

ADA 185784

2472

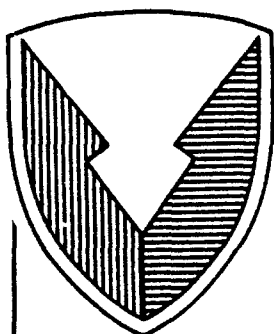
1116

A185784

R D & E

C E N T E R

Technical Report



No. 13282

MAIN BATTLE TANK CREW TASK ANALYSIS

SEPTEMBER 1987

Jeff Parks
U.S. Army Tank-Automotive Command
ATTN: AMSTA-ZET
Warren, MI 48397-5000

By

APPROVED FOR PUBLIC RELEASE:
DISTRIBUTION IS UNLIMITED

U.S. ARMY TANK-AUTOMOTIVE COMMAND
RESEARCH, DEVELOPMENT & ENGINEERING CENTER
Warren, Michigan 48397-5000

20020809128

AN-20292

NOTICES

This report is not to be construed as an official Department of the Army position.

Mention of any trade names or manufacturers in this report shall not be construed as an official endorsement or approval of such products or companies by the U.S. Government.

Destroy this report when it is no longer needed. Do not return it to the originator.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188
Exp. Date: Jun 30, 1986

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED			1b. RESTRICTIVE MARKINGS		
2a. SECURITY CLASSIFICATION AUTHORITY			3. DISTRIBUTION/AVAILABILITY OF REPORT APPROVED FOR PUBLIC RELEASE. DISTRIBUTION IS UNLIMITED.		
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE					
4. PERFORMING ORGANIZATION REPORT NUMBER(S)			5. MONITORING ORGANIZATION REPORT NUMBER(S) 13282		
6a. NAME OF PERFORMING ORGANIZATION U.S. Army Tank-Automotive Command		6b. OFFICE SYMBOL (If applicable) AMSTA-ZET	7a. NAME OF MONITORING ORGANIZATION U.S. Army Tank-Automotive Command		
6c. ADDRESS (City, State, and ZIP Code) Warren, MI 48397-5000			7b. ADDRESS (City, State, and ZIP Code) Warren, MI 48397-5000		
8a. NAME OF FUNDING/SPONSORING ORGANIZATION		8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER		
8c. ADDRESS (City, State, and ZIP Code)			10. SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.
11. TITLE (Include Security Classification) Main Battle Tank Crew Task Analysis (Unclassified)					
12. PERSONAL AUTHOR(S) Parks, Jeffery S.					
13a. TYPE OF REPORT Final		13b. TIME COVERED FROM 9/86 TO 12/86		14. DATE OF REPORT (Year, Month, Day) 87 Sep	
15. PAGE COUNT 52					
16. SUPPLEMENTARY NOTATION					
17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number) M-1, Four-Man Crew		
FIELD	GROUP	SUB-GROUP			
19. ABSTRACT (Continue on reverse if necessary and identify by block number) Current trends in tank development require a reduction in the number of crew members necessary to fight and maintain the vehicle for extended periods of time. Doctrinally, the capabilities and mission profiles of future tanks remain independent of crew size or configuration. This four-man analysis establishes a baseline by enumerating the tasks necessary to operate the current ABRAMS system. Its intent is to facilitate alignment of the MAMP technologies with the required crew operational tasks, so that the reduced crew can maintain the same level of performance as a four-man tank.					
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS			21. ABSTRACT SECURITY CLASSIFICATION Unclassified		
22a. NAME OF RESPONSIBLE INDIVIDUAL Jeff Parks			22b. TELEPHONE (Include Area Code) (313) 574-6295		22c. OFFICE SYMBOL AMSTA-ZET

Summary

Results are presented of a TACOM in-house initiative detailing the duties and responsibilities of each crewmember in a four-man tank. The Abrams series main battle tank was used as a baseline for operational tasks. Typical SOP's and personal experience were then applied to tactical doctrine to complete the analysis.

Acknowledgments

Special thanks to CPT Robert Morris and Karl Van Der Waerden for their assistance in compiling and organizing the material presented in this report.

Introduction

SUBJECT: This report is a compendium of the tasks, duties, and responsibilities each crewmember in an Abrams series tank is expected to perform.

PURPOSE: The study was conducted as part of an in-house crew reduction effort at TACOM. Its purpose is to establish an operational baseline of the required tasks each crewmember must perform in order to effectively operate a tank in a combat environment.

The results presented are intended for use as a tool to evaluate emerging technologies as they apply to crew work load reduction.

SCOPE: The scope of this study lists the individual technical and tactical duties performed by the Loader, Driver, Gunner, Tank Commander, and a composite of the Platoon Leader and Platoon Sergeant.

Each section covers a specific crew member starting with the lowest ranking (the Loader) and ending with the Platoon Leader/Sergeant. The sections are further organized by grouping the tasks into operational families which can be found under every crewmember who takes part in the operation.

It is important to note however, that although crew tasks are arranged according to duty positions, each crewmember must be able to perform the required tasks of all his subordinates.

TABLE OF CONTENTS

Section		Page
1.0.	Loader Task List.....	9
1.1.	Operational Tasks.....	9
1.2.	Main Weapon Firing Tasks.....	10
1.3.	Secondary Armament.....	11
1.4.	Ammunition Handling Tasks.....	11
1.5.	Maintenance Tasks.....	12
1.6.	Tactical Tasks.....	12
1.7.	Observation.....	12
1.8.	Communication.....	13
1.9.	Security.....	13
1.10.	Additional Duties.....	13
2.0.	Driver's Task List.....	14
2.1.	Operational Tasks.....	14
2.2.	Ammunition Handling Tasks.....	16
2.3.	Maintenance Tasks.....	16
2.4.	Tactical Tasks.....	17
2.5.	Observation.....	18
2.6.	Communication Tasks.....	18
2.7.	Security.....	18
2.8.	Additional Duties.....	18
3.0.	Gunner's Task List.....	19
3.1.	Operational Tasks.....	19
3.2.	Main Weapon Tasks.....	23
3.3.	Secondary Armament Tasks.....	24
3.4.	Ammunition Handling Tasks.....	24
3.5.	Fire Control.....	24
3.6.	Maintenance Tasks.....	24
3.7.	Tactical Tasks.....	25
3.8.	Engagement Tasks.....	25
3.9.	Observation Tasks.....	26
3.10.	Communication Tasks.....	26
3.11.	Security.....	26
3.12.	Additional Duties.....	26
4.0.	Tank Commander.....	27
4.1.	Operational Tasks.....	27
4.2.	Main Weapon Tasks.....	27
4.3.	Secondary Armament Tasks.....	27
4.4.	Ammunition Handling Tasks.....	27
4.5.	Fire Control Tasks.....	28
4.6.	Maintenance Functions.....	28

TABLE OF CONTENTS (Continued)

Section	Page
4.7. Tactical Tasks.....	29
4.8. Engagement Tasks.....	31
4.9. Navigation Tasks.....	32
4.10. Observation Tasks.....	33
4.11. Communication Tasks (Command and Control).....	33
4.12. Security.....	33
4.13. Additional Duties.....	33
5.0. Platoon Leader/Platoon SGT.....	34
5.1. Operational Tasks.....	34
5.2. Main Weapon Tasks.....	34
5.3. Secondary Armament Tasks.....	34
5.4. Ammunition Handling Tasks.....	34
5.5. Fire Control Tasks.....	35
5.6. Maintenance Functions.....	35
5.6.1. Check.....	35
5.6.2. Perform.....	36
5.7. Tactical Tasks.....	36
5.7.1. Offense	36
5.7.2. Defense.....	39
5.8. Special Combat Operations.....	42
5.9. Engagement Tasks.....	43
5.10. Navigation Tasks.....	44
5.11. Observation Tasks.....	44
5.12. Communication Tasks (Command and Control).....	44
5.13. Security.....	45
Selected Bibliography.....	47
List of References.....	49
Distribution List.....	Dist-1

1.0. LOADER TASK LIST

1.1. OPERATIONAL TASKS

- Reset circuit breakers in turret networks box
- Operate NBC system/turret blower motor
- Operate emergency engine shutoff
- Ground guide vehicle
- Assist refueling tank
- Operate elevation uncouple
- Assist in boresight operations
- Prepare loader's station for operation¹
 - Open/lock loader's hatch
 - Erect crosswind sensor
 - Install loader's machinegun
 - Install antennas
 - Prepare ammunition door knee switch
 - Clear ammunition door tracks
 - Place main gun Safe/Arm handle in the Safe position
 - Verify that main gun breech is closed
 - Ensure that all other crewmembers have entered their stations
 - Unlock turret traverse lock
 - Place loader's guards in desired position
 - Report ready for power operation to tank commander
 - Wait for commander to turn on turret power
 - Turn on/adjust dome-light
 - Ensure main gun status safe light is lit
 - Turret blower switch off
 - Ensure Gun turret drive switch manual light lit
 - Turn on amplifier, AM 1780/VRC
 - Main power switch on normal mode
 - Power circuit breaker switch on
 - INT ACCENT switch on
 - Set RADIO TRANS wsitch to desired location
 - Put on and connect CVC helmet
 - Set intercom select to INT ONLY
 - Adjust seat
 - Adjust hatch
 - Install night vision viewer if required
 - Ready Report to Tank Commander
- Power down and secure loader's station¹
 - Stow loader's guards
 - Remove night vision viewer (if installed)
 - Wait until main gun has been traversed to rear
 - Lock turret traverse lock

- Verify main gun is clear
- Verify main gun has been safed
- Close breech
- Ensure gun turret drive is in manual mode
- Verify turret blower is off
- Ensure main gun status SAFE light is lit
- Close semi-ready ammunition door
- Close ready ammunition door
- Close hull ammunition door
- Stow coaxial ammunition belt
- Turn off amplifier switch
- Remove and disconnect CVC helmet
- Turn off dome-light
- Remove loader's machinegun
- Stow crosswind sensor
- Remove and stow antennas
- Close and lock loader's hatch

1.2. MAIN WEAPON FIRING TASKS

Loader's pre-fire operations¹

- Ensure Main Gun is out of travel lock
- Ensure Turret Lock is unlocked
- Have Gun traversed over front fender
- Lock Turret Lock
- Remove Main Gun Muzzle Plug from end of tube
- Unlock Turret Lock
- Ensure gun turret drive is powered up
- Check replenisher fluid level
 - Add/delete FRH as required
- Open breech
- Return Breech Operating Handle to upright position
- Perform a function check on the Breech
- Assist in performing a firing circuit test
- Clear main gun
- Emplace Loader's guards
- Place stub base catcher in position for firing
- Ensure Commander's foot guard is in place for firing

Loader's firing operations

- Receive the fire command
- Open Ammo compartment door
- Identify ammunition
- Retrieve desired round from ammo rack
- Close Ammo compartment door
- Ensure Tube is clear
- Load main gun
- Arm main gun
- Ensure main gun status ARMED light is lit
- Ensure turret blower switch is ON
- Announce UP over intercom

Brace and ready another round for loading
Loader's Misfire Procedures¹

Receive the Misfire announcement
Ensure Main Gun is Armed
Ensure main gun status ARMED light is lit
On order, open Breech
Examine Primer for firing pin indentation
 If not indented, examine firing pin
 If indented do next procedure
Rotate round 180 degrees
Spit on primer
Reload round
Arm main gun
Ensure main gun status ARMED light is lit
Ensure turret blower switch is ON
Announce UP over intercom
Brace for recoil
On Order, extract round
Dispose of IAW unit SOP

Loader's post fire operations¹

Place SAFE/ARMED handle in safe position
Ensure main gun status Safe light is lit
Clear main gun
Turn off turret blower
Stow ammunition door knee switch
Stow loader's guards and stub base catcher
Ensure commander's footguard is stowed
Remove spent stub casings
Close turret bustle ammunition doors
Close hull ammunition door
Dispose of spent casings

1.3. SECONDARY ARMAMENT

Assemble Loader's weapon
Disassemble Loader's weapon
Perform a function check on Loader's weapon
Mount, and Maintain loader's weapon
Operate 7.62mm Loader's weapon
Correct stoppages on loader's weapon
Change barrels on loader's weapon
Dispose of spent links and casings
Load, Clear and maintain Grenade Launchers
Engagement Targets with 7.62mm Weapon

1.4. AMMUNITION HANDLING TASKS

Know and load Ammo Stowage Plan
Inspect and maintain Ammo Stowage Compartments
Stow, Inspect, and Maintain all Ammunition

Assist in ammunition breakdown
Recognize ammunition and uses

1.5. MAINTENANCE TASKS

Inspect Turret hydraulics
Inspect hydraulic system reservoir
Help inspect and maintain Track and Suspension system
Check fire bottle pressure gauges
Clean all fire sensor lenses
Check engine and transmission fluid levels
Inspect tools and BII
Inspect and maintain ammo stowage compartments
Inspect and maintain loader's station
Assist other crewmen as required

1.6. TACTICAL TASKS

Cuts and mounts camouflouge
Probes minefields
Assists in NBC operations
 Takes radiac readings
 Uses M-8 alarm paper
 Conducts local decontamination
 Administers NBC antidotes as required
Assists in consolidation and reorganization (wounded, ammo, fuel)
Reassigns to replace casualties as necessary
Deliberate occupation recon and security team leader
Emplaces/retrieves concertina wire
Assists in construction of fighting positions
 Clears fields of fire
 Assists in emplacement/retrieval of minefields
 Improves fighting positions
Assists in quartering party activities
 Recon for opfor
 NBC recon
 Locates and marks obstacles and booby traps
 Marks entrances, exits, and internal routes
 Locate and mark vehicle position
Assists in vehicle recovery operations
Assists in processing of EPW's
Assists in vehicle abandonment procedures
Conducts local dismounted recons: fords, obtacles, etc.
Distributes range cards
Assists in demolition operations

1.7. OBSERVATION

Observe target area of responsibility (approximately 180 degree

left side)

Acquire I.D. and prioritize targets

Use night vision equipment for target acquisition (pvs-2,5 etc.)

Identify U.S. and foreign equipment

1.8. COMMUNICATION

Radio watch and monitor additional net on command tanks

Places hot loop in/out

Operate and perform operator maintenance on receiver and receiver-transmitter, t/sec wiring harness, and amplifier 1780

Communicate using visual signals

1.9. SECURITY

Emplace and retrieve mines

Sagger guard

Air guard

LP/OP

Local security

Assists in providing 360 degree security during tactical operations

1.10 ADDITIONAL DUTIES

Assist in land navigation

Assist vehicle commander as necessary

Provide driver relief as necessary

Runner/messenger

Assists in messing activities

2.0. DRIVER'S TASK LIST

2.1. OPERATIONAL TASKS

Prepare driver's station for operation¹

- Set parking brake
- Inspect fire extinguisher handles
- Ensure personnel heater is off
- Ensure night periscope switch is off
- Bilge pump switch off
- Smoke generator off
- Light switch off
- HI beam off
- Tactical idle off
- Fuel tank selector switch set to right or left front
- Fuel gauge 1/4 minimum
- Low fuel level light off
- Set fuel tank selector switch to rear
- Ensure fire extinguisher 2nd shot cover is closed
- Make sure gauges all read to the leftmost position
- Dome-light off
- Announce "Power"
- Turn on vehicle master power
- Ensure master power light is lit
- Circuit breakers on
- Fire light off
- Personnel heater light off
- Night periscope light off
- Bilge pump light off
- Smoke generator light off
- HI beam light off
- Parking/service brake light on
- Press panel lights test button
- Check electrical gauge reads 23 to 29 volts
- Cable disconnected light off
- Circuit breaker open light off
- Turret seal pressure zero
- Connect CVC helmet
- Set intercom selector switch to INT only
- Adjust driver's seat
- Adjust periscopes
- Close and lock driver's hatch
- Adjust T bar
- Close drain valves
- Ready report to tank commander

Engine starts and checks ¹

- Set transmission control to neutral
- Have loader turn amplifier (1780) off
- Announce "Fire in the hole"
- Press engine push to start button
- Engine started light, lit momentarily, then turns off
- Warning and caution lights off
- Have commander turn NBC main system off
- Parking brake system pressure gauge 1,000-1,700 psi
- Press service pedal
- Release parking brake
- Place transmission control in D position
- Twist throttle handles slowly rearward RPM 1,450-1,550
tank should not move
- Twist throttle control forward, place tank in neutral
- Press and let go parking break pedal
- Press and hold service brake pedal
- Place transmission in drive
- Steer left, right, center, and listen for clunking sound
- Place transmission in neutral
- Release service brake
- Report all ready to commander

Place Tank in motion

- Press and hold service brake
- Release parking brake
- Set transmission control to needed speed range
- Release service brake
- Ensure parking/service brake light is not lit
- Move out

Engine shutdown operations ¹

- Twist throttle control forward
- Press and hold service brake pedal
- Set transmission to neutral
- Ensure parking brake system pressure is between
1000-1700 psi
- Press and let go parking brake
- Release service brake
- Ensure parking/service brake light is lit
- Ensure NBC main system is off
- Tactical idle switch off
- Bilge pump switch/light off
- Smoke generator switch/light off
- All other auxiliary systems switches/lights off
- Lights switch off
- Engine, transmission, and fire warning lights off
- Master caution and maintenance monitor lights off
- Allow engine 2 minutes to cool down
- Set engine shutoff switch to shutoff
- Stow steer control

Power down and secure driver's station ¹

Personnel heater switch/light off
Night periscope switch/light off
Bilge pump switch/light off
Smoke generator switch/light off
Lights switch off
High beam off
Tactical idle switch off
Set fuel tank selector switch to rear
Open drain valves
Record odometer reading
Record engine hours reading
Turn vehicle master power switch off
Place driver's seat in closed hatch position
Close and lock driver's hatch
Verify turret traverse lock is locked
Remove/disconnect CVC helmet
Lower driver's seat back
Raise driver's headrest
Exit station

2.2. AMMUNITION HANDLING TASKS

Know and load Ammo Stowage Plan
Inspect and maintain Ammo Stowage Compartments
Stow, Inspect, and Maintain all Ammunition
Assist in ammunition breakdown
Recognize ammunition and uses

2.3. MAINTENANCE TASKS

Perform daily PMCS
 Maintain operator's part of equipment record folder
 Look for leaks
 Fuel
 Oil
 Hydraulic fluid
 Identify class of leaks: I,II,III
 Take appropriate action
 Examine vehicle for signs of tampering
 Examine for damaged or missing parts
 Maintain track and suspension
 Adjusting link assembly
 Track tension
 Roadwheels
 Compensating idlers
 Hubs
 Shock absorbers
 Torsion bars
 Skirts

- Support roller assemblies
- Sprocket assemblies
- Track assembly
 - Track blocks
 - End connectors
 - Center guides
 - Pins
- Final drive plugs and housings
- Muzzle reference sensor
- Batteries
- Precleaners
- Transmission oil
- Engine oil level
- Engine compartment fire extinguisher lenses
- Engine hydraulics and heat exchanger
- Fire extinguisher system
- Parking brake system hydraulic pressure
- Driver's hatch
- Personnel heater
- NBC Main system
- Driver's NBC equipment
- Inspect tools and BII
- Perform other maintenance as required

2.4. TACTICAL TASKS

- Cut and mount camouflage
- Probe minefields with vehicle
- Assist in construction of fighting positions with w/out plow
- Assist in vehicle recovery operations
- Assist in vehicle abandonment procedures
- Evade an ATGM
- Protect against nuclear attack with w/out warning
- Participate in a tactical road march
- Conduct proper terrain driving
- Swim/ford a water obstacle
- Cross a bridge or a raft
- Create smoke
- Operate buttoned up
- Ascend and descend a steep grade
- Cross a vertical obstacle
- Cross a ditch
- Move in smoke
- Move during darkness
- Take action on contact
- Enter/leave an overwatch position
- Drive in Traveling formation
- Drive in Traveling Overwatch formation
- Drive in Bounding Overwatch formation
- Prepare vehicle for operations

Assist in conduct of Fire and Maneuver
React to indirect fire
Occupy battle positions
Remove an injured crewman from the vehicle
Provide first aid as required
Provide buddy aid to an NBC casualty
Give the alarm for an NBC hazard
Detect NBC contamination and conduct local decon
Move under direct fire
Select temporary fighting positions
Assist in processing of EPW's
Apply customs and laws of war
Occupy hull down and turret down positions in primary,
alternate, and supplemental fighting positions

2.5. OBSERVATION

Observe target area of responsibility (approximately 120 degree front)
Acquire, identify, and prioritize targets
Use night vision equipment
Identify U.S. and foreign equipment

2.6. COMMUNICATION TASKS

Pull radio watch
Communicate using visual signaling techniques
Send a radio message
Set up a hot loop

2.7. SECURITY

Emplace and retrieve mines
LP/OP
Assist in providing 360 degree security during tactical operations
Assist providing local security

2.8. ADDITIONAL DUTIES

Recognize ammunition and its uses
Dispose of spent links and casings
Assist vehicle commander as necessary
Train, supervise, and inspect subordinates

3.0. GUNNER'S TASK LIST

3.1. OPERATIONAL TASKS

- Place the turret into manual operation
- Perform a manual elevation check
- Place the turret into power operation
- Perform a zero pressure check
- Manually operate gun/turret drive
- Assist in refueling tank
- Assist in vehicle recovery operations
- Assist in evacuation of wounded crewman
- Operate gunner's power control handles
- Operate GPS ballistic doors
- Power up gunner's station
- Operate GPS/GAS/TIS
- Install/remove laser safety guard
- Operate laser rangefinder
- Place main gun in travel lock

Prepare gunner's station for operation¹

- Verify that gun/turret drive switch is on manual
- Ensure loader has safed main gun
- Install coax machinegun
- Verify installation of laser safety guard
- Report ready for power operation to TC
- Wait for tank commander to power up turret
- Turn on and adjust dome-light
- Put on and connect CVC helmet
- Set intercom select lever to desired setting
- Set fire control mode to manual
- Unlock main gun travel lock
- Adjust seat
- Adjust browpads
- Adjust chestrest
- Conduct a GPS/TIS panel lights test
- Ensure hydraulic pressure gage is between 1,500 and 1,700 psi
- Ensure computer power switch is on
- Conduct a computer panel lights test
- Close and latch computer cover
- Set thermal mode switch to standby
- Verify turret traverse lock is unlocked
- Verify gun/turret drive lights at loader's station are powered
- GPS functional check
 - Check defroster switch mode
 - Set gun select switches to desired settings

Set ammunition select switch to desired setting
 Open GPS ballistic doors
 Set FLIR/CLEAR/SHIR switch to CLEAR
 Adjust GPS
 Adjust reticle knob
 Set fire control mode switch to NORMAL
 Focus GPS eyepiece
 Adjust NORMAL MODE DRIFT knobs

 Computer self test
 Ensure computer power switch is on
 Squeeze and hold gunner's power control handles
 Press and release test push button
 Ensure display says pass
 Computer data check¹
 Press/release AMMO TEMP key
 Press/release ENTER key
 Press/release BARO PRESS key
 Press/release ENTER key
 Press/release AIR TEMP key
 Press/release ENTER key
 Press in MRS switch and ensure light is lit
 Press/release boresight key
 Press/release ENTER key
 Ensure MRS switch is out and the light off
 Press/release boresight key
 Press/release ENTER key
 Set gun select switch to coax and ensure light is lit
 Press/release AMMO SUBDES key
 Press/release ENTER key
 Press/release BS ADJUST key
 Press/release ENTER key
 Press/release ZERO key
 Press/release ENTER key
 Set gun select switch to main and ensure light is lit
 Set AMMO SELECT switch to SABOT and ensure light is lit
 Press/release AMMO SUBDES key
 Press/release ENTER key
 Press/release BS ADJUST key
 Press/release ENTER key
 Press/release ZERO key
 Press/release ENTER key
 Set AMMO SELECT switch to HEAT and ensure light is lit
 Press/release AMMO SUBDES key
 Press/release ENTER key
 Press/release BS ADJUST key
 Press/release ENTER key
 Press/release ZERO key
 Press/release ENTER key

Close and latch computer cover

Checkout TIS¹

- Set FLTR/CLEAR/SHTR switch to SHTR
- Set POLARITY switch to white hot
- Set thermal magnification lever to 3x
- Set unit test pattern switch to PCU - fault light off
- Ensure no test patterns visible in image display
- Set unit test pattern switch to ICU - fault light off
- Ensure upper right hand corner of display is dark and no symbols displayed
- Set unit test pattern switch to EU - fault light off
- Set THERMAL MODE SWITCH to ON
- Ensure displayed fault light goes off within 5 sec.
- Ensure corner markers and symbols displayed in image
- Set thermal magnification lever to 10x
- Ensure moving reticle and symbols visible
- Check that TRU ready light is ON
- Set unit test pattern switch to TRU
- Ensure fault light goes out within 5 sections
- Verify image has reticle in center, verticle bar, and symbols visible
- Turn and verify CONTRAST knob function
- Turn and verify SENSITIVITY knob function
- Turn and verify RETICLE knob function
- Flip POLARITY switch from WHITE HOT to BLACK HOT and verify function
- Lay on a target at least 1,000 meters away
- Adjust CONTRAST knob
- Adjust SENSITIVITY knob
- Adjust FOCUS knob
- Manually enter 2680 into computer
- Adjust SYMBOLS knob
- Set thermal magnification lever to 3x
- Place THERMAL MODE switch to desired setting
- Place thermal ballistic door in desired position
- Set FLTR/CLEAR/SHTR switch to CLEAR

Adjust Gunner's Auxiliary Sight (GAS)

- Turn on reticle brightness knob if required
- Lay on a target
- Adjust focusing ring
- Set filter knob to desired position
- Set reticle select knob to desired position

Check lead system

- Verify that fire control switch is in normal mode
- Verify that GUN SELECT switch is set to MAIN
- Set AMMUNITION SELECT switch to HEAT
- Verify magnification lever is set to 10x

Verify FLTR/CLEAR/SHTR switch is set to CLEAR
Squeeze and hold gunner's power control handles
Manually enter 2,000 meter range into computer
Rotate gunner's power control handles left & right
Verify that reticle moves
Rotate gunner's power control handles back to center
Ensure turret moves when handles are centered

Check firing circuits¹

Have loader set GUN/TURRET DRIVE switch to MANUAL
Have loader close the breech
Install firing circuit tester
Have loader place SAFE/ARMED handle in ARMED position
Ensure GUN SELECT switch MAIN light is lit
Operate master blaster and observe circuit tester flash
Press trigger on manual elevation crank and observe flash
on circuit tester
Have loader turn on power to gun/turret drive
Have loader verify FIRE CONTROL switch is set to NORMAL
Press triggers on gunner's power control handles and
observe flash on circuit tester
Lock turret traverse lock
Press triggers on gunner's power control handles
Observe that light on circuit tester does not flash
Unlock turret traverse lock
Lock main gun elevation travel lock
Press triggers on gunner's power control handles
Observe that light on circuit tester does not flash
Unlock main gun elevation travel lock
Place GUN SELECT switch in TRIGGER SAFE position
Press triggers on gunner's power control handles
Observe that light on circuit tester does not flash
Place GUN SELECT switch in MAIN position
Place GUN/TURRET DRIVE in MANUAL position
Press triggers on gunner's power control handles
Observe flash on circuit tester
Stow circuit tester
Have loader place SAFE/ARM handle in SAFE position

Crosswind sensor check

Have loader erect/cover crosswind sensor
Manually enter 5 degree cant into the computer
Press and release CROSSWIND key
Verify that computer shows less than 3 mph
Close and latch computer cover
Have loader uncover crosswind sensor
Give ready report to tank commander

Gunner's pre-fire operations¹

Set GUN SELECT switch to TRIGGER SAFE

- Ensure TRIGGER SAFE light is lit
- Set AMMUNITION SELECT switch to proper setting
- Ensure proper ammunition light is lit
- Enter computer manual inputs
- Update MRS
- Load coax
- Place chestrest in firing position

Gunner's main gun firing operations

- Set GUN SELECT switch to MAIN
- Ensure MAIN light is lit
- Verify that proper AMMUNITION SELECT light is lit
- Remove laser safety guard
- Arm 1ST RTN/LAST RTN laser RANGE switch
- Identify and track target
- Depress laser range button
- Announce "on the way!" and squeeze trigger

Gunner's coax firing operations

- Place machinegun manual safety in "F" position
- Set GUN SELECT switch to COAX
- Ensure GUN SELECT light is lit
- Identify and track targets
- Announce "on the way!" and squeeze trigger

Gunner's post fire operations

- Check that GUN SELECT switch is in TRIGGER SAFE position
- Ensure that the TRIGGER SAFE light is lit
- Ensure that laser RANGE switch is SAFE
- Install laser safety guard
- Clear coaxial machinegun
- Stow chestrest

Power down and secure gunner's station

- Remove coax
- Close and latch computer cover
- Turn THERMAL MODE switch to OFF position
- Set GUN SELECT switch to TRIGGER SAFE position
- SAFE laser RANGE switch
- Install laser safety guard
- Close GPS ballistic doors
- Stow chestrest
- Lock main gun elevation travel lock
- Disconnect and remove CVC helmet
- Turn off dome-light
- Verify turret traverse lock has been locked
- Verify main gun has been safed

3.2. MAIN WEAPON TASKS

Safe/Arm main armament
Boresight and Zero main gun
Apply misfire procedures
Assemble, disassemble, and perform a function check on main gun
Inspect the replenisher system
Inspect and clean the bore
Inspect and clean the bore evacuator
Drop, inspect and clean the breech
Fire main gun

3.3. SECONDARY ARMAMENT TASKS

Assemble, disassemble, and perform a function check on coax
Install/remove coaxial machinegun
Zero coaxial machinegun
Manually operate coax
Correct stoppages on coax
Change barrels on coax
Dispose of spent links and casings

3.4. AMMUNITION HANDLING TASKS

Know and load ammunition storage plan
Stow, inspect, and maintain all ammunition
Assist in ammunition breakdown
Recognize ammunition and uses

3.5. FIRE CONTROL

Inspect the ballistic computer
Inspect the ballistic drive
Inspect the periscope and the infinity sight
Inspect the telescope
Boresight all sights
Conduct firing circuit test
Crosswind sensor computer check
Update MRS
Perform a cant unit check
Perform a superelevation check
Perform a lead accuracy check
Test fire control system

3.6. MAINTENANCE TASKS

Replace thrown track
Adjust track
Inspect roadwheels and support rollers
Inspect sprocket and track assembly

- Inspect muzzle reference sensor
- Inspect turret traverse and gun elevation locks
- Inspect gunner's power control handles
- Inspect gun turret traverse and elevation servos
- Check accumulator pressure and hydraulic system reservoir
- Check auxiliary hydraulic pump
- Inspect main gun mount and recoil system
- Clean optics
- Perform a TIS check
- Perform computer self tests
- Perform computer data checks
- Perform laser rangefinder tests
- Perform GPS functional check
- Perform GAS functional check
- Inspect gunner's station dome light
- Maintain gunner's part of equipment record folder

3.7. TACTICAL TASKS

- Assist in consolidation and reorganization (wounded, ammo, fuel)
- Assigned to replace casualties as necessary
- Assists in processing of EPW'S
- Makes up range cards
- Assists in demolition operations
- Assists in vehicle abandonment procedures
- Assist in vehicle preparation for nuclear strike
- React to nuclear burst
- Determine location using a military map
- Install/retrieve mines
- Administer nerve agent antidote to another crewman
- Operate an M8 chemical detection alarm/paper
- Conduct partial decontamination
- Select temporary fighting positions
- Apply customs/laws of war governing forbidden targets, tactics etc.
- Call for and adjust indirect fire
- Operate TSEC speech security equipment
- Prepare tank for fording

3.8. ENGAGEMENT TASKS

- Index ammunition type into computer
- Laser range to target
 - Single returns
 - Multiple returns
- Know and employ the frontal fire pattern
- Know and employ the cross fire pattern
- Know and employ the depth fire pattern
- Identify and prioritize targets using all sights
- Know and react to fire commands

Engage targets using battlesight gunnery techniques
Engage targets with precision gunnery techniques
Engage targets from range card data
Estimate range
Engage a moving target(s) from a stationary tank
Engage a moving target(s) from a moving tank
Engage troops with coax
Engage multiple targets with main gun and coax
Move from a hide to a hull down position and engage targets
Perform immediate action on a misfire main gun round
Employ correct actions on contact

3.9. OBSERVATION TASKS

Observe target area of responsibility
Assist in clearing of fields of fire
Acquire, identify, and prioritize targets
Identify U.S. and foreign equipment
Operate thermal sight
Operate daylight channel
Identify minefield markers
Collect and report information
Operate GAS

3.10. COMMUNICATION TASKS

Perform radio watch
Operate intercom/radio system
Send radio messages
Mount and perform operator PMCS on radio sets
Use CEOI

3.11. SECURITY

Assists in providing 360 degree security during tactical operations
Provide local security
Scan from an overwatch position
Use thermal channel during periods of limited visibility

3.12. ADDITIONAL DUTIES

Acting vehicle commander in TC's absence
Perform Loader duties as necessary
Apply first aid as required
Perform driver's duties as necessary
Train, supervise, and inspect subordinates

4.0. TANK COMMANDER

4.1. OPERATIONAL TASKS

- Continuous operations
 - Enforce sleep plan
 - Perform stand to
 - All equipment is loaded and stowed
 - Complete precombat checks
 - All personnel are manning battle positions
 - Simultaneously start engines
 - Vehicles are ready to move out
 - Report status to commander
- Operate during periods of limited visibility
 - Rain
 - Smoke
 - Fog
 - Darkness
 - Use night vision devices
- Operate on all types of terrain
 - Desert
 - Arctic
 - Mountain
 - Forest and jungle

4.2. MAIN WEAPON TASKS

- Fire main gun from commander's station
- Apply misfire procedures
- Supervise main gun maintenance
- Keep track of equivalent rounds through tube/breech
- Ensure main gun stays clear of obstacles
- Verify presence of FRH in replenisher

4.3. SECONDARY ARMAMENT TASKS

- Assemble, disassemble, and perform a function check on Commander's weapon
- Mount/dismount commander's weapon
- Correct stoppages
- Perform maintenance on cdr's weapon
- Operate commander's weapon
- Load/unload and clear Commander's weapon

4.4. AMMUNITION HANDLING TASKS

- Know and load ammunition storage plan

Stow, inspect, and maintain all ammo
Assist in ammunition breakdown
Recognize ammunition
Know ammunition ranges and uses

4.5. FIRE CONTROL TASKS

Perform operator's portion of fire control system checkout
Boresight and zero all sights and weapons
Update MRS
Receive, interpret, and apply all fire control data

4.6. MAINTENANCE FUNCTIONS

Responsible for condition of entire vehicle

Inspect

Visually inspect vehicle

leaks
Tampering
Damage
Missing parts
Cleanliness
Paint/rust

Common areas

Skirts
MRS
Final drive housings and plugs
Precleaners
Gunner's station
Loader's station
Driver's station
Fire extinguisher handles
Track
Center guides
End connectors
Dead track

Check

Gunner's maintenance responsibilities
Loader's maintenance responsibilities
Driver's maintenance responsibilities
Frequent maintenance areas
Adjusting link assembly
Track tension
Roadwheels
Compensating idler
Roadarms
Shock absorbers
Torsion bars
Support roller assemblies
Hub and sprocket assemblies

- Track assy
- All fluid levels
 - Engine
 - Transmission
- Replenisher
- Precleaners
- Main gun
- Secondary armament
- Support roller assemblies
- Perform
 - All maintenance as necessary
 - Operator's part of equipment folder
 - Verify operation
 - Commander's seat
 - Guards
 - Hatch
 - Commander's NBC system
 - Commander's panel
 - Commander's power control handle
 - GPS extension
 - Commander's weapon station
 - Commander's weapon
 - Commander's seat
 - Subordinate crew stations

4.7. TACTICAL TASKS

- Offense
 - Drills
 - Battle, Platoon, Company
 - Action
 - Left, Right, Front, Rear
 - Contact
 - Indirect fire
 - Air attack
 - Understand and employ wingman concept
 - Know use and employment of basic formations
 - Wedge
 - Vee
 - Echelon
 - Line
 - Column
 - Coil
 - Herringbone
 - Understand and use the principles of cover and concealment
 - Use proper terrain driving techniques
 - Use hull down and turret down positions
 - Camouflage personnel and equipment
 - Ensure light, noise, and litter discipline are

- maintained
- Ensure proper security is maintained
 - LP/OP
 - Local security
 - Area security
- Properly use 3 types of movement techniques
 - Traveling
 - Traveling overwatch
 - Bounding overwatch
 - Alternate bounds
 - Successive bounds
 - Overwatch
 - Vision check position security
 - Occupy hull down fire position
 - Assign areas of fire
 - Orientate weapons
 - Search for targets
 - Visual/thermal
- Movement
 - Select next position
 - Select routes
 - Determine likely enemy locations
 - Pre-plan actions on contact
 - Back down from fighting positions
 - Avoid skylining
 - Scan area for displaced features
 - Ensure entire movement is covered by overwatch element
- Actions on contact
 - Return fire
 - Alert crew/unit
 - Report contact to commander

Defense

- Receive the order
 - Commander's intent and concept of how battle will go
 - Element's role in units defense
 - Positions to be reconned, prepared, and occupied
 - Direct fire orientation
 - SOP's
 - Special instructions
 - Allocate time
 - Determine covered/concealed routes in/out of BP's
 - Determine likely enemy avenues of approach
 - Plan emplacement of obstacles
 - Locate battle/fighting positions
 - Primary
 - Alternate
 - Supplementary
 - Coordinate for construction of BP's
- Perform pre-combat checks

- Occupy battle positions
 - Deliberate Occupation
 - Halt behind battle position
 - Coil
 - Conduct dismounted recon to select BP's
 - Receive sectors of fire
 - Move tank into hide position behind fighting position
 - Clear fighting positions
 - Establish security
 - Prepare range cards
 - Clear fields of fire
 - Camouflage position
 - Improve position
 - Construct alternate/supplemental positions
 - Establish wire communication
 - Set up chemical alarms
 - Emplace obstacles
 - Hasty Occupation
 - Approach battle position from friendly side
 - Receive individual fighting positions
 - Move tank to hull down fighting position
 - Receive
 - TRP's
 - Engagement areas
 - Routes to subsequent battle positions
 - Exit routes
 - Prepare range cards
 - Back tank down to turret down position
 - Prepare to fight
- Conduct the Defense
 - SOP's
 - Operation Order
 - Fragmentary Orders

4.8. ENGAGEMENT TASKS

- Estimate range
- Engage troops with coax
- Engage multiple targets
- Control and distribute fires
- Issue fire commands
 - Alert
 - Weapon or ammo
 - Target description
 - Location
 - Method of control (optional)
 - execution
- Create fire plans
- Determine and engage most dangerous targets first

- Suppress less dangerous targets
 - Indirect and/or direct fire
- Employ control techniques
 - Frontal fire
 - Cross fire
 - Depth fire
- Employ engagement priorities
 - Command and control vehicles
 - ADA weapons
 - Engineer assets
 - Tanks
 - Other armored vehicles
 - Dismounted infantry
- Employ firing techniques
 - Simultaneous fires
 - Alternating fires
 - Observed fires
 - Surprise targets
 - Battlesight gunnery
 - Assault fire
 - Employ all weapons simultaneously
 - Support by fire
 - Recon by fire direct/indirect
 - Known/suspected enemy locations
 - Dominate terrain overwatching choke points
 - Dominate towns or villages
 - Uncleared wooded areas
 - Provide base of fire for the attack
 - Suppressive fires
- Call for indirect fire
 - I.D. of F.O. and Warning order
 - Target location
 - Grid
 - Shift
 - Target description method of engagement / control
 - Spotting and adjusting
 - Determine OT factor
 - Adjust range and deviation

4.9. NAVIGATION TASKS

- Use a map
 - Navigate by terrain association
 - Locate a point using intersection
 - Locate a point using resection
 - Identify locations using 8 digit grid coordinates
 - Identify likely avenues of approach
 - Determine accessible routes
 - Determine lines of sight
 - Conduct a map recon

- Identify terrain features
- Identify and use graphic control measures
- Reproduce and use map overlays
- Navigate during periods of limited visibility
- Use a compass

4.10. OBSERVATION TASKS

- Observe target area of responsibility
- Acquire, identify, and prioritize targets
- Identify U.S. and foreign equipment
- Maintain contact with wingman

4.11. COMMUNICATION TASKS (COMMAND AND CONTROL)

- Know communications responsibilities
 - Senior to subordinate
 - Supporting to supported
 - Lateral
 - Restoration
- Know use and employment of tactical commo
 - Messenger
 - Wire
 - Visual
 - Hand and arm signals
 - Flags
 - Lights
 - Pyrotechnique
 - Radio
 - Know, use, and employ call signs
 - Take action on jamming
 - Disconnect antennae
 - Continue to transmit
 - Send a MIJI report
 - Know and use proper RTO procedures

4.12. SECURITY

- Assists in providing 360 degree security during tactical operations
- Provide local security
- Scan from an overwatch position
- Use thermal channel during periods of limited visibility

4.13. ADDITIONAL DUTIES

- Acting vehicle commander in TC's absence
- Perform Loader duties as necessary
- Apply first aid as required
- Perform driver's duties as necessary
- Train, supervise, and inspect subordinates

5.0. PLATOON LEADER/PLATOON SGT

5.1. OPERATIONAL TASKS

- Continuous operations
 - Enforce sleep plan
 - Perform stand to
 - All equipment is loaded and stowed
 - Complete pre-combat checks
 - Simultaneously start engines
 - Vehicles are ready to move out
 - Report status to commander
- Operate during periods of limited visibility
 - Rain
 - Smoke
 - Fog
 - Darkness
 - Use night vision devices
- Operate on all types of terrain
 - Desert
 - Arctic
 - Mountain
 - Forest and jungle

5.2. MAIN WEAPON TASKS

- Fire main gun from commander's station
- Apply misfire procedures
- Supervise Main Gun maintenance
- Keep track of equivalent rounds through tube/breech
- Ensure Main Gun stays clear of obstacles
- Verify presence of FRH in replenisher

5.3. SECONDARY ARMAMENT TASKS

- Assemble, disassemble, and perform a function check on Commander's weapon
- Mount/dismount Commander's weapon
- Correct stoppages
- Perform maintenance on Commander's weapon
- Operate Commander's weapon
- Load/unload and clear Commander's weapon

5.4. AMMUNITION HANDLING TASKS

Know and load ammunition storage plan
Stow, inspect, and maintain all ammunition
Assist in ammunition breakdown
Recognize ammunition
Know ammunition ranges and uses

5.5. FIRE CONTROL TASKS

Perform operator's portion of fire control system checkout
Boresight and zero all sights and weapons
Update MRS
Receive, interpret, and apply all fire control data

5.6. MAINTENANCE FUNCTIONS

Responsible for condition of entire vehicle

Inspect

Visually inspect vehicle

leaks

Tampering

Damage

Missing parts

Cleanliness

Paint/rust

Common areas

Skirts

MRS

Final drive housings and plugs

Pre-cleaners

Gunner's station

Loader's station

Driver's station

Fire extinguisher handles

Track

Center guides

End connectors

Dead track

5.6.1. Check

Gunner's maintenance responsibilities

Loader's maintenance responsibilities

Driver's maintenance responsibilities

Frequent maintenance areas

Adjusting link assemblies

Track tension

Roadwheels

Compensating idler

Roadarms

- Shock absorbers
- Torsion bars
- Support roller assemblies
- Hub and sprocket assemblies
- Track assemblies
- All fluid levels
 - Engine
 - Transmission
- Replenisher
- Precleaners
- Main gun
- Secondary armament

5.6.2. Perform

- All maintenance as necessary
- Operator's part of equipment folder
- Verify operation
 - Commander's seat
 - Guards
 - Hatch
 - Commander's NBC system
 - Commander's panel
 - Commander's power control handle
 - GPS extension
 - Commander's weapon station
 - Commander's weapon
 - Subordinate crew stations

5.7. TACTICAL TASKS

5.7.1. Offense

- Drills
 - Battle, Platoon, Company
 - Action
 - Left, Right, Front, Rear
 - Contact
 - Indirect fire
 - Air attack
- Understand and implement the fundamentals of offense
 - Concentrate overwhelming combat power
 - Surprise
 - Speed
 - Flexibility
 - Audacity
 - See the battlefield
 - Use weapon systems to best advantage
 - Shock, overwhelm, and destroy the enemy
 - Provide continuous mobile support
 - Be flexible

- Understand and employ wingman concept
- Know use and employment of basic formations
 - Wedge
 - Vee
 - Echelon
 - Line
 - Column
 - Coil
 - Herringbone
- Understand and use the principles of cover and concealment
 - Use proper terrain driving techniques
 - Use hull down and turret down positions
 - Camouflage personnel and equipment
- Ensure light, noise, and litter discipline are maintained
 - Ensure proper security is maintained
 - LP/OP
 - Local security
 - Area security
- Properly use 3 types of offensive operations.
 - Movement to contact
 - Traveling
 - Traveling overwatch
 - Bounding overwatch
 - Alternate bounds
 - Successive bounds
 - Overwatch
 - Visually check position security
 - Occupy hull down fire position
 - Assign areas of fire
 - Orientate weapons
 - Search for targets
 - Visual/thermal
 - Movement
 - Select next position
 - Select routes
 - Determine likely enemy locations
 - Pre-plan actions on contact
 - Back down from fighting positions
 - Avoid skylining
 - Scan area for displaced features
 - Ensure entire movement is covered by overwatch element
 - Actions on contact
 - Return fire
 - Alert crew/unit
 - Report contact to commander
 - Develop situation through fire and maneuver

- Bypass
- Hasty attack
- Attack by fire
- Report encounter to commander
- Hasty attack
 - Determine size, location, and composition
 - Position support element
 - Considerations
 - Mission
 - Terrain
 - Friendly capabilities
 - Enemy capabilities
 - Time
 - Position assault element
 - Considerations
 - Mission
 - Terrain
 - Friendly capabilities
 - Enemy capabilities
 - Time
 - Armor pure
 - Maneuver to last covered and concealed position
 - Suppress objective
 - Assault objective/shift fires
 - Fire all weapons
 - Sweep the objective
 - Halt on friendly side of objective
 - Hull down
 - Engage fleeing enemy/counter.
 - Consolidation/reorganization
 - Occupy hull down position
 - Assign sectors of fire
 - Estimate security
 - Eliminate remaining resistance
 - Secure EPW's
 - Replace injured key persons
 - Report status to CO
 - Cross level supplies
 - Evacuate casualties
 - Reload/redistribute ammo
 - Conduct essential maintenance
 - Continue mission
 - Armor with mechanized infantry
 - Maneuver to last covered and concealed position
 - Suppress objective
 - Assault objective/shift fires
 - Fire all weapons
 - Sweep the objective

- Dismount infantry
- Clear objective
- Halt on enemy side of objective
- Hull down
- Engage fleeing enemy/counter attack
- Consolidation/reorganization
 - Occupy hull down position
 - Assign sectors of fire
 - Est. security
 - Eliminate remaining resistance
 - Secure EPW's
 - Replace injured key persons
 - Report status to CO
 - Cross level supplies
 - Evacuate casualties
 - Reload/redistribute ammo
 - Conduct essential maintenance
 - Continue mission

Deliberate attack

Strongpoints

Breach element

- Breach required obstacles

Assault element

- Assault objective through breachpoint

Support element

- Support by fire breach/assault

5.7.2. Defense

Receive the order

- Commander's intent and concept of how battle will go

- Element's role in units defense

- Positions to be reconned, prepared, and occupied

- Direct fire orientation

- SOP's

- Special instructions

Apply troop leading procedures

Allocate time

Issue a warning order

Conduct a recon

- Determine covered/concealed routes in/out of BP's

- Request Engineer support if routes require

- Determine likely enemy avenues of approach

- Allocate direct/indirect fire zones

- Coordinate preplots & TRP's w/FSO/FIST

- Plan emplacement of obstacles

- Coordinates with engineers

- Locate battle/fighting positions

- Primary

- Alternate

- Supplementary

- Coordinate for construction of BP's
- Perform precombat checks
- Occupy battle positions
 - Deliberate Occupation
 - Halt unit behind battle position
 - Coil
 - Conduct dismounted recon to select BP's
 - Assign sectors of fire
 - Move tanks into hide position behind each fighting position
 - Clear fighting positions
 - Establish security
 - Prepare range cards/fire plan
 - Company/Platoon sector
 - Individual tank positions
 - OP's
 - TRP's and engagement areas
 - Obstacles
 - Indirect fire targets
 - Final protective fires
 - Unit information
 - Engagement ledger
 - Clear fields of fire
 - Camouflage position
 - Improve position
 - Construct alternate/supplemental
 - Coordinate with adjacent units
 - Location of
 - Primary positions
 - Secondary positions
 - Alternate positions
 - Sectors of fire
 - Dead space between units
 - How it will be covered
 - Routes in and out of BP's
 - OP's
 - Obstacles
 - CEOI information
 - Establish wire communication
 - Set up chemical alarms
 - Emplace obstacles
- Hasty Occupation
 - Approach battle position from friendly side
 - Point out individual fighting positions
 - Move tanks to hull down fighting positions
 - Point out
 - TRP's
 - Engagement areas
 - Routes to subsequent battle positions
 - Exit routes

- Prepare range cards
 - Back tanks down to turret down positions
 - Prepare to fight
- Conduct the defense
 - Initial battle
 - Employ all available fires to best advantage
 - Artillery/mortars first
 - Attack helicopters/tac air next
 - ATGM's
 - Direct fire
 - SOP's
 - Movement to alternate/supplementary BP's
 - Covered
 - By tanks
 - By section
 - Uncovered
 - By platoon
 - Request smoke
 - Movement to subsequent battle positions
 - Maximize firepower to suppress enemy
 - Use an obstacle to slow enemy advance
 - Back out of fighting positions
 - Keep a terrain feature between moving tanks and enemy
 - Keep main gun orientated in direction of enemy
 - Move quickly to next battle position
 - If move is covered
 - By another platoon/company
 - Move as a platoon/company
 - By another section
 - Move as a section
 - If move is uncovered
 - Move by platoon
 - Request smoke
- Counter attack
 - Conduct a hasty attack
 - Conduct a deliberate attack
 - Attack by fire
- Prepare for next attack
 - Reestablish security
 - Ensure positions are still mutually supporting
 - Replace wounded key personnel
 - Process wounded/dead
 - Cross level and resupply ammo
 - Improve positions
 - Replace obstacles if enemy has withdrawn
- Defense under adverse conditions
 - Position vehicles closer to area of engagement
 - Mark routes and positions
 - Utilize night vision devices

- Increase security
- Enforce noise and light discipline
- Ambush as often and far forward as possible

5.8. Special combat operations

- Relief in place

 - Necessary coordination

 - Exchange of liaison personnel

 - Positions of weapons

 - Exchange of sketch cards

 - Exchange of fire plans

 - Exchange of fire support elements

 - Location of and transfer responsibility for obstacles

 - Routes and guides

 - Transfer excess ammo and supplies

 - Communications

 - Enemy situation and intelligence

 - Sequence of relief

 - Time of change of responsibility for area

 - Conduct of relief

 - Both units on common net

 - Relieving vehicles occupy hide positions while relieved unit backs down from BP

 - Exchange necessary information

 - Passage of lines

 - Conduct a recon to confirm

 - Location of stationary force to be passed through

 - Location of contact points

 - Location of passage points

 - Location of passage lanes

 - Attack position location

 - Assembly area location

 - Initial location of passing unit's combat support

 - Coordinate

 - Supporting fires

 - Time of transfer of responsibility of sectors

 - Troop density

 - Traffic control

 - Communications

 - CEOI data

 - Recognition signals

 - Unit designations

 - Stationary unit's mission and battle plan

 - Enemy situation

 - Friendly situation

 - OP's and patrol routes

 - Obstacle locations and types

Traffic control points
Contaminated areas

5.9. ENGAGEMENT TASKS

- Estimate range
- Engage troops with coax
- Engage multiple targets
- Control and distribute fires
- Issue fire commands
 - Alert
 - Weapon or ammo
 - Target description
 - Location
 - Method of control (optional) execution
- Create vehicle, platoon, and company fire plans
- Determine and engage most dangerous targets first
- Suppress less dangerous targets
 - Indirect and/or direct fire
- Employ control techniques
 - Frontal fire
 - Cross fire
 - Depth fire
- Employ engagement priorities
 - Command and control vehicles
 - ADA weapons
 - Engineer assets
 - Tanks
 - Other armored vehicles
 - Dismounted infantry
- Employ firing techniques
 - Simultaneous fires
 - Alternating fires
 - Observed fires
 - Surprise targets
 - Battlesight gunnery
 - Assault fire
 - Employ all weapons simultaneously
 - Support by fire
 - Recon by fire direct/indirect
 - Known/suspected enemy locations
 - Dominate terrain overwatching choke points
 - Dominate towns or villages
 - Uncleared wooded areas
 - Provide base of fire for the attack
 - Suppressive fires
- Call for indirect fire
 - I.D. of F.O. and Warning order
 - Target location

Grid
Shift
Target description/Method of engagement/Method of
control
Spotting and adjusting
Determine OT factor
Adjust range and deviation

5.10. NAVIGATION TASKS

Use a map
Navigate by terrain association
Locate a point using intersection
Locate a point using resection
Identify locations using 8 digit grid coordinates
Identify likely avenues of approach
Determine accessible routes
Determine lines of sight
Conduct a map recon
Identify terrain features
Identify and use graphic control measures
Reproduce and use map overlays
Navigate during periods of limited visibility
Use a compass

5.11. OBSERVATION TASKS

Observe target area of responsibility
Acquire, identify, and prioritize targets
Identify U.S. and foreign equipment
Maintain contact with wingman

5.12. COMMUNICATION TASKS (COMMAND AND CONTROL)

Know communications responsibilities
Senior to subordinate
Supporting to supported
Lateral
Restoration
Know use and employment of tactical commo
Messenger
Wire
Visual
Hand and arm signals
Flags
Lights
Pyrotechnique
Radio
Know, use, and employ call signs
Take action on jamming

Disconnect antennae
Continue to transmit
Send a MLJI report
Know and use proper RTO procedures

5.13. SECURITY

Assists in providing 360 degree security during tactical operations
Provide local security
Scan from an overwatch position
Use thermal channel during periods of limited visibility

Selected Bibliography

MASTER CMF 19 TASK LIST (MARCH 86)

FM 71-2, "ARTEP"

FM 17-15, "DIVISION 86 TANK PLATOON"

TM9-2350-264-10-1,2,3; "M1 OPERATOR'S MANUAL"

FM 17-19K-1/2, "M1 SOLDIER'S MANUAL"

TM 9-2350-264-CL, "M1A1 CREW CHECKLIST"

TRADOC PAMPHLET NO. 600-4, "SOLDIER'S HANDBOOK"

TC 17-15-11, "TANK CREW DRILLS"

FM 17-12-1, "TANK GUNNERY"

FM 71-1, "TANK AND MECH. INFANTRY COMPANY TEAM"

List of References

- ¹ HQDA, "Crew Checklist for Tank, Combat, Full Tracked, M1A1,"
(TM 9-235002640-CL), AG Publication Center, Baltimore, Maryland

Distribution List

	Copies
Commander Defense Technical Information Center Bldg. 5, Cameron Station ATTN: DDAC Alexandria, Virginia 22304-9990	12
Manager Defense Logistics Studies Information Exchange ATTN: AMXMC-D Fort Lee, Virginia 23801-6044	2
Commander U.S. Army Tank-Automotive Command ATTN: AMSTA-DDL (Technical Library) Warren, MI 48397-5000	2
Commander U.S. Army Tank-Automotive Command ATTN: AMSTA-CF (Mr. G. Orlicki) Warren, MI 48397-5000	1
Commander USAHEL ATTN: SLCHE-CC/CPT Koffinke APG MA 21005	2
Commander U.S. Army Tank-Automotive Command ATTN: AMSTA-ZET Warren, MI 48397-5000	15
Commandant U.S. Army Armor School ATTN: ATSB-CD-ML (CPT Pride) Fort Knox, KY 40121-5215	2