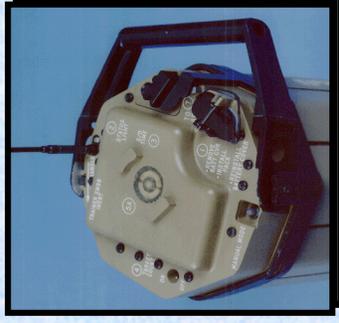
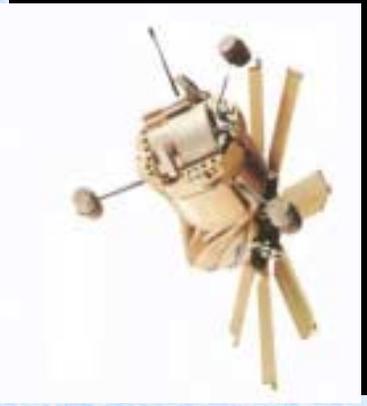


Munitions New Equipment Training Office



US ARMY TACOM-ARDEC

Picatinny Arsenal, New Jersey



HORNET: Hand Emplaced Wide Area Munition

COURSE OUTLINE

- **Introduction**
- **Safety, PMCS & Components**
- **Manual Mode Operations**
- **Remote Control Unit M71 (RCU)**
- **Remote Mode Operations**
- **Unusual Conditions Operation**
- **Tactical Decision Aid**

HORNET: Hand Emplaced Wide Area Munition



VIDEO



HORNET: Hand Emplaced Wide Area Munition

INTRODUCTION

- **Anti-tank/Anti-vehicular Munition**
- **One Person employable, 35 LBS**
- **Detect, Locate, Destroy up to 100M Away**
- **Automatic Anti Disturbance capability**
- **Manual or Remote Activation**
- **Self Destructible by either Time or Command from Remote Control Unit**
- **Five Self Destruct Times**

HORNET: Hand Emplaced Wide Area Munition

LESSON ONE OBJECTIVES

- **Safety**
- **Container Identification & Inventory**
- **Identify Components**
- **PMCS Munitions**

HORNET: Hand Emplaced Wide Area Munition

AMMUNITION SAFETY

- **Be Familiar with Safety Regulations**
- **Keep Munitions in Original Shipping Containers Until Ready for Use**
- **Do Not Disassemble or Modify Munitions**
- **Mark and Report any Malfunctions or Misfires IAW Local Procedures**

HORNET: Hand Emplaced Wide Area Munition

FIRES INVOLVING MUNITIONS

- Produce Toxic Gas and Plume
- Produce Own Oxidizer, Will Not Smother
- Possible Detonation
- XM93 is 1.1 Munition. Display Fire Hazard Symbol 1.
- Clear Area For 2500 Ft.
- Fight Fires Only With Built in Apparatus Such As Sprinkler System



HORNET: Hand Emplaced Wide Area Munition

PACKAGING

- **Shipped & Stored in the PA160 Container**
- **Weight is :**
 - @ 1710 LBS = One Pallet**
 - @ 57 LBS = 1 Container w/Munition**
 - @ 20.6 LBS = Empty**



HORNET: Hand Emplaced Wide Area Munition

CONTAINER INSPECTION



- Security Seal Intact
- Is Container Damaged
- Is Munition Removable
- Humidity Indicator
 - ✓ *Verified by pink coloring of indicator*
 - ✓ *Displays Highest Exposure*
 - ✓ *More Than 40% Do Not Use*

HORNET: Hand Emplaced Wide Area Munition

UNPACK MUNITIONS



- Remove Seal and Pull Ring From Lid
- Rotate Cover Handle 180° & Rotate Counterclockwise to Unlock
- Remove Cover, Top Cushion & HORNET Munition
- Remove Active Battery Packs
- Replace Cushion and Top Cover on Container For Reuse

HORNET: Hand Emplaced Wide Area Munition

MUNITION INSPECTION

XM93 & XM98

CHECK FOR:

- **Missing Parts**
- **No Dents, Punctures or Other Damage**
- **Battery Packs for Damage, Serviceability**
- **Remove Cover, Check Switches and Indicators for Damage**
- **XM98-**
 - **Deployability of Legs**
 - **Feedback Panel**
 - **Toggle Switch**

HORNET: Hand Emplaced Wide Area Munition

COMPONENT LISTING

XM93

- **Munition Body Assembly**
 - Main Body
 - Munition Cover
 - S&H Band
- **Active Battery Packs**
- **Shipping Container**



HORNET: Hand Emplaced Wide Area Munition

CONTROLS & INDICATORS XM93, XM97 & XM98

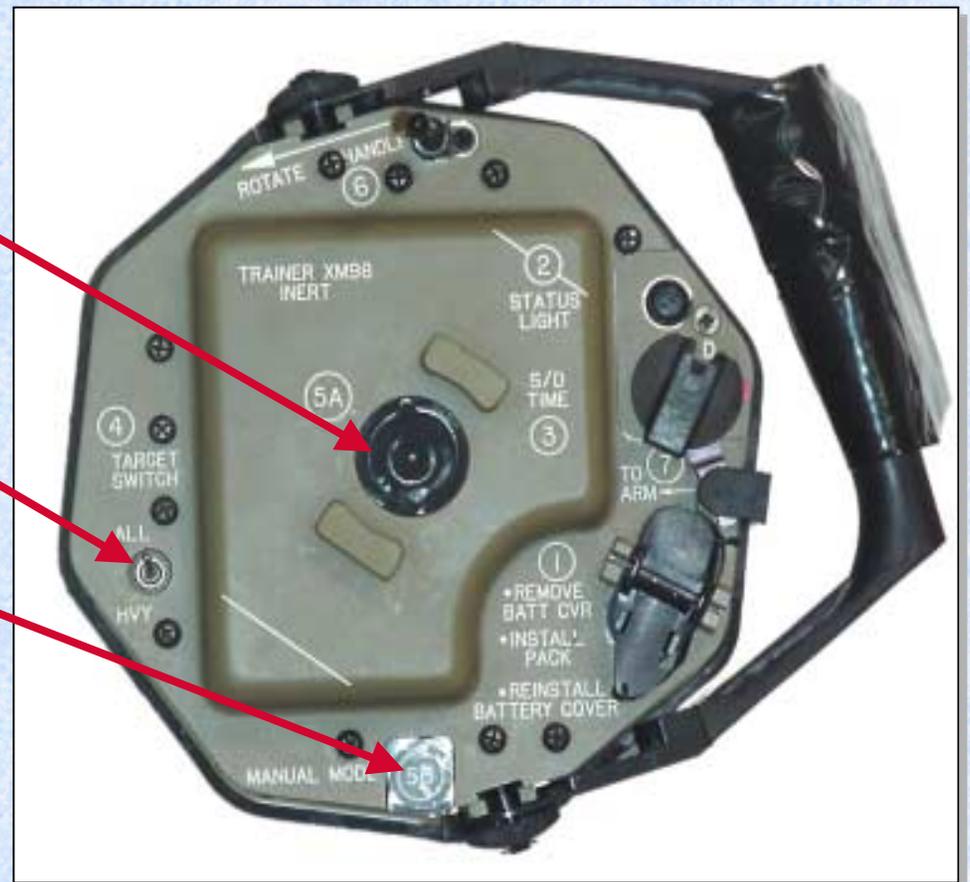


- Status Light
- Self Destruct Switch
- Arming Lever
- Active Battery Pack Cover

HORNET: Hand Emplaced Wide Area Munition

CONTROLS & INDICATORS Cont ...

- (MCD) Magnetic Coupling Device
- Target Switch
- Manual Select Switch

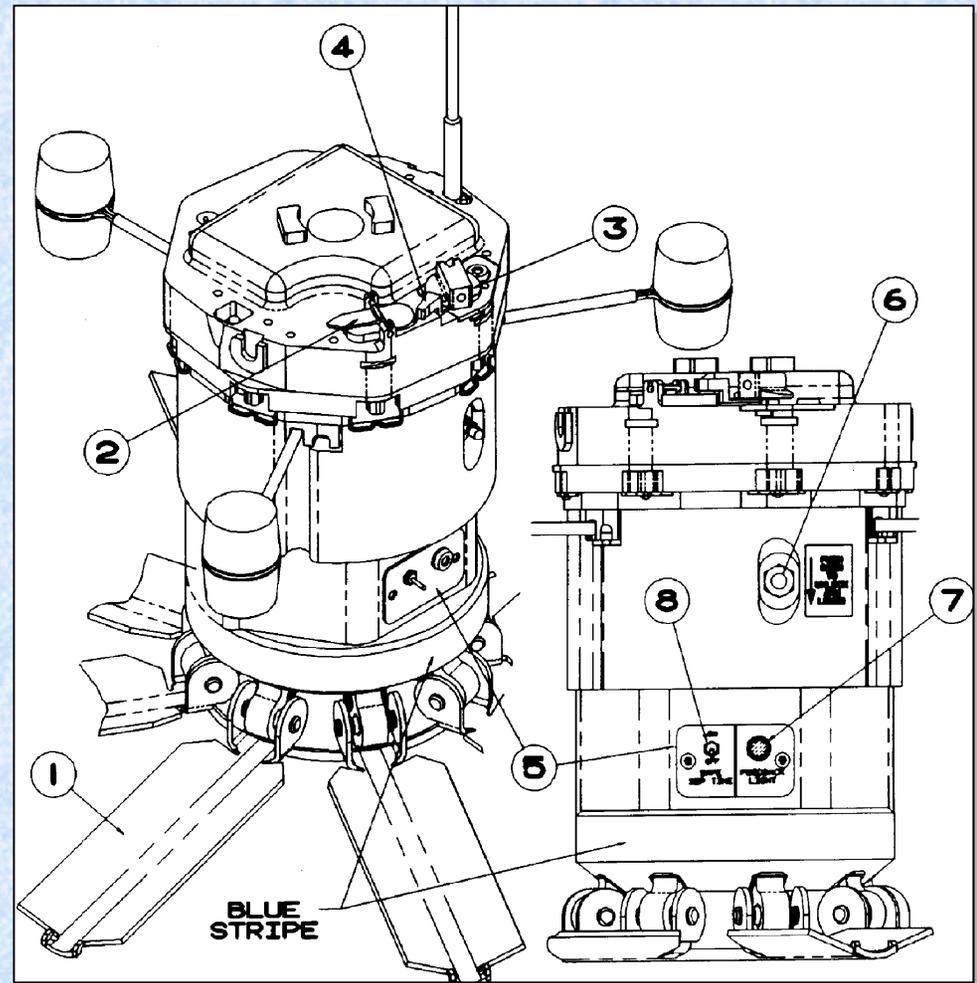


HORNET: Hand Emplaced Wide Area Munition

XM 98 TRAINER

XM98 TRAINER

1. Support Legs
2. Active Battery Cover
3. SD Switch
4. Arm Control Switch
5. Feedback Panel
6. System Reset Lever
7. Delay Feedback Light
8. Feedback On/Off Switch
9. BA5112/U Battery



HORNET: Hand Emplaced Wide Area Munition

Feedback Evaluation Lights on XM98

LIGHT INDICATION

MEANING

Steady Red

Munition Fails Self Test

Alternate Yellow-Red Flash

Low Battery Power

Steady Green

Munition Successfully Armed In Remote Mode At Mission SD Time

Green Flashing

Munition Armed In Remote Mode At Time Other Than Mission SD Time

Red Flash, 1 Per Second

Munition Not Armed. Remote Command Sent Prior To Expiration Of Safe Separation Time.

Red Flash, 4 Per Second

Munition Not Armed, Remote Command Never Received

Steady Yellow

Munition Armed In Manual Mode At Mission SD Time.

Yellow Flashing

Munition Armed In Manual Mode At Time Other Than Mission SD Time

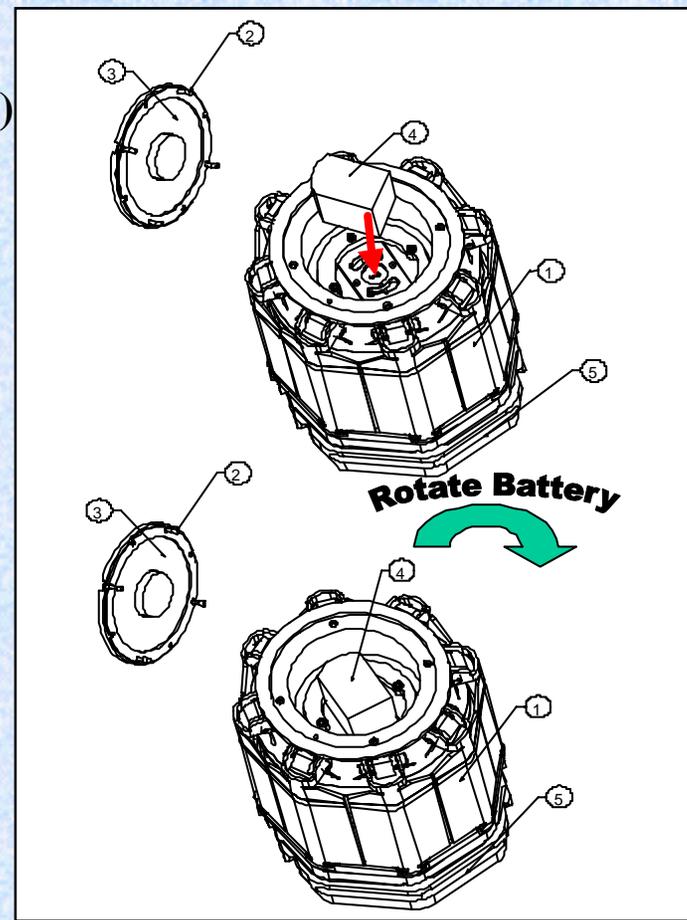
HORNET: Hand Emplaced Wide Area Munition

XM98 BATTERY INSTALLATION

- Install S&H Cover (5) on munition placing antenna into slot under cover. Press cover firmly in place.
- Place trainer (1) upside down resting it on S&H Cover (5)
- Using a ¼-inch flat-tip screwdriver loosen four captive screws (2) on Bottom Cover (3) and remove.
- Insert Battery (4) into radial slots of Battery Holder and rotate clockwise.

The rounded side of the Battery must face the side of the Battery Holder where three socket head mounting screws are located.

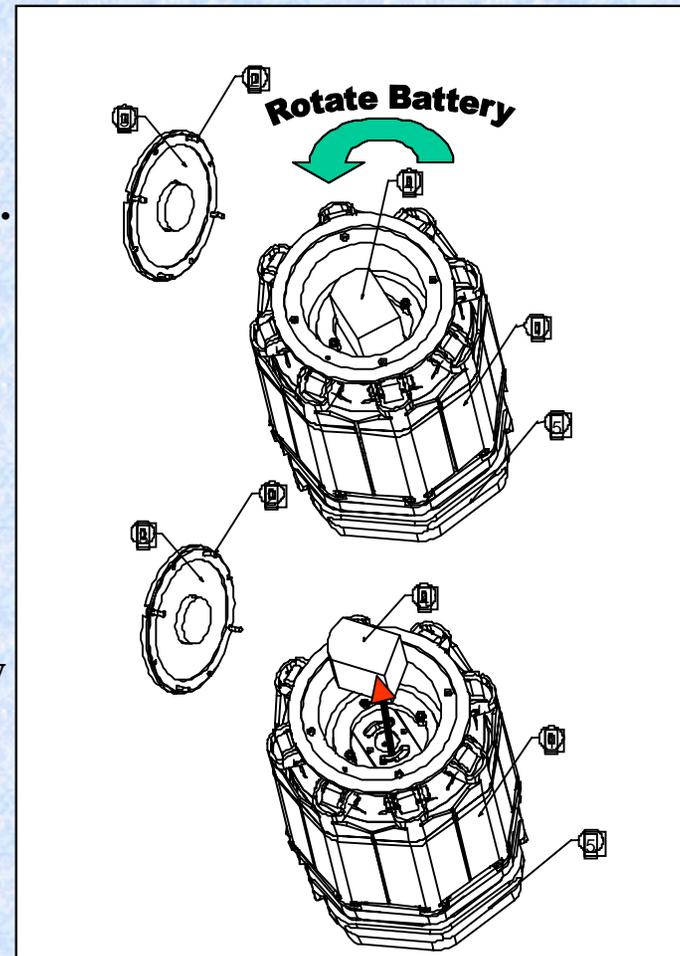
- Install Bottom Cover (3) by aligning the four captive screws (2) on the Bottom Cover with the four threaded holes on the munition bottom.
- Push down on the Bottom Cover and secure the four captive screws (2) using a ¼-inch flat-tip screwdriver.



HORNET: Hand Emplaced Wide Area Munition

XM98 BATTERY REMOVAL

- Install S&H Cover (5) on munition placing antenna into slot under cover. Press cover firmly in place.
- Place trainer (1) upside down resting it on S&H Cover (5).
- Using a 1/4-inch flat-tip screwdriver loosen four captive screws (2) on Bottom Cover (3) and remove.
- Remove Battery (4) by rotating the Battery counter clockwise.
- Dispose of expended battery in accordance with local procedures.
- If the munition is to be stored, install Bottom Cover (3) by aligning the four captive screws (2) on the Bottom Cover with the four threaded holes on the bottom of the munition and securing the four captive screws (2) using a 1/4-inch flat-tip screwdriver.



HORNET: Hand Emplaced Wide Area Munition

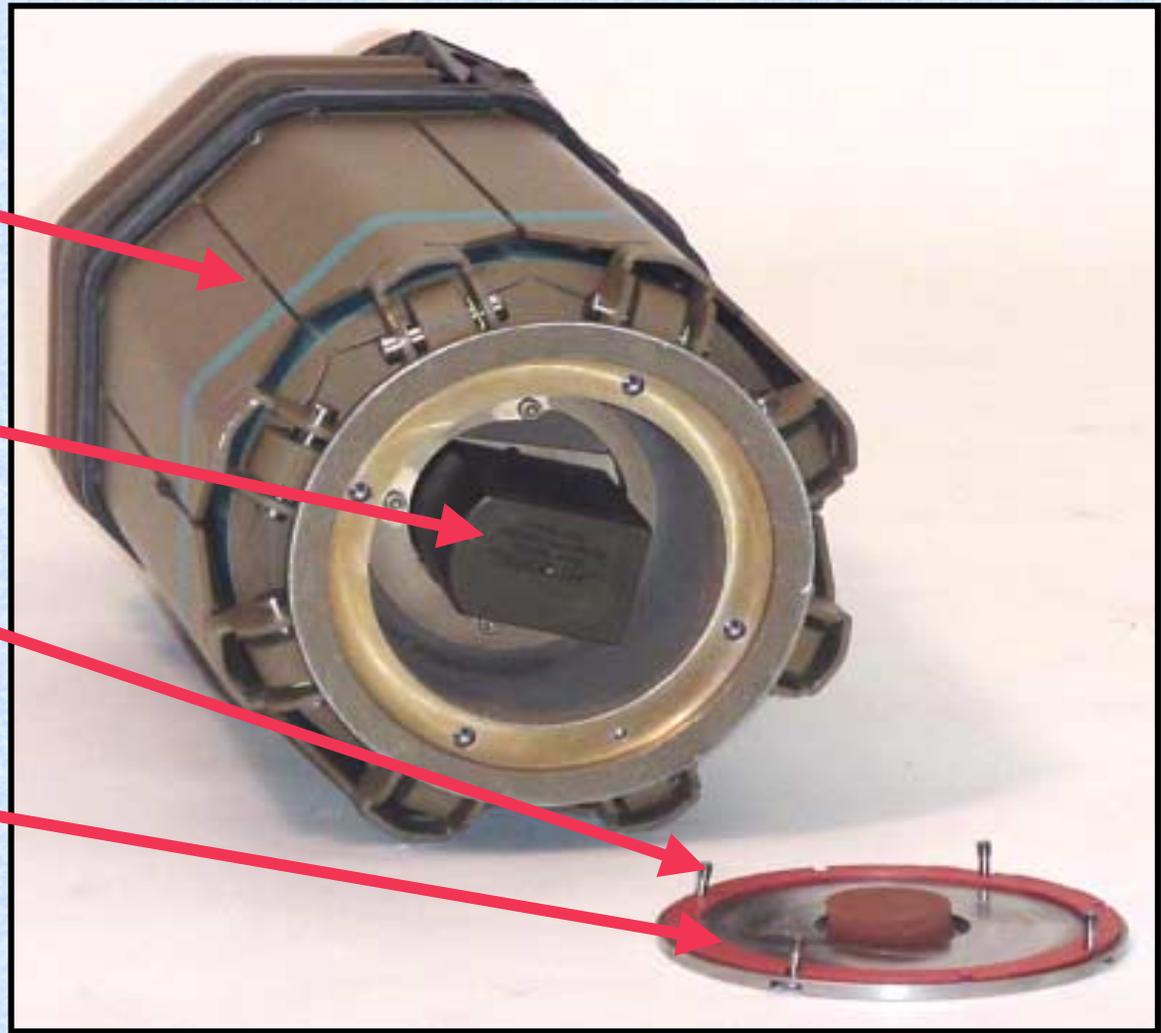
XM98 BATTERY INSTALLATION

**1. Munition
Body**

2. Battery

**3. Captive
Screws (4)**

**4. Bottom
Plate**



HORNET: Hand Emplaced Wide Area Munition

LESSON TWO OBJECTIVES

- **Properly Prepare the Hornet For Manual Employment**
- **Correctly set the Function switches**
- **Identify the Status Lights**
- **Correctly Place & Arm Munition**

HORNET: Hand Emplaced Wide Area Munition

MUNITION EMPLOYMENT

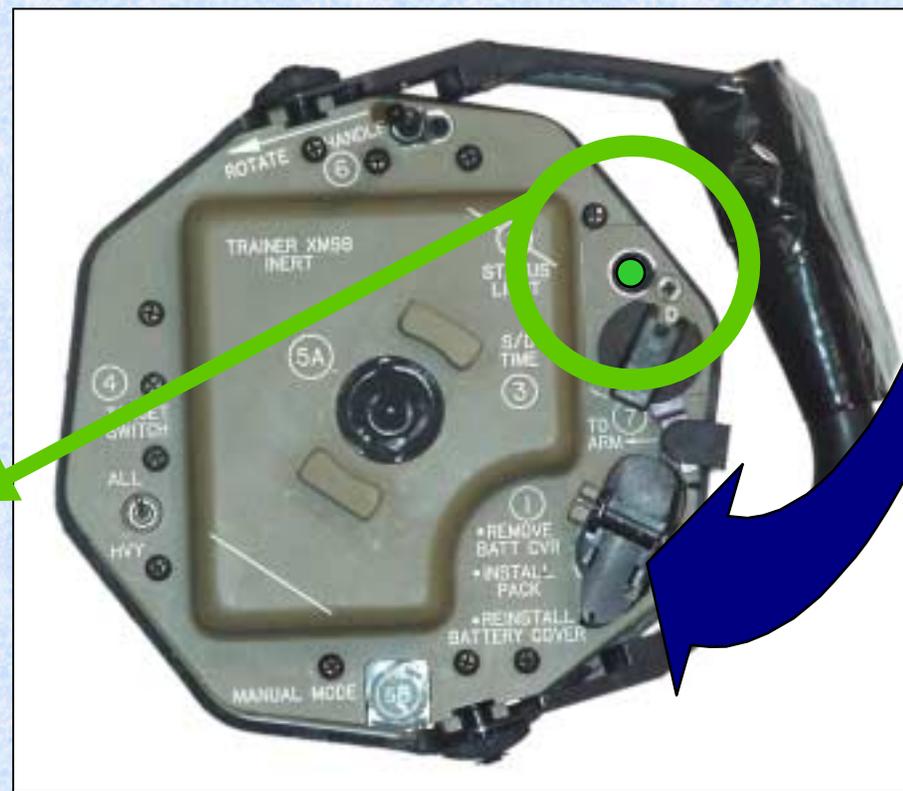


- **Unpack & PMCS Munitions**
- **Do Not Use Questionable Munitions**
- **Place on Level Surface**
- **Remove Cover & Set Aside**
- **Do Not Remove the S&H Band**

HORNET: Hand Emplaced Wide Area Munition

MUNITION EMPLOYMENT Cont ...

- Remove Active Battery Cover and Install Active Battery Pack
- Annotate Time
- The active battery pack has a 10-hour life
- Replace Cover and Verify Green Light Illuminates within 3 seconds



HORNET: Hand Emplaced Wide Area Munition

SET SELF-DESTRUCT TIME

- Turn SD Switch to Correct Time Setting IAW Mission Parameters



<u>SETTING</u>	<u>SD TIME</u>	<u>SD START</u>	
A	4 HRS	3 HRS	36 MIN
B	2 DAYS	1 DAY	19 HRS
C	5 DAYS	4 DAYS	12 HRS
D	15 DAYS	13 DAYS	12 HRS
E	30 DAYS	27 DAYS	

HORNET: Hand Emplaced Wide Area Munition

SET TARGET SELECTION MODE SELECTION

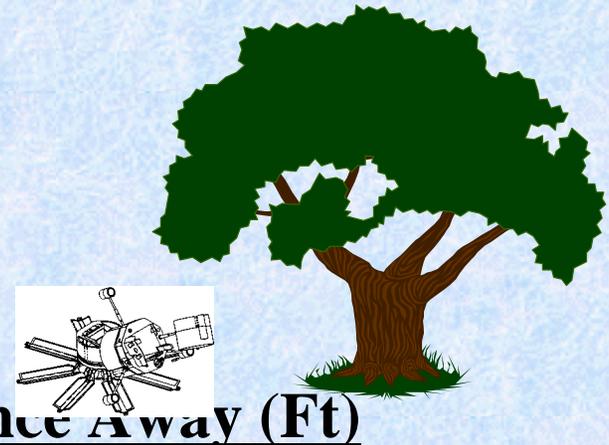


- Move the Target Selection Switch to Correct Setting
 - Heavy = Heavy Tracked Vehicles
 - All = All Tracked Vehicles
- Remove Plastic Cover “5B” from Manual Select Switch & Discard
- Depress Manual Select Switch for 0.5 Sec
 - Verify Green Light is Flashing
 - If Not, Repeat, or Discard Munition as Defective
- Replace cover, lock S&H handle, transport munition to deployment site

HORNET: Hand Emplaced Wide Area Munition

MUNITION PLACEMENT

- Place on Level Surface
(Not more than 15° ground angle)
- Distance from Obstacles:
(allow for 35° angle of firing)



Max. Obstacle Ht. (Ft)

Distance Away (Ft)

3.0
5.0
6.5
8.0
10.0
11.5
13.0
15.0
16.0

6.5
10.0
11.5
14.0
16.0
21.0
23.0
27.5
33.0

HORNET: Hand Emplaced Wide Area Munition

COMMIT to FINAL ARMING Manual Mode

- Remove Cover and S&H Band and Retain for Turn in.
- Rotate SD Switch to U and Verify
Red Slider Pops into Place
- Push the Arming Lever
over to Arm
- Verify that Green Status
Light goes out
- Move to 360 Meters
_____ or More Away



HORNET: Hand Emplaced Wide Area Munition

FINAL ARMING Cont ...

Manual Mode

- Automatic
- 5 to 6 Min after Arming
Lever is Set
- Legs & Sensors Deploy
- Begins Searching for
Targets



HORNET: Hand Emplaced Wide Area Munition

LESSON THREE OBJECTIVES

- **Unpack and PMCS the M71**
- **Understand the Various Keyboard Functions and Controls**
- **Correctly Perform System Checks**
- **Correctly Encode the RCU for Use**

HORNET: Hand Emplaced Wide Area Munition

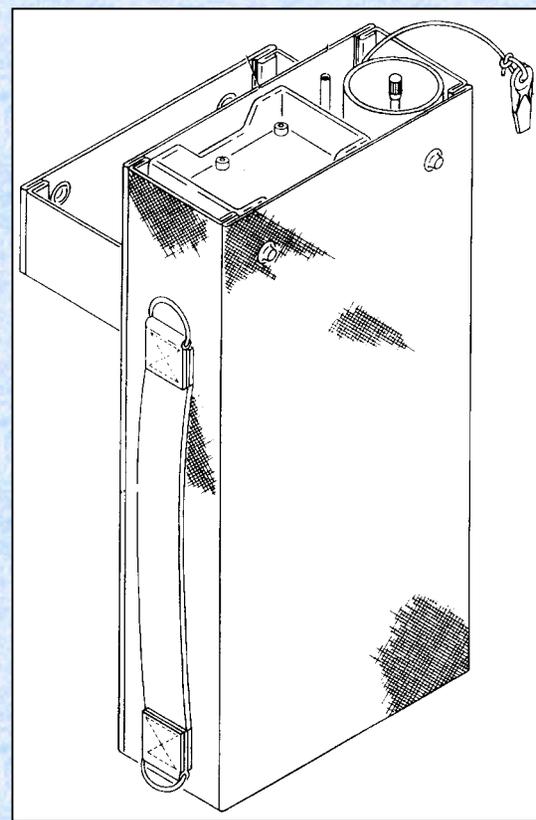
M71 REMOTE CONTROL UNIT



HORNET: Hand Emplaced Wide Area Munition

UNPACK RCU CARRYING BAG

- Unclasp Fasteners on Canvas Bag and Remove All Components:
- Remote Control Unit
- Counterpoise Cable
- Antenna Subassembly
- PVC Protection Tube
- Battery Compartment
- Screwdriver



HORNET: Hand Emplaced Wide Area Munition

THE LED AND DISPLAY CODES



The LCD Display Guides
the RCU Operator
Through the Hornet
Operations in the Remote
Mode

HORNET: Hand Emplaced Wide Area Munition

KEYBOARD ASSEMBLY

- Push Button Type Keys for Entry of the Data into the RCU
- Keys Are Back Lit red for Night-time Operations
- LED Display Window Located Above Keypad



HORNET: Hand Emplaced Wide Area Munition

RCU CONTROL BUTTONS



1 - DESTRUCT

2 - AUTO

3 - DEPLOY

4 - R'SET SD

5 - GRP ID

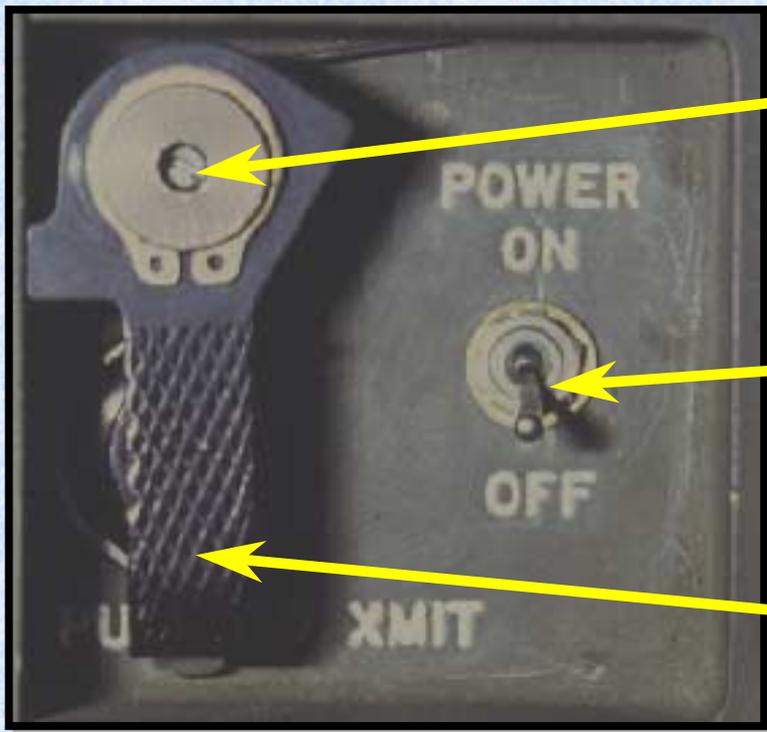
6 - COPY

7 & 8 Number

TRANSFER

HORNET: Hand Emplaced Wide Area Munition

RCU SIDE CONTROL SWITCHES

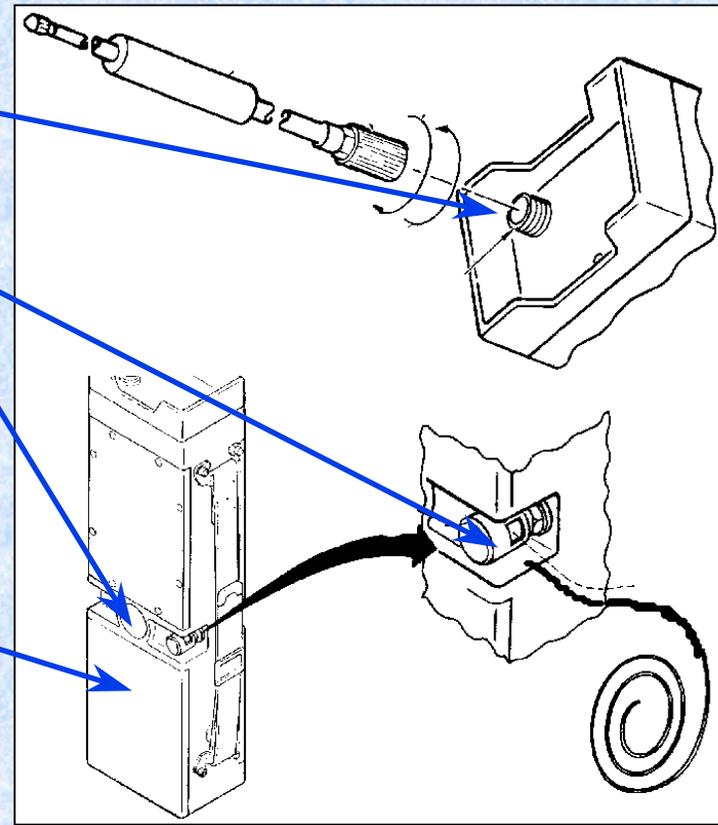


- **Store Code Select Switch**
(Store Code Key kept in Battery Compartment)
- **Power Switch**
- **Push To XMIT Switch**
- **Push To XMIT Cover**

HORNET: Hand Emplaced Wide Area Munition

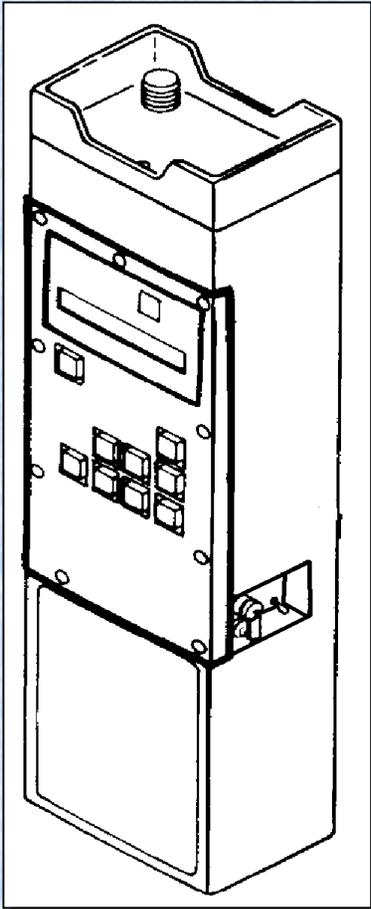
RCU COMPONENTS

- Antenna Connector (Base)
- Counterpoise Terminal
- Magnetic Coupling Device (MCD)
- Battery Cover
- Pressure Relief Valve (Not Shown)



HORNET: Hand Emplaced Wide Area Munition

RCU PMCS & TESTS



- PMCS, Tests and CCD Transfer are performed **without** the antenna and counterpoise cable installed

CHECK:

- Overall RCU Serviceability
- Antenna or Upper Mounts
- Counterpoise Terminal
- Battery Leakage
- LCD Readouts
- Check All Buttons & Switches

HORNET: Hand Emplaced Wide Area Munition

INSTALL/REMOVE BATTERY BA-5598/U

- Remove Battery Cover of RCU
- Insert Battery in Compartment
- Insert Power Cable
- Replace Cover



HORNET: Hand Emplaced Wide Area Munition

RCU INITIAL CHECK

- Install Battery
- Power ON
- Observe BAT LOW
- Press R'SET SD
- Depress PUSH TO XMIT
- Observe BAT LOW
- Turn RCU Off



HORNET: Hand Emplaced Wide Area Munition

STORE CODE

- **5 Digits**
- **Only Entered When the Store Code Switch Is Activated**
- **When a New Code Is Created the Old One Is Cleared (and All CCD)**
- **Lost If Battery Is Disconnected for Over Five Minutes**

HORNET: Hand Emplaced Wide Area Munition

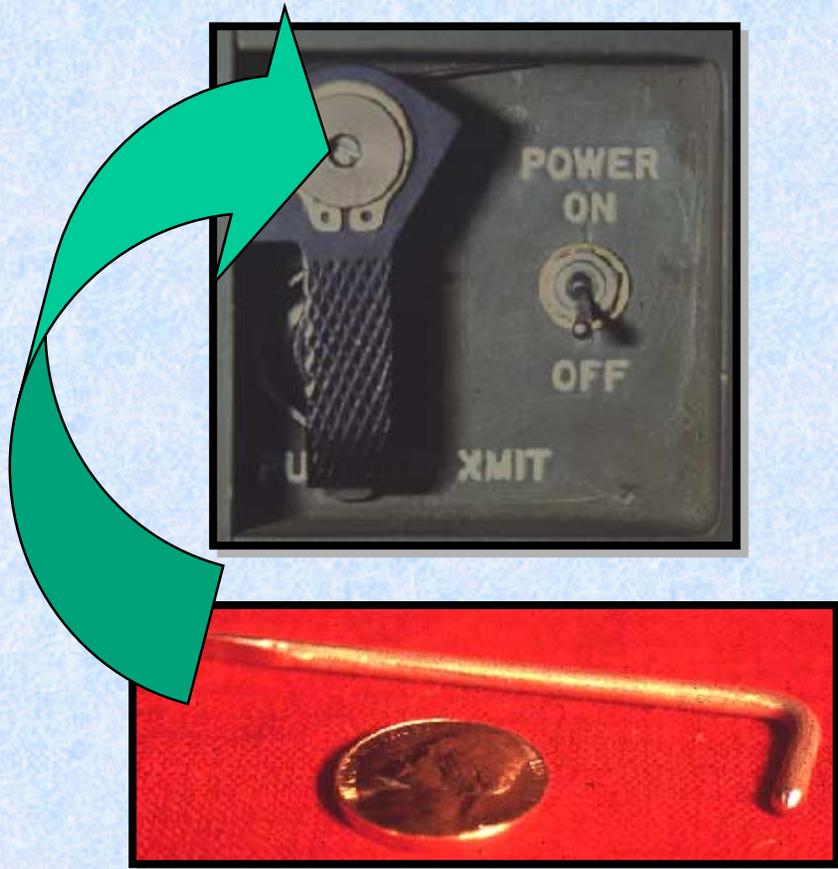
SET STORE CODE

- Turn Power On and Verify **BAT LOW** Indicator is Not Lit
- **INVALID** is Displayed After 15 Seconds



HORNET: Hand Emplaced Wide Area Munition

SET STORE CODE Cont ...



- Set Power to Off
- Insert Store Code Key into Switch Shaft and Engage Screw Head
- Rotate Screw $\frac{1}{4}$ Turn Clockwise and Hold Position, Turn On the RCU.
- Remove Store Code Key

HORNET: Hand Emplaced Wide Area Munition

SET STORE CODE Cont ...

- Verify 5 Dashes  are Displayed
- Press numbers 1-5 and Verify that **12345** is Displayed on LCD
- Turn power OFF



HORNET: Hand Emplaced Wide Area Munition

SEND CODE

- **Four Digit Code**
- **Used For**
 - Transfer of CCD
 - Check Group Status
 - Command Arm
 - Reset SD Times
 - Command Destruct



HORNET: Hand Emplaced Wide Area Munition

GENERATING SEND CODE

- Turn power ON, Verify ON is displayed
- Enter Store Code, Verify 4 dashes



- Push AUTO / TRANSFER buttons
- Write Down the 4 digit SEND CODE number displayed
- Turn power OFF



HORNET: Hand Emplaced Wide Area Munition

GROUP ID CODES

- **Each RCU holds 15 sets of CCD**
- **Unlimited number of munitions in each group**
- **User has the option to control 1 group individually or all 15 groups at one time**
- **RCU will display the last function performed**

HORNET: Hand Emplaced Wide Area Munition

GROUP ID CYCLE

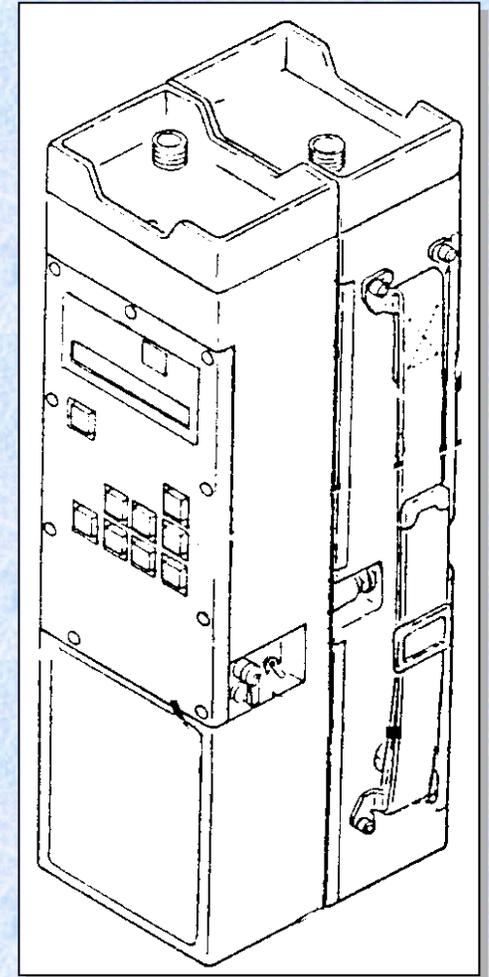
- Turn power ON
- Enter Send Code
- Verify 1 NONE
- Press GRP ID from 1-15, including ALL
- Verify all are “# NONE”
- Turn RCU OFF



HORNET: Hand Emplaced Wide Area Munition

DATA TRANSFER BETWEEN RCUs

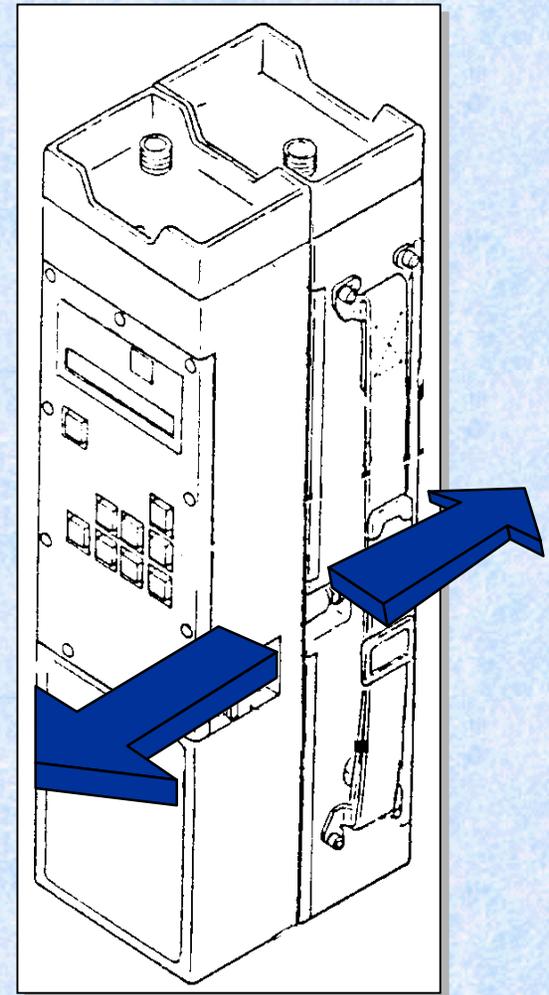
- Turn ON both RCUs & enter Store Codes
- Verify 4-digit send code is displayed on sending unit
- Place both RCUs on flat surface, align MCDs
- On sending RCU press COPY, then press TRANSFER
- On Receiving RCU verify RECEIVE, press TRANSFER and verify same Send Code is on both RCUs



HORNET: Hand Emplaced Wide Area Munition

DATA TRANSFER BETWEEN RCU's Cont ...

- Separate the RCU's
- On Receiving RCU press COPY then TRANSFER
- Verify Send Code is the same as on the sending RCU



HORNET: Hand Emplaced Wide Area Munition

TRANSFER CCD

- Transfer of Command and Control Data (CCD) *must* be accomplished *manually*
- **DO NOT INSTALL ANTENNA OR COUNTERPOISE**
- Select same GRP ID on both RCUs
 - If the sending unit has no data to transfer, cycle both units to the next group
- Observe data shown on the sending unit
- Cycle receiving unit through the necessary steps until data for that group matches the sending unit
- Repeat for all 15 groups until all CCD has been transferred to the receiving unit
- Clear CCD from sending unit

HORNET: Hand Emplaced Wide Area Munition

EXAMPLE CCD TRANSFER

SENDING UNIT

RECEIVING UNIT

1 NONE

1 NONE

No action required. Cycle both units to Group 2

HORNET: Hand Emplaced Wide Area Munition

EXAMPLE CCD TRANSFER CONT...

SENDING UNIT

2 DEPLOYED

RECEIVING UNIT

2 NONE

Press **TRANSFER** key

Verify **2 TRANSFER** appears

Press **DEPLOY** key

Verify **DEPLOY 2** appears

Depress **PUSH TO XMIT** switch

Verify **TUNE = 1**

Verify after 10 seconds that **2 DEPLOY** is displayed

HORNET: Hand Emplaced Wide Area Munition

REPACKAGING THE RCU

- **Ensure RCU is OFF, remove battery**
- **Ensure Store Code Key is in the battery compartment**
- **Repack components**
 - Counterpoise Cable
 - Antenna Subassembly
 - Main Body Assembly



HORNET: Hand Emplaced Wide Area Munition

LESSON FOUR OBJECTIVES



- Procedures to use RCU w/Hornet in remote mode
- Encode the Hornet w/RCU
- Command deploy to ARM
- Command extend SD time
- Command destruct Hornet

HORNET: Hand Emplaced Wide Area Munition

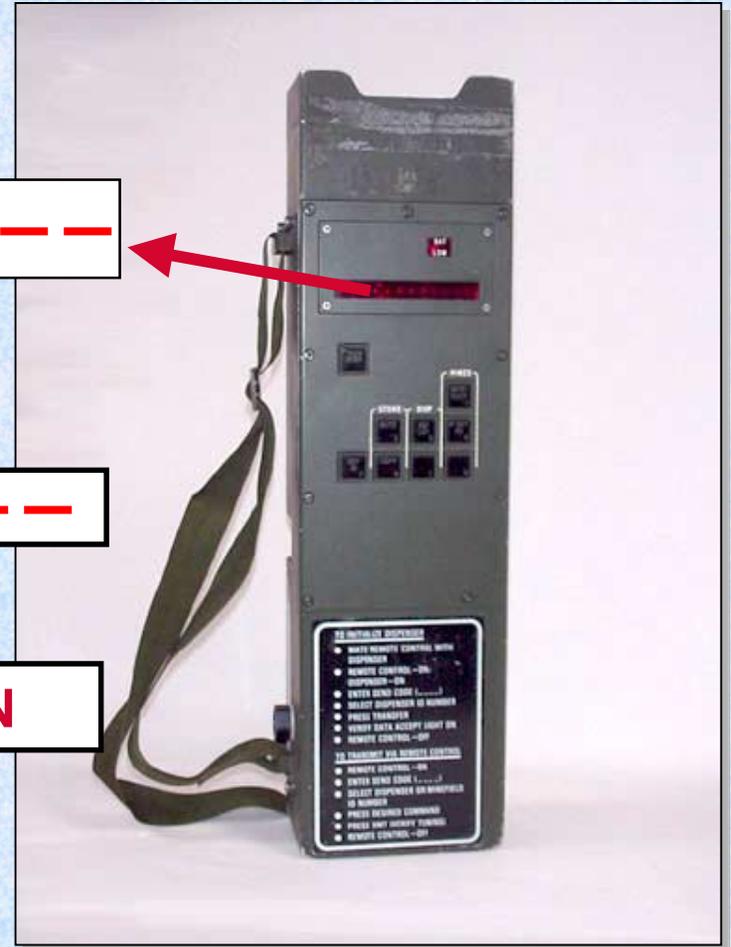
GENERATE 5 DIGIT STORE CODE

- Generate the 5 digit Store Code

- Generate the 4 digit Send Code

- Set Group ID

1NON
E



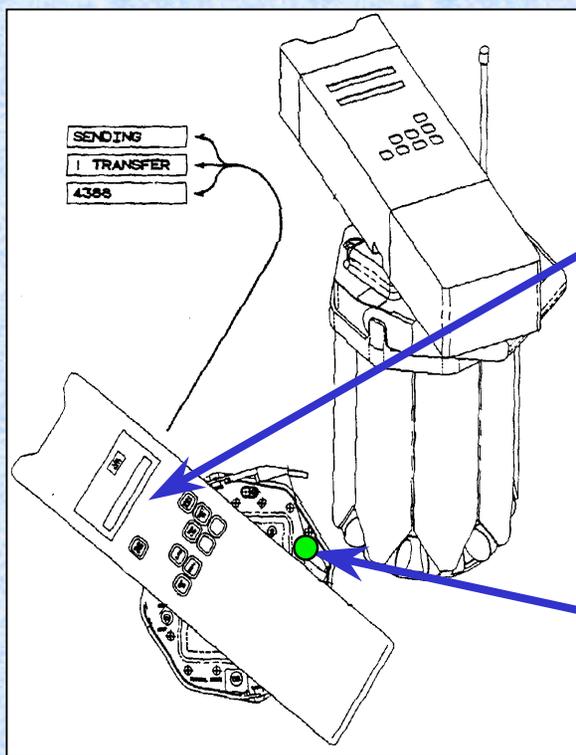
HORNET: Hand Emplaced Wide Area Munition

PRE ARM MUNITION

- **Set up Muniton**
- **Use pre arm procedures for manual mode**
- **DO NOT Press manual mode selector switch (Under 5B Cover)**

HORNET: Hand Emplaced Wide Area Muniton

ENCODING THE HORNET



- Align MCDs of HORNET and programmed RCU
- Turn RCU ON, enter SEND CODE
- Verify 1 NONE is displayed
- Press GRP ID Key to desired group, press TRANSFER key
- Verify SENDING is displayed, then #TRANSFER is displayed
- Verify STATUS LIGHT is flashing
- Turn RCU OFF, remove from HORNET, reinstall munition cover
- Munition is ready to be transported

HORNET: Hand Emplaced Wide Area Munition

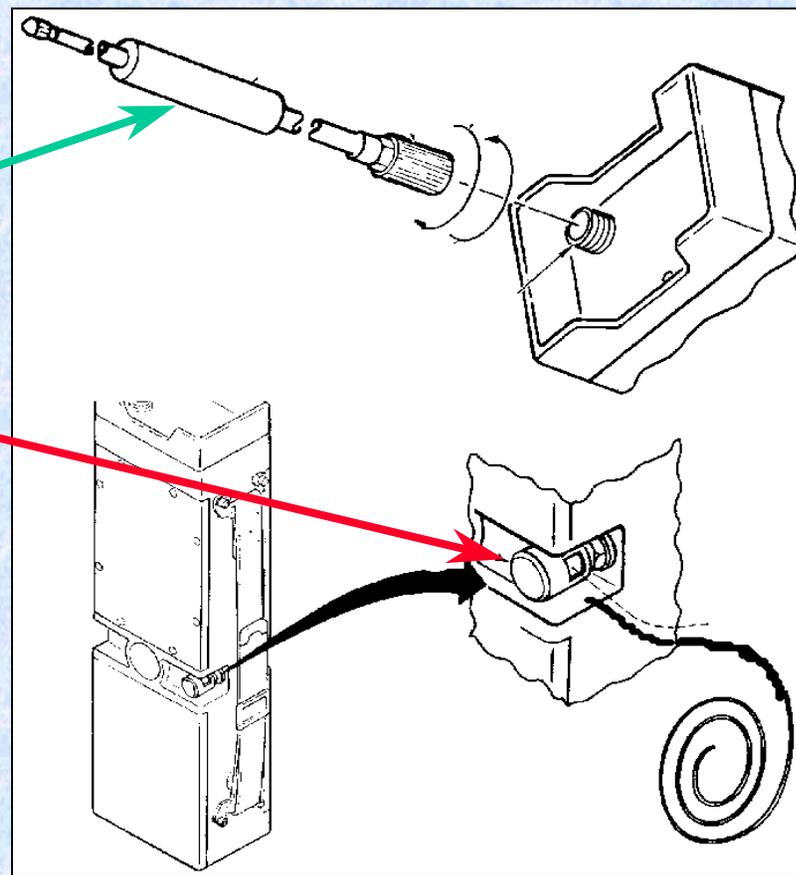
EMPLACEMENT

- Remove Cover and S&H Band and retain for turn in.
- Rotate SD switch to U and verify Red Slider pops into place
- Push the arming lever over to ARM
- Verify that Green Status Light goes out
- Munitions cannot be successfully Command Deployed until at least 36 minutes after the LAST munition was armed
 - A command sent prior to the 36 minute expiration will not be received and will have to be resent.
- Move to 360 Meters or More Away

HORNET: Hand Emplaced Wide Area Munition

ATTACH ANTENNA, COUNTERPOISE CABLE

- Attach the Antenna
and
- Counterpoise Cable



HORNET: Hand Emplaced Wide Area Munition

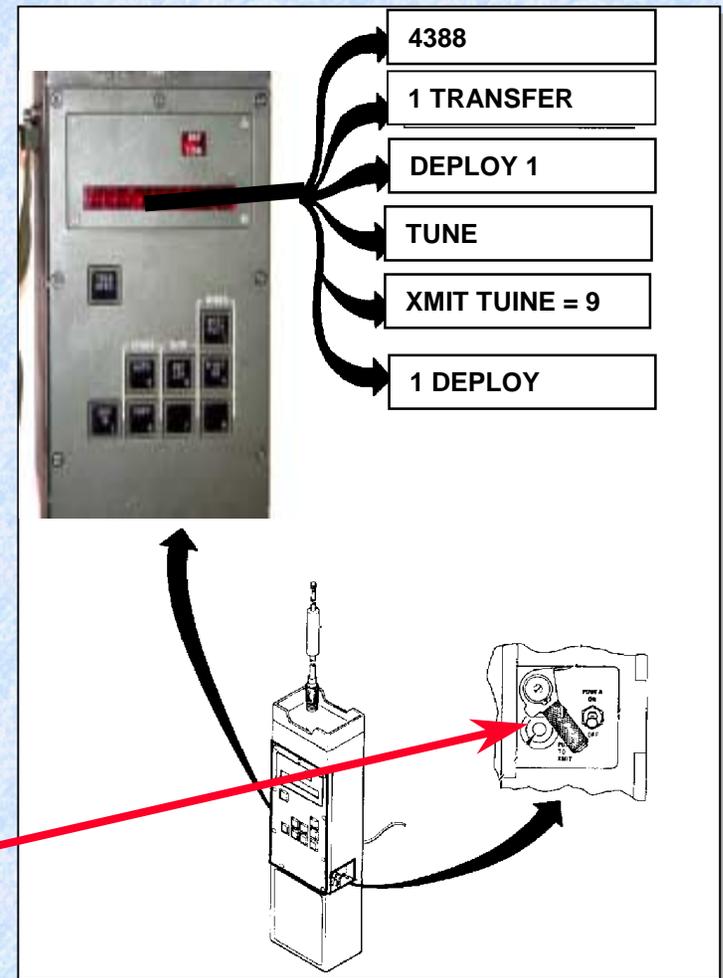
COMMAND DEPLOY

- Turn RCU On & enter Send Code. Verify 1 TRANSFER is displayed
- Press DEPLOY and Verify that DEPLOY 1 is Displayed
- Munitions cannot be successfully Command Deployed until at least 36 minutes after the LAST munition was armed
 - A command sent prior to the 36 minute expiration will not be received and will have to be resent.

WARNING

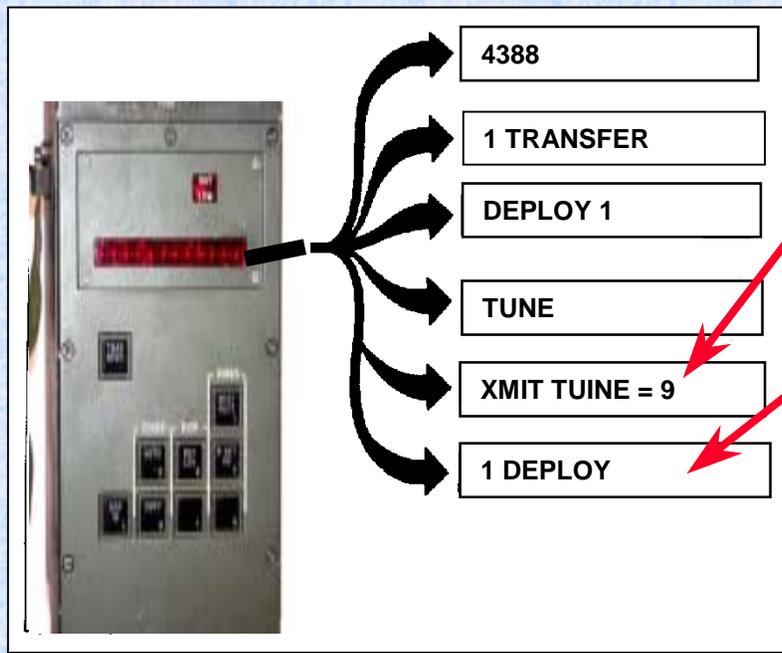
DO NOT TOUCH ANTENNA WHILE TRANSMITTING

- Depress PUSH TO XMIT Switch



HORNET: Hand Emplaced Wide Area Munition

COMMAND DEPLOY Cont ...

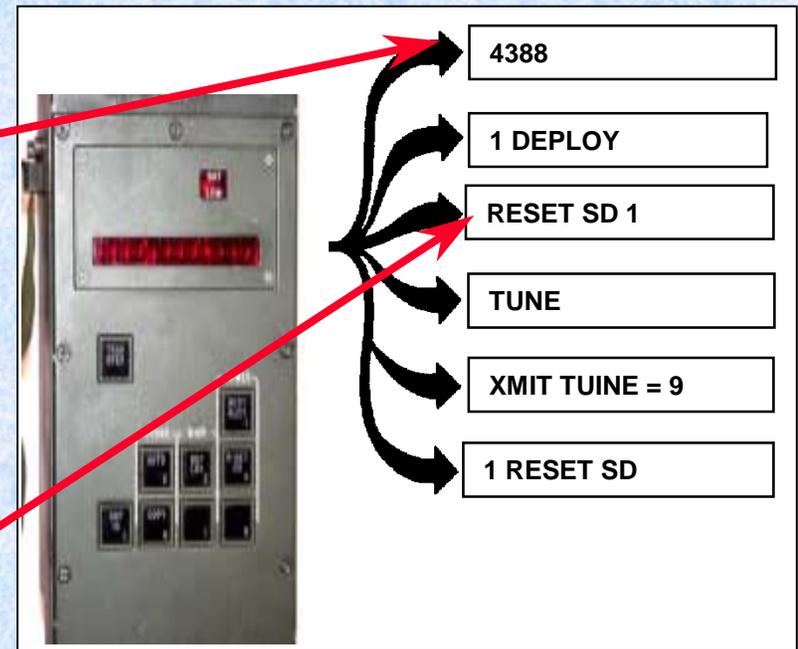


- **Verify tune greater than 5**
- **Verify after 10 seconds that 1 DEPLOY is displayed**
- **Munitions are now armed and awaiting for the SD time to expire or for further instructions from the RCU**

HORNET: Hand Emplaced Wide Area Munition

COMMAND RESET SD TIME

- Attach the RCU antenna
- Turn on the RCU & enter the 4 digit Send Code
- Verify that 1 DEPLOY appears in the LCD
- Depress the R'SET SD
- Verify RESET SD in LCD

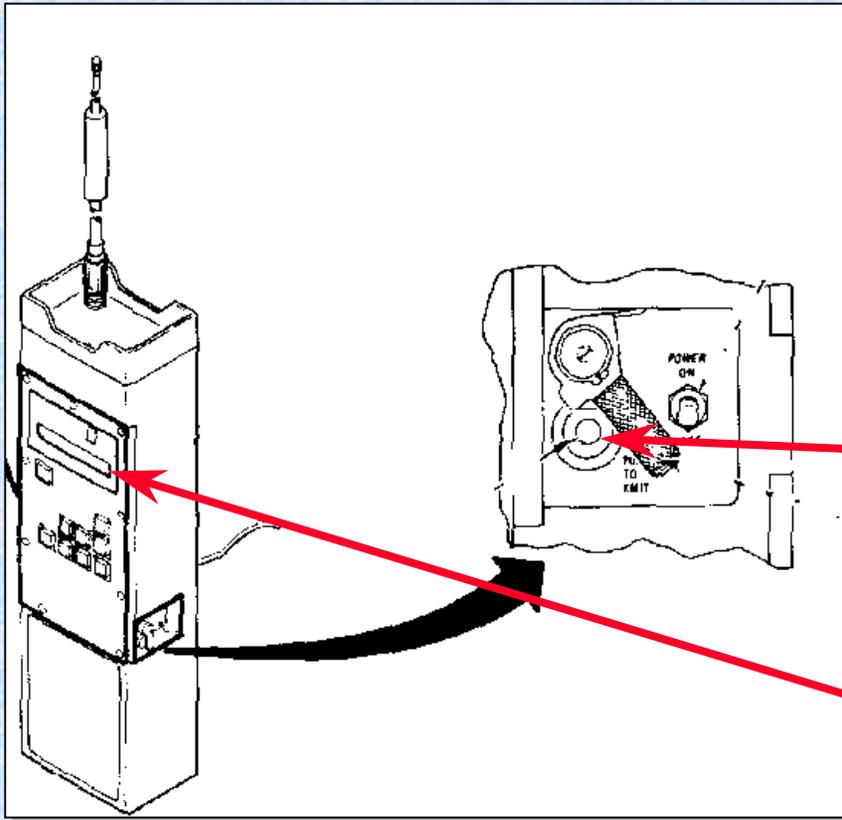


HORNET: Hand Emplaced Wide Area Munition

COMMAND RESET SD TIME Cont ...

WARNING

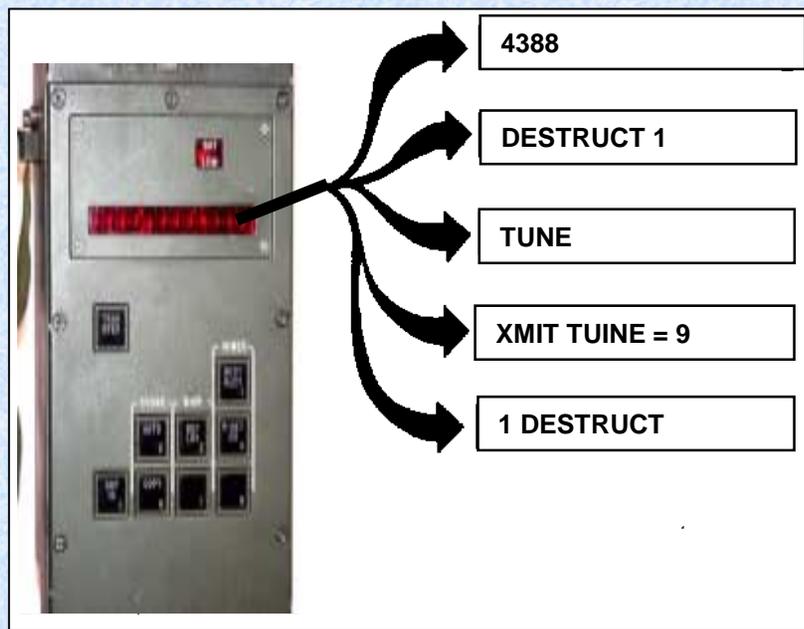
**DO NOT TOUCH ANTENNA
WHILE TRANSMITTING**



- Depress the **PUSH to XMIT** switch and verify tune = 5 or greater
- After 10 seconds verify **RESET SD** is displayed

HORNET: Hand Emplaced Wide Area Munition

COMMAND DESTROY



- Attach Antenna and Counterpoise Cable
- Turn ON RCU and enter Send Code.
- Press GRP ID until proper group is selected
- Verify the # “LAST COMMAND SENT” in LCD
- Press DESTROY and verify DESTROY 1 in LCD

HORNET: Hand Emplaced Wide Area Munition

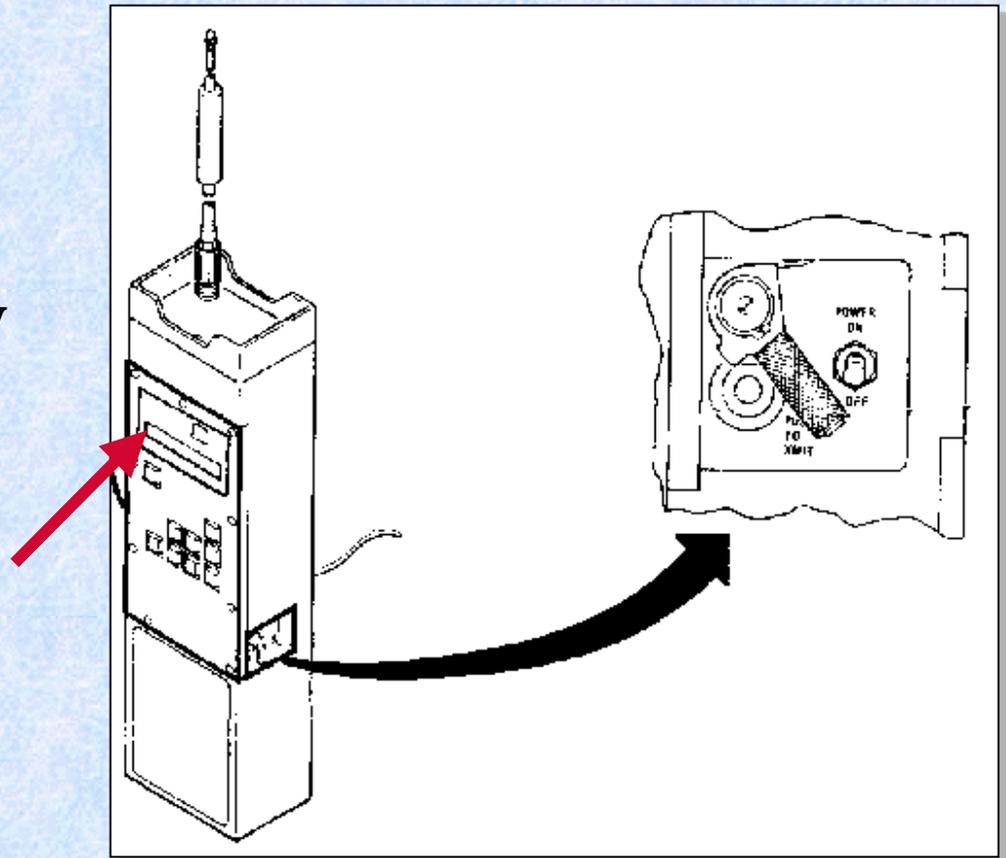
COMMAND DESTRICT Cont ...

WARNING

DO NOT TOUCH ANTENNA

WHILE TRANSMITTING

- Depress the **PUSH TO XMIT** switch and verify tune = 5 or greater
- After 10 seconds verify **1 DESTRUCT** is displayed



HORNET: Hand Emplaced Wide Area Munition

LESSON FIVE OBJECTIVES

- **Identify various weather conditions**
- **Know equipment care methods**
- **Operate Tactical Decision Aid**

HORNET: Hand Emplaced Wide Area Munition

UNUSUAL CONDITIONS

- **OPERATION IN HOT TEMPERATURES**

- * HORNET operates in air temperatures to 125°F (52°C).
- * Greater than 140°F (60°C) RCU may have incorrect displays or circuitry damage.
- * Keep RCU in shade when not in use.
- * After remote SST expires, RCU operator can wait up to 60 days to send a remote arm command (up to 15 days if temp exceeded 100°F).

- **OPERATION IN WET OR HUMID WEATHER**

- * Heavy rainfall may degrade HORNET operation.
- * Keep the RCU as dry as possible.
- * Extreme humidity may adversely affect auto-tune indication.
- * Complete immersion for more than a few minutes should be avoided.

HORNET: Hand Emplaced Wide Area Munition

UNUSUAL CONDITIONS Cont ...

- **OPERATION IN COLD WEATHER**

- * Operating RCU and HORNET below -25°F (-32°C) or in extreme snow or ice conditions can cause improper displays or system malfunctions to occur.
- * Snowfall of 4 to 8 inches may degrade HORNET performance. (See FM 9-207)

- **OPERATION IN DUST AND SAND STORMS**

- * Ensure that all RCU cover screws are tight, clean by wiping with a soft cloth.

- **OPERATION IN SALT AIR AND SEA SPRAY**

- * Protect the RCU and HORNET from the corrosive effects of salt spray.
- * Wipe unit with fresh water damp soft cloth then dry.

- **OPERATION IN HIGH WINDS**

- * HORNET capable of withstanding steady winds and gusts up to 30mph.

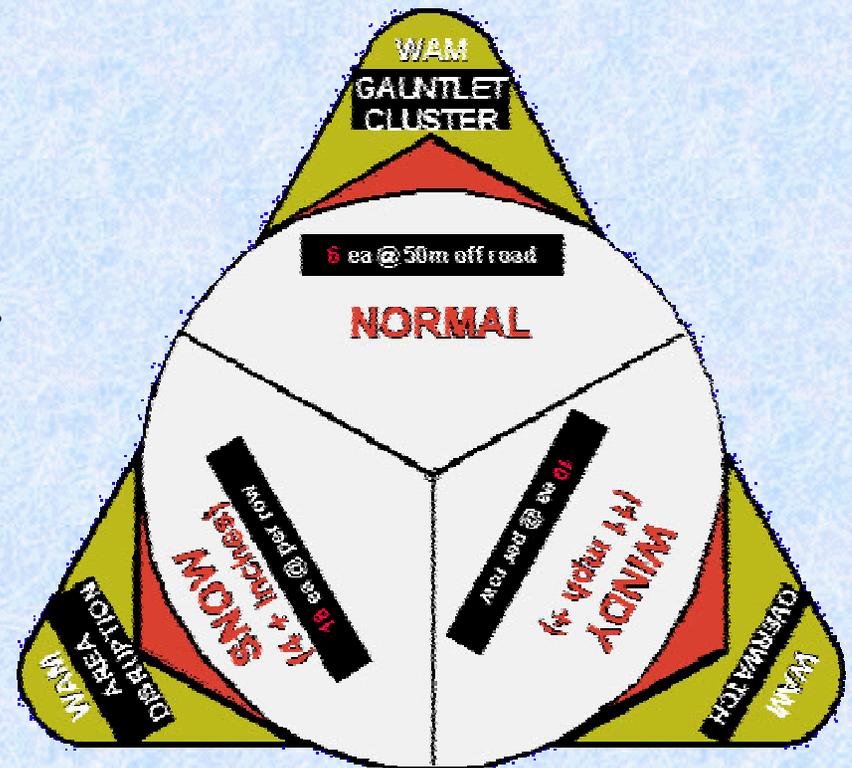
HORNET: Hand Emplaced Wide Area Munition

TACTICAL DECISION AID

PURPOSE

The Tactical Decision Aid (TDA) was developed to assist Combat Engineers when planning emplacement of the WAM. It is a quick reference for the soldier in the field to employ WAM assets efficiently in a variety of weather conditions.

It is based on Tactics, Techniques and Procedures provided by the US Army Engineer School.



HORNET: Hand Emplaced Wide Area Munition

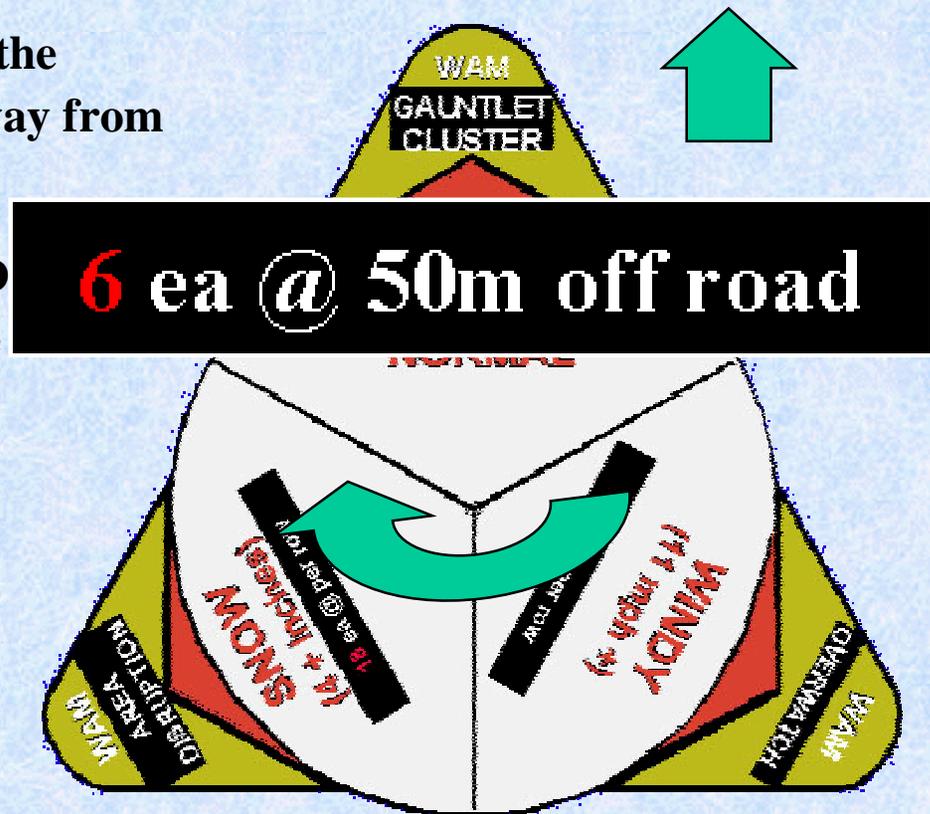
TACTICAL DECISION AID OPERATING INSTRUCTIONS

1) Hold Triangle portion in your hand with the required Emplacement Scenario pointing away from you.

2) Rotate the circular portion until the RED triangle for the weather conditions you have points to the placement Scenario.

3) Look through cut-out window for the number of WAM munitions required for the operation.

In the example shown here, a gauntlet set up under normal weather conditions should be configured with 6 WAM munitions placed 50 meters from the centerline of the roadway



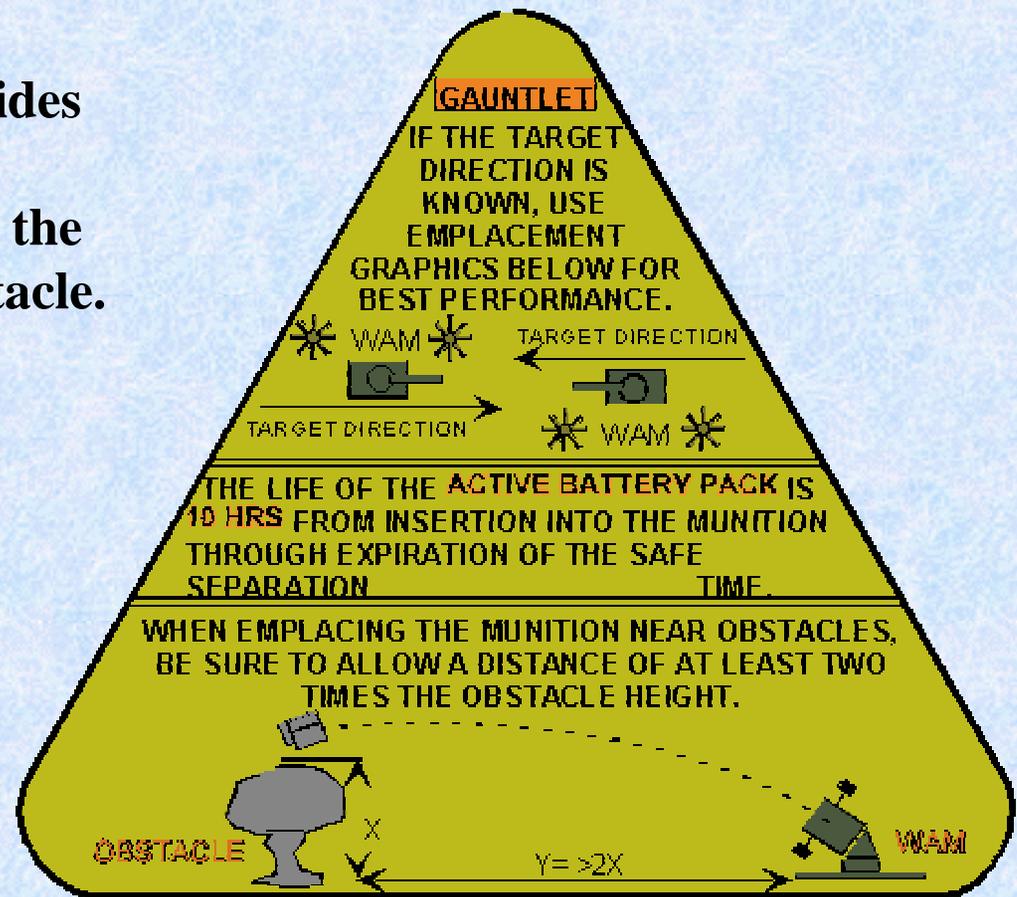
HORNET: Hand Emplaced Wide Area Munition

TACTICAL DECISION AID

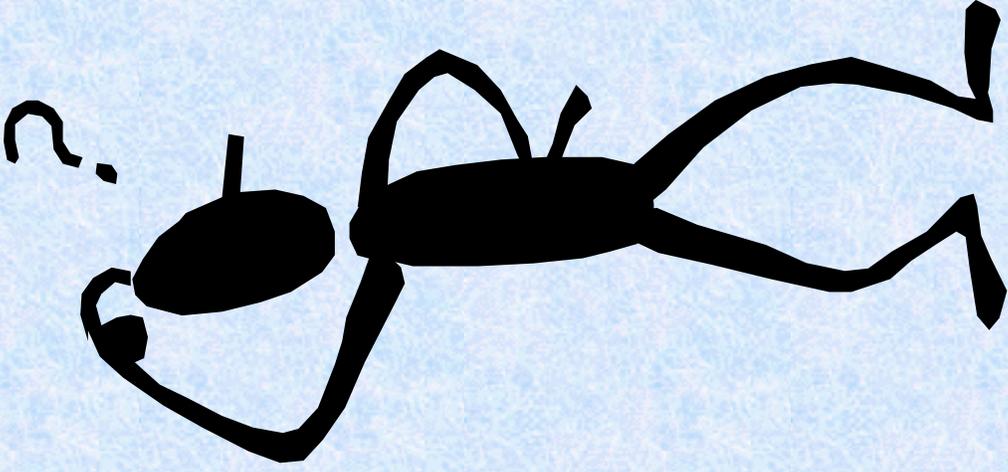
OPERATING INSTRUCTIONS, Cont.

- 4) The back side of the TDA provides information on methods for emplacing munitions optimize the effectiveness of the WAM obstacle.

The TDA is a quick reference only. Consult FM 5-250 for additional information on emplacing WAM obstacles.



HORNET: Hand Emplaced Wide Area Munition



HORNET: Hand Emplaced Wide Area Munition