of head movement, and to permit maximum viewing over caliber .50 machinegun.
- . Bottom platform adjusted so that TC is at eye level with sights of caliber .50 machinegun and has 360 degree field of vision.
- . Intermediate platform adjusted so that when standing on the platform, the TC is "name tag high" to top opening of hatch and power control handles are within reach.

#### REFERENCES

DEP 9-2350-255-10-1; pp. 2-94 to 2-95.

## TASK 3A: OPERATE INTERCOMMUNICATIONS EQUIPMENT

### CONDITIONS/STIMULUS

System State: Table A, Column 3A; and, an operational radio inter-communications system, Gunner and TC CVC helmets, a predetermined frequency set on the radio.  
TC Location: In Commander's station.  
Initiating Stimuli: Task 2A is completed.

### ACTION

- TC will:
1. Move PWR SW on frequency selector control to LO or HI.
  2. Turn CHAN SEL switch to same frequency as set on the radio.
  3. Put CVC helmet ON.
  4. Connect CVC cable to intercom control box.
  5. Turn MONITOR switch to ALL.
  6. Press remote intercom switch to talk to Gunner.
  7. Release switch to hear.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 7.  
Accuracy - As indicated by match between steps given above and steps performed by TC.

End of Training: Time - Between end of initiating stimuli and completion of Step 7.  
Accuracy - As indicated by TC establishing communications with Gunner.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-96.

**TASK 4A: PERFORM BEFORE-OPERATIONS MAINTENANCE CHECKS AND SERVICES ON  
COMMANDER'S STATION**

**CONDITIONS/STIMULUS:**

**System State:** Table A, Column 4A; and, an operational radio intercommunications system, Gunner and TC CVC helmets, a predetermined frequency set on the radio, gas mask M25A1, TM 9-2350-235-10-1, and DA Form 2404.

**TC Location:** In Commander's station.

**Initiating Stimuli:** Task 3A is completed.

**ACTION**

- TC will:**
1. Verify that fire bottle pressure is above minimum for the ambient temperature (see chart on bottles).
  2. Verify that fire bottles are secure in mounts.
  3. Clean all sensor lenses in Commander's station.
  4. Operate Commander's hatch through all positions (See Task 1A).
  5. Adjust Commander's seat and platforms (See Task 2A).
  6. Check seat cushions for rips and tears.
  7. Move Commander's knee guard from stowed position by lifting guard up and pivoting forward.
  8. Check condition of Commander's knee guard.
  9. Stow Commander's knee guard by pivoting guard to rear into stowed position.

**NOTE A:** Commander's knee guard should be moved from stowed position before main gun firing.

10. Check Commander's panel for operation of switches and panel light operation (See Task 1B).
11. Operate intercommunications equipment (See Task 3A).
12. Clean finned area of KY-57 Power Control Unit so that air can flow around unit.
13. Check Commander's gas particle filter equipment as follows:

- a. Take breakaway socket of air hose from mount at right of Commander's seat.
- b. Connect hose to cannister of protective mask.

**NOTE B:** GAS PARTICLE FILTER switch on Driver's master panel must be ON.

- c. Tell Loader to remove spring clip from air intake.
- d. Turn air heater ON.
- e. Regulate air temperature with air heater control knob until comfortable air temperature is reached.

- f. Mask and check operation of filter, hose, and connector.
  - g. Check microphone operation (See Task 3A).
  - h. Unmask and turn air heater OFF.
  - i. Disconnect hose from mask and connect break-away socket to mount.
  - j. Stow protective mask.
  - k. Tell Loader to replace spring clip over air intake opening.
14. List any uncorrected deficiencies on DA Form 2404.

### MEASUREMENT

- During Training:**
- Time - Between end of initiating stimuli and completion of Step 13 (or Step 14 if uncorrected deficiencies are noted).
  - Accuracy - As indicated by match between steps given above and steps performed by TC.
- End of Training:**
- Time - Between end of initiating stimuli and completion of Step 13 (or Step 14 if uncorrected deficiencies are noted).
  - Accuracy - As indicated by:
    - . Deficiencies corrected or listed on Operator portion of DA Form 2404.

### REFERENCES

DEP 9-2350-255-10-1; pp. 2-45 to 2-47; pp. 2-109 to 2-110.

## MODULE B. POWER UP COMMANDER'S STATION

### CONDITIONS/STIMULUS

System State: Table B, Column 1B; and, Commander's Station prepared for operation.

TC Location: In Commander's station.

Initiating Stimuli: Platoon leader tells TC to power up Commander's station.

### ACTION

TC will:

- 1B. Test Commander's panel lights and switches.
- 2B. Operate Commander's power control handle.
- 3B. Prepare GPS extension for operation.
- 4B. Operate Commander's weapon station in power mode.
- 5B. Operate Commander's weapon station in manual mode.

**TABLE B**

**POSITION OF CONTROLS FOR TASKS IN MODULE B  
WHEN TASK PERFORMANCE BEGINS**

CONTROLS	POSITION OF CONTROLS				
	TASK				
	1B	2B	3B	4B	5B
VEHICLE MASTER POWER switch	ON	ON	ON	ON	ON
TURRET POWER switch	ON	ON	ON	ON	ON
Domelight	ON	ON	ON	ON	ON
Commander's hatch	FULL OPEN	FULL OPEN	FULL OPEN	FULL OPEN	FULL OPEN
POWER/MANUAL lever	MANUAL	MANUAL	MANUAL	MANUAL	POWER
Main gun elevation travel lock	LOCKED	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED
Turret traverse lock	LOCKED	UNLOCKED	UNLOCKED	UNLOCKED	UNLOCKED

## TASK 1B: TEST COMMANDER'S PANEL LIGHTS AND SWITCHES

### CONDITIONS/STIMULUS

**System State:** Table B, Column 1B; and, Commander's station prepared for operation.  
**TC Location:** In Commander's station.  
**Initiating Stimuli:** Platoon Leader tells TC to power up Commander's station.

### ACTION

- TC will:**
1. Push PANEL LIGHTS TEST pushbutton on Commander's panel.
  2. Check that all lights on Commander's panel and Loader's panel are ON.  
**NOTE A:** Panel light controls on Commander's panel also control light on Loader's panel.
  3. Release PANEL LIGHTS TEST pushbutton.  
**NOTE B:** Do Steps 4 through 7 if any lights do not light. If all lights light, proceed to Step 7.
  4. Replace lamps that do not light as follows:
    - a. Unscrew and take off lens.
    - b. Pull lamp out of lens and throw lamp away.  
**NOTE C:** Throw away any lens that is cracked.
    - c. Put new lamp into lens.
    - d. Screw new lamp and lens into housing.
  5. Repeat Steps 1 and 2 to verify that all lights on Commander's panel and Loader's panel are on.
  6. Release PANEL LIGHTS TEST pushbutton.
  7. Turn PANEL LIGHTS knob clockwise to make panel lights brighter, counterclockwise to make panel lights dimmer, as appropriate.
  8. Verify that the following warning lights are not lit:
    - . ENGINE FIRE
    - . CKT BKR OPEN
    - . FIRE CONTROL MALF
    - . LOW BAT CHG
  9. Verify that GRENADES switch is in spring-loaded SAFE position.

**NOTE D:** Vehicle master power can be turned ON and OFF from either the Commander's panel or the Driver's station. When turned ON from either position, VEHICLE MASTER POWER lights on both panels come ON and VEHICLE MASTER POWER switch returns to center when released.

NOTE E: Vehicle master power can also be turned ON by setting TURRET POWER switch to ON.

NOTE F: Auxiliary hydraulic system will be on when vehicle master power is ON and vehicle engine is not running.

NOTE G: Turret electrical power is turned ON and OFF by TURRET POWER switch. TURRET POWER light comes ON when TURRET POWER switch is set to ON and switch returns to center when released.

NOTE H: Turret power goes OFF when VEHICLE MASTER POWER switch is turned OFF.

NOTE I: BATTLE RNG pushbutton is used to enter a fixed battlerange into the ballistic computer. MANUAL RANGE ADD-DROP switch is used to increase or decrease indexed range.

10. If LOW BAT CHG indicator light comes ON when using auxiliary hydraulic power, tell Driver to start engine and set TACTICAL IDLE switch to ON. (This will recharge batteries).

NOTE J: Anytime sudden loss of hydraulic pressure is detected, a large hydraulic leak is found, or a loud high-pitched squeal is heard, immediately set turret power OFF and tell Driver to shut down engine.

11. If ENGINE FIRE warning light comes ON, check with Driver for status of fire extinguisher operation.
12. If FIRE CONTROL MALF light comes ON when TURRET POWER switch is set to ON, tell Gunner to set LRF RANGE switch to SAFE.
13. If FIRE CONTROL MALF light stays ON with LRF RANGE switch in SAFE, tell Gunner to perform computer self-test.
14. If CKT BKR OPEN light comes ON, tell Loader to re-set tripped circuit breaker in turret networks box and press LAMP RESET button.

### MEASUREMENT

During Training:

Time -- Between end of initiating stimuli and completion of Step 14.

Accuracy - As indicated by match between steps given above and steps performed by TC.

- Time - Between end of initiating stimuli and completion of Step 14.
- End of Training:
- Accuracy - As indicated by:
- . Commander's panel and Loader's panel lights come on when PANEL LIGHTS TEST pushbutton is pushed.
  - . PANEL LIGHTS knob adjusted for panel light illumination.
  - . Warning lights not lit.
  - . GRENADES switch in SAFE.

REFERENCES

- DEP 9-2350-255-10-1; pp. 2-96 to 2-98.  
DEP 9-2350-255-10-2; p. 2-20.

## TASK 2B: OPERATE COMMANDER'S POWER CONTROL HANDLES

### CONDITIONS/STIMULUS

System State: Table B, Column 2B  
TC Location: In Commander's Station  
Initiating Stimuli: Task 1B is completed.

### ACTION

- TC will:
- NOTE A: Commander's power control handle takes control away from Gunner's handles when Commander's handle palm switch is depressed.
1. Grasp Commander's power control handle and squeeze palm switch.
  2. With palm switch squeezed, traverse turret right and left by moving handle to the right then to the left.  
  
NOTE B: Traversing speed increases as handle is turned further and slows as handle is turned toward center position.
  3. With palm switch squeezed, elevate gun by pulling back on handle and then depress gun by pushing forward on handle.  
  
NOTE C: Rate of movement of main gun increases as handle is pulled/pushed further and slows as handle is pulled/pushed toward center position.  
  
NOTE D: Releasing palm switch causes turret and main gun to stop moving. When power control handle is released, handle returns to center position.

### MEASUREMENT

During Training:

Time - Between end of initiating stimuli and completion of Step 3.

Accuracy - As indicated by match between steps given above and steps performed by TC.

Time - Between end of initiating stimuli and  
completion of Step 3.  
End of Training:  
Accuracy - As indicated by:  
. Turret is traversed both right and  
left.  
. Main gun is elevated.  
. Main gun is depressed.

REFERENCES

DEP 9-2350-255-10-1; p. 2-99.

## TASK 3B: PREPARE GPS EXTENSION FOR OPERATION

### CONDITIONS/STIMULUS

System State: Table B, Column 3B; and, GPS prepared for operation.  
TC Location: In Commander's Station.  
Initiating Stimuli: Task 2B is completed.

### ACTION

TC will: NOTE A: The GPS extension at the Commander's Station is primarily controlled from the Gunner's station. Control of magnification; selection of day or night sight; filters, laser range, and thermal image are not available at the Commander's station.

1. Adjust GPS extension browpad as follows:
  - a. Turn thumbscrew above browpad to the left until browpad can be moved.
  - b. Pull browpad out of holding groove.
  - c. Slide browpad arm to right or left groove (depending on whether right or left eye is used to view through eyepiece).
  - d. Turn thumbscrew above browpad to the right to lock browpad in place.

NOTE B: Browpad may be bent to fit contour of CVC helmet.

2. Adjust focus in GPS extension by turning diopter ring.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 2.  
Accuracy - As indicated by match between steps given above and steps performed by TC.

End of Training: Time - Between end of initiating stimuli and completion of Step 2.  
Accuracy - As indicated by:

- . Browpad adjusted for right or left eye use.
- . GPS extension focused.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-99; p. 2-112.

## TASK 4B: OPERATE COMMANDER'S WEAPON STATION IN POWER MODE

### CONDITIONS/STIMULUS

System State: Table B, Column 4B.  
TC Location: In Commander's Station.  
Initiating Stimuli: Task 3B is completed.

### ACTION

TC will: 1. Move POWER/MANUAL lever to POWER.

NOTE A: Make sure that area around Commander's weapon station is clear.

NOTE B: Do not traverse Commander's weapon station when Loader's hatch is open.

2. Grasp Commander's weapon station power control handle, squeeze palm switch and push thumb control to right to traverse right and left to traverse left.

NOTE C: Traverse speed increases as pressure is applied to thumb control; speed decreases as pressure is removed from thumb control.

3. Turn elevation crank handle clockwise to elevate Commander's weapon; counterclockwise to depress weapon.

4. Release thumb control to lock Commander's weapon in azimuth.

5. Pull knob on elevation crank handle out and turn 1/2 turn to lock Commander's weapon in elevation; reverse to unlock weapon.

6. For open hatch power operation of the Commander's weapon station:

a. Open hatch (See Task 1A).

b. Move spring-loaded intermediate platform down to position for standing.

c. Remove Commander's weapon station power control handle from mounting and place in mount on outside of Commander's weapon station.

### MEASUREMENT

During Training:

Time - Between end of initiating stimuli and completion of Step 6.

Accuracy - As indicated by match between steps given above and steps performed by TC.

Time - Between end of initiating stimuli and completion of Step 6.

End of Training:

Accuracy - As indicated by:

- . Commander's weapon station traverses both left and right in power mode.
- . Commander's weapon is elevated and depressed.
- . Commander's weapon is locked and unlocked in both azimuth and elevation.

REFERENCES

DEP 9-2350-255-10-1; pp. 2-100 to 2-101.

## TASK 5B: OPERATE COMMANDER'S WEAPON STATION IN MANUAL MODE

### CONDITIONS/STIMULUS

System State: Table B, Column 5B  
TC Location: In Commander's station.  
Initiating Stimuli: Commander's weapon station power mode fails.

### ACTION

TC will: NOTE A: Manual operation is provided as a backup if the power mode fails.

1. Move POWER/MANUAL lever to MANUAL.
2. Adjust Commander's seat and platform (See Task 2A).
3. Grasp manual traverse ring and move to the right or left to traverse Commander's weapon station to right or left.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 3.  
Accuracy - As indicated by match between steps given above and steps performed by TC.

End of Training: Time - Between end of initiating stimuli and completion of Step 3.  
Accuracy - As indicated by:  
. Commander's weapon station traverses both left and right in manual mode.

### REFERENCES

DRP 9-2350-255-10-1; p. 2-101.

MODULE C. OPERATE COMMANDER'S MACHINEGUN (CALIBER .50)

CONDITIONS/STIMULUS

System State: Table C, Column 1C; Commander's machinegun loaded.  
Commander Location: In Commander's station.  
Initiating Stimuli: As described for each task.

ACTION

Commander will do the following tasks:

- 1C. Clear Commander's machinegun.
- 2C. Remove Commander's machinegun.
- 3C. Install Commander's machinegun.
- 4C. Bore-sight Commander's machinegun.
- 5C. Check and adjust headspace on Commander's machinegun.
- 6C. Check and adjust timing on Commander's machinegun.
- 7C. Load Commander's machinegun.
- 8C. Zero Commander's machinegun.
- 9C. Clear misfire in Commander's machinegun.
- 10C. Prepare Commander's machinegun for travel.

TABLE C

POSITION OF CONTROLS FOR TASKS IN MODULE C  
WHEN TASK PERFORMANCE BEGINS

CONTROLS	POSITION OF CONTROLS									
	1C	2C	3C	4C	5C	6C	7C	8C	9C	10C
VEHICLE MASTER POWER switch	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
TURRET POWER switch	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
POWER/MANUAL lever	POWER	POWER	POWER	POWER	POWER	POWER	POWER	POWER	POWER	POWER
Elevation crank trigger safety switch	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE	SAFE
Commander's hatch	FULL OPEN	FULL OPEN	FULL OPEN	FULL OPEN	FULL OPEN	FULL OPEN	FULL OPEN	FULL OPEN	FULL OPEN	FULL OPEN

## TASK 1C: CLEAR COMMANDER'S MACHINEGUN

### CONDITIONS/STIMULUS

System State: Table C, Column 1C; Commander's machinegun loaded.  
Commander Location: In Commander's station.  
Initiating Stimuli: Completion of firing, or requirement to boresight,  
or remove Commander's machinegun.

### ACTION

Commander will:

1. Insure machinegun is cooled before clearing.
2. Set machinegun safety switch to SAFE.
3. Raise cover.
4. Lift extractor from ammunition belt.
5. Remove belt from receiver.
6. Stow belt in container.
7. Set machinegun safety switch to FIRE.
8. Pull charger handle to rear and hold it there.
9. Insure that there is no round in chamber or T-slot of bolt.
10. Allow charger handle to go forward.
11. Close cover.
12. Press butterfly trigger.
13. Set machinegun safety switch to SAFE.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 13.  
Accuracy - As indicated by match between steps given above and steps performed by Commander.

End of Training: Time - Between end of initiating stimuli and completion of Step 13.  
Accuracy - As indicated by:  
. Belt is removed from receiver.  
. No round is in chamber or T-slot of bolt.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-104.

## TASK 2C: REMOVE COMMANDER'S MACHINEGUN

### CONDITIONS/STIMULUS

System State: Table C, Column 2C; Commander's machinegun cleared.  
Commander Location: In Commander's station.  
Initiating Stimuli: Securing station.

### ACTION

- Commander will:
1. Insure machinegun safety switch is set to SAFE.
  2. Insure machinegun is cleared (see Task 1C).
  3. If machinegun is hot (has been fired within the past hour) put on asbestos gloves.
  4. Pull charger handle to rear until barrel locking spring lug is centered in hole on right side of receiver (3/8 inch) and hold it there.

NOTE A: Charger handle may be held in this position by raising cover and inserting a spent link between trunnion and bolt. Remove link, allow charger handle to go forward, and close cover at Step 6.

5. Unscrew barrel and pull barrel from receiver.
6. Allow charger handle to go forward.
7. Stow barrel as required.
8. Pull spring-loaded rear mounting pin from mount.
9. Push receiver forward and up to disengage front mounting adapter from slots.
10. Lift receiver from mount.
11. Remove front mounting adapter from pintle mount hole on receiver.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 11.  
Accuracy - As indicated by match between steps given above and steps performed by Commander.

End of Training: Time - Between end of initiating stimuli and completion of Step 11.  
Accuracy - As indicated by:  
. Machinegun safety switch is set to SAFE.  
. Barrel is removed from receiver.  
. Machinegun receiver is removed from mount.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-107.

## TASK 3C: INSTALL COMMANDER'S MACHINEGUN

### CONDITIONS/STIMULUS

**System State:** Table C, Column 3C; Commander's machinegun cleared and removed.  
**Commander Location:** In Commander's station.  
**Initiating Stimuli:** Platoon leader tells TC to prepare tank weapons systems for a tactical mission.

### ACTION

- Commander will:**
1. Insure machinegun is cleared (Task 1C).
  2. Insure machinegun safety switch is set to SAFE.
  3. Insert front adapter into pintle mount holes on receiver.
  4. Mount receiver into weapon mount by sliding front adapter into slot on mount.
  5. Retract spring-loaded rear mounting pin.
  6. Line-up rear receiver holes with mount holes.
  7. Insert rear mounting pin into mount holes and receiver holes.
  8. Pull charger handle to rear until barrel locking spring lug is centered in hole on right side of receiver (3/8 inch) and hold it there.
- NOTE A:** Charger handle may be held in this position by raising cover and inserting a spent link between trunnion and bolt. Remove link, allow charger handle to go forward, and close cover at Step 11.
9. Screw barrel into receiver until fully seated in barrel extension.
  10. Allow charger handle to go forward.
  11. Check headspace and timing (see Tasks 5C and 6C).

### MEASUREMENT

**During Training:**

**Time** - Between end of initiating stimuli and completion of Step 11.  
**Accuracy** - As indicated by match between steps given above and steps performed by Commander.

**End of Training:**

**Time** - Between end of initiating stimuli and completion of Step 11.  
**Accuracy** - As indicated by:

- . Front adapters in receiver are in slot on mount.
- . Rear mounting pin is inserted in mount and receiver.
- . Barrel is firmly seated in barrel extension.
- . Headspace and timing are adjusted.

**REFERENCES**

DEP 9-2350-255-10-1; p. 2-102.

## TASK 4C: BORESIGHT COMMANDER'S MACHINEGUN

### CONDITIONS/STIMULUS

**System State:** Table C, Column 4C; machinegun installed and cleared; tank on level ground; target with 90° corner at about 500 meters.

**Commander Location:** In Commander's station.

**Initiating Stimuli:** Platoon leader tells TC to prepare tank weapons systems for a tactical mission.

### ACTION

- Commander will:**
1. Insure bolt is forward.
    - a. Pull charger handle to rear and hold it there.
    - b. Press butterfly trigger.
    - c. Allow charger handle to go forward.
  2. Pull out on latch and up on lock on back of receiver.
  3. Slide backplate up and off of receiver.
  4. Remove driving spring rod from receiver by pushing rod forward and to left, then pulling rod out.
  5. Pull charger handle to rear until bolt pin lines up with removing hole.
  6. Pull bolt pin out of receiver.
  7. Allow charger handle to go forward.
  8. Remove bolt from receiver.
    - a. Open cover.
    - b. Push bolt to rear.
    - c. Pull bolt from receiver.
    - d. Close cover.
  9. While sighting through bore of barrel, aim machinegun at target using manual controls (see Task 5B).

NOTE A: Right eyepiece of binocular may be used as an aid in sighting through bore of barrel.

NOTE B: Do not move machinegun or weapon station during Steps 10-16.
  10. Look through weapon sight.
  11. Loosen lockscrew above azimuth adjustment screw.
  12. Turn azimuth adjustment screw to align vertical boresight line with vertical line of target.
  13. Tighten lockscrew above azimuth adjustment screw.
  14. Loosen lockscrew by elevation adjustment screw.
  15. Turn elevation adjustment screw to align horizontal boresight line with horizontal line of target.
  16. Tighten lockscrew by elevation adjustment screw.

NOTE C: If reticle does not align with target, notify organizational maintenance.

17. Push bolt into receiver until bolt pin hole lines up with removing hole.
18. Insert bolt pin into removing hole.
19. Insert driving spring rod forward and to right until rod locks in place.
20. Slide backplate down on to receiver until locked in place.
21. Check headspace and timing (see Tasks 5C and 6C).

#### MEASUREMENT

**During Training:**                      **Time** - Between end of initiating stimuli and completion of Step 21.  
**Accuracy** - As indicated by match between steps given above and steps performed by Commander.

**End of Training:**                      **Time** - Between end of initiating stimuli and completion of Step 21.  
**Accuracy** - As indicated by:  
    . Vertical and horizontal lines of bore-sight reticle are aligned with target.  
    . Bolt is in machinegun.  
    . Driving spring rod is in machinegun.  
    . Backplate is locked on machinegun.  
    . Headspace and timing are adjusted.

#### REFERENCES

DEP 9-2350-255-10-1; pp. 2-105 through 2-106.

## TASK 5C: CHECK AND ADJUST HEADSPACE ON COMMANDER'S MACHINEGUN

### CONDITIONS/STIMULUS

System State: Table C, Column 5C; machinegun cleared; headspace and timing gage.  
Commander Location: In Commander's station.  
Initiating Stimuli: Task 3C or 4C completed.

### ACTION

- Commander will:
1. Insure machinegun is cleared (see Task 1C).
  2. Insure machinegun safety switch is set to SAFE.
  3. Raise cover.
  4. Pull charger handle to rear until barrel locking spring lug is centered in hold in right side plate (about 3/8 inch) and hold it there.  
  
NOTE A: Charger handle may be held in this position by raising cover and inserting a spent link between trunnion and bolt. Remove link, allow charger handle to go forward, and close cover at Step 7.
  5. Screw barrel all the way into barrel extension.
  6. Unscrew barrel two notches (clicks).
  7. Allow charger handle to go forward.
  8. Check barrel for rotation by attempting to turn barrel--barrel should not turn in either direction.  
  
NOTE B: If barrel turns, inspect barrel notches and barrel locking spring for damage. Replace barrel or report defective barrel locking spring to organizational maintenance.
  9. Pull charger handle fully to rear.
  10. Slowly allow charger to go forward.
  11. Pull charger handle to rear until barrel extension is 1/16 inch from trunnion and hold it there.
  12. Raise extractor.
  13. Insert GO end of headspace gage in T-slot (between face of bolt and end of barrel) up to ring on gage.
  14. Attempt to insert NO GO end of gage into T-slot.
  15. Remove gage.
  16. Allow charger handle to go forward.  
  
NOTE C: If GO end of gage enters T-slot up to ring, and NO GO end of gage does not enter T-slot, headspace is correct. Continue with Step 19. If GO end of gage does not enter T-slot up to ring, headspace is too tight. Continue with Step 17. If NO GO end of gage enters T-slot, headspace is too loose. Continue with Step 18.

17. Loosen headspace as follows:
  - a. Pull charger handle to rear until barrel locking spring lug is centered in hole in right side plate (3/8 inch) and hold it there.
  - b. Unscrew barrel one notch.

NOTE D: Do not unscrew barrel more than five notches beyond first setting of two notches in Step 6 (total of seven notches from when barrel is all the way screwed in). If headspace is still too tight, notify organizational maintenance.

- c. Repeat Steps 10 through 16 and NOTE C.
18. Tighten headspace as follows:
  - a. Pull charger handle to rear until barrel locking spring lug is centered in hole in right side plate (3/8 inch) and hold it there.
  - b. Screw barrel in one notch.
  - c. Repeat Steps 10 through 16 and NOTE C.

NOTE E: If headspace cannot be adjusted (GO end of gage enters T-slot up to ring, NO GO end of gage does not enter T-slot) following procedures above, check barrel notches and replace barrel if necessary, or notify organizational maintenance.

19. When headspace is correct, check and adjust timing (see Task 6C).

#### MEASUREMENT

**During Training:**  
Time - Between end of initiating stimuli and completion of Step 19.  
Accuracy - As indicated by match between steps given above and steps performed by Commander.

**End of Training:**  
Time - Between end of initiating stimuli and completion of Step 19.  
Accuracy - As indicated by:

- . Machinegun is cleared.
- . Machinegun safety switch is set to SAFE.
- . GO end of gage enters T-slot up to ring, NO GO end of gage does not enter T-slot.
- . Barrel is not unscrewed more than seven notches.

#### REFERENCES

Supplemental Headspace and Timing Procedure to TM 9-1005-213-10; pp. 2-3.

## TASK 6C: CHECK AND ADJUST TIMING ON COMMANDER'S MACHINEGUN

### CONDITIONS/STIMULUS

**System State:** Table C, Column 6C; machinegun cleared and headspace correct; headspace and timing gage.  
**Commander Location:** In Commander's station.  
**Initiating Stimuli:** Task 5C completed.

### ACTION

- Commander will:**
1. Insure machinegun is cleared (see Task 1C).
  2. Insure machinegun safety switch is set to **SAFE**.
  3. Check headspace (see Task 5C).
  4. Pull charger handle fully to rear.
  5. Slowly allow charger handle to go forward.
  6. Pull charger to rear until barrel extension is 1/16 inch from trunnion and hold it there.
  7. Insert **NO FIRE** end of timing gage between barrel extension and trunnion, with bevel against barrel notches.
  8. Slowly allow charger handle to go forward.
  9. Press butterfly trigger.
  10. Pull charger handle to rear enough to remove timing gage and hold it there.
  11. Remove timing gage.  
**NOTE A:** If machinegun does not fire in Step 9, continue with Step 12.  
If machinegun fires in Step 9, timing is early. Continue with Step 17.
  12. Insert **FIRE** end of timing gage between barrel extension and trunnion, with bevel against barrel notches.
  13. Slowly allow charger handle to go forward.
  14. Press butterfly trigger.
  15. Pull charger handle to rear enough to remove timing gage and hold it there.
  16. Remove timing gage.  
**NOTE B:** If machinegun fires in Step 14, timing is correct. Continue with Step 34.  
If machinegun does not fire in Step 14, timing is late. Continue with Step 17.
  17. Pull charger handle fully to rear.
  18. Slowly allow charger handle to go forward.
  19. Remove backplate (see Task 4C, Steps 2-3).
  20. Screw timing adjustment nut all the way down (to the left, clockwise).
  21. Pull charger handle to rear until barrel extension is 1/16 inch from trunnion and hold it there.

22. Insert FIRE end of timing gage between barrel extension and trunnion, with bevel against barrel notches.
23. Push up on rear of trigger bar.  
NOTE C: If machinegun fires, notify organisational maintenance.
24. Screw timing adjustment nut up (to the right, counterclockwise) one notch.
25. Push up on rear of trigger bar.  
NOTE D: If machinegun fires, continue with Step 26.  
If machinegun does not fire, repeat steps 24 and 25 until machinegun fires, then continue with Step 26.
26. Screw timing adjustment nut up (to the right, counterclockwise) two notches.
27. Pull charger handle to rear enough to remove timing gage and hold it there.
28. Remove timing gage.
29. Allow charger handle to go forward.
30. Slide backplate down on to receiver until locked in place.
31. Pull charger handle fully to rear.
32. Slowly allow charger handle to go forward.
33. Repeat Steps 6 through 16 two times.
34. Close cover.

### MEASUREMENT

During Training:

Time - Between end of initiating stimuli and completion of Step 34.

Accuracy - As indicated by match between steps given above and steps performed by Commander.

End of Training:

Time - Between end of initiating stimuli and completion of Step 34.

Accuracy - As indicated by:

- . Machinegun is clear.
- . Machinegun safety switch is set to SAFE.
- . Backplate is locked on machinegun.
- . Machinegun does not fire when NO FIRE end of gage is inserted and does fire when FIRE end of gage is inserted.

### REFERENCES

Supplemental Headspace and Time Procedure to TM 9-1005-213-10; pp. 4-5.

## TASK 7C: LOAD COMMANDER'S MACHINEGUN

### CONDITIONS/STIMULUS

**System State:** Table C, Column 7C; machinegun installed and cleared; at least two belts ammunition in original containers.

**Commander Location:** In Commander's station.

**Initiating Stimuli:** Platoon leader tells TC to prepare tank weapons systems for a tactical mission.

### ACTION

- Commander will:**
1. Record ammunition lot numbers from container.
  2. Set container in holder at left of machinegun.
  3. Open cover of machinegun.
  4. Insure machinegun is cleared (see Task 1C).
  5. Insure machinegun safety switch is set to SAFE.
  6. Lay ammunition belt in receiver with first round just past holding pawls.
  7. Close cover.
  8. Pull charger handle to rear.
  9. Slowly return charger handle to forward position.
  10. Pull charger handle to rear.
  11. Return charger handle to forward position.

**NOTE A:** Machinegun is now loaded and will fire if butterfly trigger on backplate is pressed, even though safety switch is set to SAFE.

### MEASUREMENT

**During Training:**

**Time** - Between end of initiating stimuli and completion of Step 11.

**Accuracy** - As indicated by match between steps given above and steps performed by Commander.

**End of Training:**

**Time** - Between end of initiating stimuli and completion of Step 11.

**Accuracy** - As indicated by:

- . Ammunition lot numbers recorded.
- . Machinegun fires when butterfly trigger is pressed.

### REFERENCES

DEP 9-2350-255-10-1; pp. 2-102 through 2-103.

### NOTE

Loading procedure differs from procedure in the DEP. The Commander's weapon station has been redesigned so there is no ready box, no feed chute, and no requirement to link ammo belts together.

## TASK 8C: ZERO COMMANDER'S MACHINEGUN

### CONDITIONS/STIMULUS

**System State:** Table C, Column 8C; machinegun installed, bore-sighted, and loaded; target at about 500 meters.  
**Commander Location:** In Commander's station.  
**Initiating Stimuli:** Platoon leader tells TC to prepare weapons systems for a tactical mission.

### ACTION

- Commander will:**
1. Insure Driver's hatch is closed.
  2. Set machinegun safety switch to FIRE.
  3. Look through Commander's weapon sight.
  4. Lay 500 meter zero dot on reticle on zero target at about 500 meters using power or manual controls (see Task 4B or Task 5B).
  5. Fire a 10-20 round burst (2-4 tracers) by pulling down on elevation crank handle.

**NOTE A:** Machinegun will fire as long as elevation crank handle is pulled.

**NOTE B:** If misfire occurs, perform failure to fire procedures (Task 9C).

6. Set machinegun safety switch to SAFE.

**NOTE C:** If strike area is on zero point of target, machinegun is zeroed.

**NOTE D:** Do not move machinegun or weapon station during Steps 7-11.

7. Loosen lock screw above azimuth adjustment screw.
8. Turn azimuth adjustment screw until 500 meter zero dot on reticle is aligned with strike area in azimuth (vertical alignment).
9. Tighten lock screw above azimuth adjustment screw.
10. Loosen lock screw by elevation adjustment screw.
11. Turn elevation adjustment screw until 500 meter zero dot on reticle is aligned with strike area in elevation (horizontal adjustment).

**NOTE E:** Repeat Steps 2-11, until strike area is on zero point of target.

### MEASUREMENT

**Time -** Between end of initiating stimuli and completion of Step 6, when machinegun is zeroed.

**Accuracy -** As indicated by match between steps given above and steps performed by Commander.

Time - Between end of initiating stimuli and completion of Step 6, when machinegun is zeroed.

End of Training:

Accuracy - As indicated by:

- . When machinegun is fired with 500 meter zero dot laid on target at 500 meters, strike area is on zero point of target.

REFERENCES

DEP 9-2350-255-10-1; pp. 2-106 through 2-107.

## TASK 9C: CLEAR MISFIRE IN COMMANDER'S MACHINEGUN

### CONDITIONS/STIMULUS

System State: Table C, Column 9C; machinegun installed, loaded; has been fired, target at 500 meters, misfire occurs.  
Commander Location: In Commander's station.  
Initiating Stimuli: Commander's machinegun misfires.

### ACTION

Commander will:

1. Keep machinegun pointed at target (down range).
2. Wait five seconds after misfire occurs.
3. Press butterfly trigger.

NOTE A: If machinegun fires, misfire is cleared.  
If machinegun does not fire, continue with Step 4.

4. Wait five seconds.
5. Pull charger handle to rear and return to forward position.  
(See TM 9-1005-213-10.)
6. Wait five minutes.
7. Clear machinegun of chambered rounds (see Task 1C).

### MEASUREMENT

Time - Between end of initiating stimuli and performance of Step 3; between completion of Step 3 and beginning of Step 4; between completion of Step 5 and beginning of Step 7; between beginning of Step 7 and completion of Step 7.

During Training: Accuracy - As indicated by match between steps given above and steps performed by Commander.

Time - Between end of initiating stimuli and performance of Step 3; between completion of Step 3 and beginning of Step 4; between completion of Step 5 and beginning of Step 7; between beginning of Step 7 and completion of Step 7.

End of Training: Accuracy - As indicated by:  
. Machinegun fires (Step 3)  
or . Machinegun is cleared (Step 7).

### REFERENCES

DEP 9-2350-255-10-1; p. 2-104.

## TASK 10C: PREPARE COMMANDER'S MACHINEGUN FOR TRAVEL

### CONDITIONS/STIMULUS

System State: Table C, Column 1C; machinegun cleared.  
Commander Location: In Commander's station.  
Initiating Stimuli: Platoon leader tells TC to prepare weapons systems for a tactical mission.

### ACTION

- Commander will:
1. Insure machinegun safety switch is set to SAFE.
  2. Insure machinegun is cleared (see Task 1C).
  3. Point machinegun toward front.
  4. Set POWER/MANUAL lever to POWER.
  5. Use manual elevation crank handle to place machinegun at zero elevation (see Task 4B, Step 3).
  6. Lock elevation crank handle (see Task 4B, Step 5).

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 6.  
Accuracy - As indicated by match between steps given above and steps performed by Commander.

End of Training: Time - Between end of initiating stimuli and completion of Step 6.  
Accuracy - As indicated by:

- . Machinegun safety switch is set to SAFE.
- . Machinegun is cleared.
- . Machinegun is pointed toward front.
- . POWER/MANUAL lever is set to POWER.
- . Machinegun is locked at zero elevation.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-197 (Change 1).

## MODULE D. OPERATE GRENADE LAUNCHER

### CONDITIONS/STIMULUS

System State: Table D, Column 1D; grenade launchers unloaded;  
12 grenades.  
Commander Location: In Commander's station.  
Initiating Stimuli: As described for each task.

### ACTION

Commander will do the following tasks:

- 1D. Load grenade launcher.
- 2D. Fire grenades.
- 3D. Take immediate action for misfire of grenade launcher.
- 4D. Unload grenade launcher (Prepare for travel).

**TABLE D**

**POSITION OF CONTROLS FOR TASKS IN MODULE D  
WHEN TASK PERFORMANCE BEGINS**

CONTROLS	POSITION OF CONTROLS			
	TASKS			
	1D	2D	3D	4D
VEHICLE MASTER POWER switch	OFF	OFF	ON	ON
TURRET POWER switch	OFF	OFF	ON	ON
GRENADES switch	SAFE	SAFE	READY	SAFE
Commander's hatch	OPEN	OPEN	CLOSED	CLOSED

## TASK 1D: LOAD GRENADE LAUNCHER

### CONDITIONS/STIMULUS

System State: Table D, Column 1D; grenade launchers unloaded;  
12 grenades.  
Commander Location: In Commander's station.  
Initiating Stimuli: Platoon leader tells TC to prepare weapon systems  
for tactical mission.

### ACTION

Commander will:

1. Insure VEHICLE MASTER POWER switch is OFF  
(light is not lit).
2. Remove covers from launchers.
3. Insure launcher tubes (6 on each launcher)  
are clean of dirt or sharp objects.

NOTE A: Do not place any part of body in  
front of launchers during loading.

4. Insert a grenade into a launcher tube, clip  
end down.
5. When grenade is fully inserted, turn grenade  
one-half turn clockwise.

NOTE B: Repeat Steps 4 and 5 until six grenades  
are loaded in each launcher.

### MEASUREMENT

During Training:

Time - Between end of initiating stimuli and  
completion of Step 5 for all six  
grenades in each launcher.

Accuracy - As indicated by match between steps  
given above and steps performed by  
Commander.

End of Training:

Time - Between end of initiating stimuli and  
completion of Step 5 for all six  
grenades in each launcher.

Accuracy - As indicated by:

- . VEHICLE MASTER POWER switch is OFF (light  
is not lit).
- . Six grenades are loaded in each launcher.
- . Grenades are loaded clip end down.
- . Each grenade make positive contact in  
its launcher tube.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-108.

## TASK 2D: FIRE GRENADES

### CONDITIONS/STIMULUS

System State: Table D, Column 1D; grenade launchers loaded.  
Commander Location: In Commander's station.  
Initiating Stimuli: Tactical situation requires a smoke screen.

### ACTION

- Commander will:
1. Close hatches (see Task 1A).
  2. Tell Loader and Driver to close hatches.
  3. Insure no personnel are within 200 meters of tank.
  4. Turn on TURRET POWER switch (insure light is lit).
  5. Insure turret is pointed toward where smoke is desired.

NOTE A: Correction for wind direction must be made.

6. Hold GRENADE switch in READY position.
7. Push SALVO 1 button to fire 3 additional grenades from each launcher.

NOTE B: GRENADE switch must be held in READY position while SALVO 1 or SALVO 2 button is pressed to fire grenades. When GRENADE switch is released, switch returns to SAFE position.

NOTE C: In case of failure to fire take action as in Task 3D.

NOTE D: If any launched grenade(s) fails to explode (dud), insure personnel remain at least 200 meters from grenade. If launched grenade has not exploded within 15 minutes, notify explosive ordnance disposal of type, quantity and location of unexploded grenade(s).

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 8.  
Accuracy - As indicated by match between steps given above and steps performed by Commander.



## TASK 3D: TAKE IMMEDIATE ACTION FOR MISFIRE OF GRENADE LAUNCHER

### CONDITIONS/STIMULUS

System State: Table D, Column 3D; grenade launcher(s) loaded with at least one grenade; all hatches closed.  
Commander Location: In Commander's station.  
Initiating Stimuli: Grenade launcher misfires.

### ACTION

- Commander will:
1. Insure all hatches remain closed through Step 6.
  2. Wait 10 seconds after misfire.
  3. Attempt to fire (see Task 2D) using salvo button for which misfire occurred.
  4. Repeat Steps 2 and 3 one time.
  5. Insure GRENADE switch is at SAFE (release GRENADE switch).
  6. Wait five minutes after last attempt to fire.
  7. Remove misfired grenade(s).

NOTE A: Misfired grenades should be placed at least 200 meters from personnel and equipment.

NOTE B: Notify explosive ordinance disposal (EOD) personnel of type, quantity and location of misfired grenade(s).

### MEASUREMENT

Time - Between end of initiating stimuli and completion of Step 3 (first time); between completion of Step 3 (first time) and completion of Step 3 (second time); between completion of Step 3 (second time) and beginning of Step 7; between beginning of Step 7 and completion of Step 7.

During Training:

Accuracy - As indicated by match between steps given above and steps performed by Commander.

End of Training:

**Time** - Between end of initiating stimuli and completion of Step 3 (first time); between completion of Step 3 (first time) and completion of Step 3 (second time); between completion of Step 3 (second time) and beginning of Step 7; between beginning of Step 7 and completion of Step 7.

**Accuracy** - As indicated by:

- . Two fire attempts are made.
- . Hatches remain closed until 5 minutes after second attempt to fire.
- . Misfired grenade(s) removed to at least 200 meters from equipment and personnel.
- . EOD personnel are notified of type, quantity and location of misfired grenade(s).

REFERENCES

DEP 9-2350-255-1; p. 2-108.1.

**TASK 4D: UNLOAD GRENADE LAUNCHER (PREPARE FOR TRAVEL)**

**CONDITIONS/STIMULUS**

System State: Table D, Column 4D; grenade launcher loaded.  
Commander Location: In Commander's station.  
Initiating Stimuli: Platoon leader tells TC to prepare weapons systems for travel.

**ACTION**

Commander will: 1. Set VEHICLE MASTER POWER switch to OFF (insure light is not lit).

NOTE A: Do not place any part of body in front of launchers during unloading.

2. Remove grenades from launchers.
3. Place covers over launchers.

**MEASUREMENT**

During Training: Time - Between end of initiating stimuli and completion of Step 3.  
Accuracy - As indicated by match between steps given above and steps performed by Commander.

End of Training: Time - Between end of initiating stimuli and completion of Step 3.  
Accuracy - As indicated by:  
. VEHICLE MASTER POWER switch is OFF (light is lit).  
. No grenades are in launchers.  
. Covers are placed on launchers.

**REFERENCES**

DEP 9-2350-255-10-1; p. 2-109.

**MODULE E: POWER DOWN AND SECURE COMMANDER'S STATION**

**CONDITIONS/STIMULUS**

System State: Table E  
TC Location: In Commander's station.  
Initiating Stimuli: Return to assembly area.

**ACTION**

TC will:

1E. Power down and secure Commander's station.

**TABLE E**  
**POSITION OF CONTROLS FOR MODULE E**  
**WHEN TASK PERFORMANCE BEGINS**

<b>CONTROLS</b>	<b>POSITION</b>
<b>VEHICLE MASTER POWER switch</b>	<b>ON</b>
<b>TURRET POWER switch</b>	<b>ON</b>
<b>Domelight</b>	<b>ON</b>
<b>Hatch</b>	<b>FULL OPEN</b>

## TASK 1E: POWER DOWN AND SECURE COMMANDER'S STATION

### CONDITIONS/STIMULUS

System State: Table N  
TC Location: In Commander's station.  
Initiating Stimuli: Return to assembly area.

### ACTION

TC will: 1. Set VEHICLE MASTER POWER switch to OFF and check that VEHICLE MASTER POWER light goes out.

NOTE A: Turret power goes off when vehicle master power is turned off.

NOTE B: Auxiliary hydraulic system goes off (when engine is not running) when vehicle master power is turned off.

2. Turn domelight switch OFF.
3. Remove Commander's weapon and secure as required (See Task 2C).
4. Close Commander's hatch (See Task 1A).
5. Exit through Loader's hatch.

### MEASUREMENT

During Training: Time - Between end of initiating stimuli and completion of Step 5.  
Accuracy - As indicated by match between steps given above and steps performed by TC.

End of Training: Time - Between end of initiating stimuli and completion of Step 5.  
Accuracy - As indicated by:

- . VEHICLE MASTER POWER is OFF.
- . Domelight is OFF.
- . Commander's weapon is removed and secured.
- . Commander's hatch closed.
- . TC exits tank.

### REFERENCES

DEP 9-2350-255-10-1; p. 2-110.