

CRM LESSON PLAN REPORT

TACTICAL EMPLOYMENT OF COUNTER RADIO CONTROLLED IED ELECTRONIC WARFARE (CREW)
071-FREBB005 / 02.0 ©

Analysis
21 May 2013

Effective Date: N/A

SCOPE:

None

Distribution Restriction: Distribution authorized to the DOD and DOD Contractors only due to material being sensitive in nature. This determination was made on date.

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Foreign Disclosure: FD3 - This training product has been reviewed by the developers in coordination with the MCOE, Fort Benning, GA foreign disclosure officer. This training product cannot be used to instruct international military students.

SECTION I. ADMINISTRATIVE DATA

All Course Masters/POIs Including This Lesson

Courses				
<u>Course Number</u>	<u>Version</u>	<u>Title</u>	<u>Phase</u>	<u>Status</u>
9E-F59/950-F38	02.0	Dismounted Counter-IED Tactics Master Trainer	N/A	Analysis

POIs				
<u>POI Number</u>	<u>Version</u>	<u>Title</u>	<u>Phase</u>	<u>Status</u>
9E-F59/950-F38	02.0 ©	Dismounted Counter-IED Tactics Master Trainer	0	Analysis

Task(s) Taught(*) or Supported

<u>Task Number</u>	<u>Task Title</u>	<u>Status</u>
Individual		
071-420-0009	Conduct Dismounted Movement by an Infantry Platoon	Approved
551-751-3402	Plan Mounted/Dismounted Movement of Personnel and Equipment	Approved
150-COM-6001 (*)	Integrate CREW Systems	Approved
052-703-9113 (*)	Plan for the Integration of Counter-Improvised Explosive Device (C-IED) Assets (UNCLASSIFIED//FOR OFFICIAL USE ONLY) (U//FOUO)	Approved
150-COM-6002 (*)	Manage CREW Systems	Approved
171-121-4024	Conduct a Mounted/Dismounted Patrol	Approved

Reinforced Task(s)

<u>Task Number</u>	<u>Task Title</u>	<u>Status</u>
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Knowledge

<u>Knowledge Id</u>	<u>Title</u>	<u>Taught</u>	<u>Required</u>
052-K-00001	Knowledge of Mine Awareness	Yes	Yes
052-K-00122	Booby Trap Principles	No	Yes
052-K-00123	Explosive Hazards Indicators	Yes	Yes
052-K-00002	Knowledge of Mine/UXO Marking Requirements	Yes	Yes
052-K-00126	Minimum Safe Distance for Explosives	No	Yes

Skill

<u>Skill Id</u>	<u>Title</u>	<u>Taught</u>	<u>Required</u>
052-S-00007	Ability to Recognize Battlefield Hazard Indicators	No	Yes
052-S-00010	Ability to Understand Verbal Instructions	No	Yes

**Administrative/
Academic
Hours**

The administrative/academic (50 min) hours required to teach this lesson are as follows:

<u>Academic</u>	<u>Resident Hours / Methods</u>		
Yes	0 hrs	15 mins	Discussion (small or large group)
Yes	1 hr	35 mins	Practical Exercise (hands-on/written)
<hr/>			
Total Hours(50 min):	2 hrs	0 mins	

**Instructor
Action
Hours**

The instructor action (60 min) hours required to teach this lesson are as follows:

<u>Hours/Actions</u>		
0 hrs	10 mins	Classroom Breakdown
0 hrs	15 mins	Classroom Setup
0 hrs	15 mins	Training Event Clean-up/Breakdown (non-FTX)
0 hrs	30 mins	Training Event Prep/Setup (non-FTX)
<hr/>		
Total Hours (60 min):	1 hrs	10 mins

Test Lesson(s)

<u>Hours</u>	<u>Lesson Number Version</u>	<u>Lesson Title</u>
None		

**Prerequisite
Lesson(s)**

<u>Hours</u>	<u>Lesson Number Version</u>	<u>Lesson Title</u>
None		

**Training
Material
Classification**

Security Level: This course/lesson will present information that has a Security Classification of: FOUO – For Official Use Only.

**Foreign
Disclosure
Restrictions**

FD3. This training product has been reviewed by the developers in coordination with the MCOE, Fort Benning, GA foreign disclosure officer. This training product cannot be used to instruct international military students.

References

<u>Number</u>	<u>Title</u>	<u>Date</u>
ATP 3-90.37	COUNTERING IMPROVISED EXPLOSIVE DEVICES	29 Jul 2014
ATP 5-19 (Change 001 09/08/2014 78 Pages)	RISK MANAGEMENT http://armypubs.army.mil/doctrine/DR_pubs/dr_a/pdf/atp5_19.pdf	14 Apr 2014
DD FORM 2977	DELIBERATE RISK ASSESSMENT WORKSHEET	01 Jan 2014
FB (Safety) Form 385-1-E	Daily Risk Management Assessment Matrix	01 Oct 2013
FM 3-34.5	Environmental Considerations	16 Feb 2010
FM 3-36	Electronic Warfare in Operations	09 Nov 2012
THOR III	Technical Manual, Operation and Maintenance With Parts Breakdown Organization Level for the THOR III System P/N 118600-001	29 Sep 2009

**Student Study
Assignment**

Review course material in preparation for examination on this topic. Study for the next day's assignment.

Instructor Requirements

Instructor must be certified in the following courses: Army Basic Instructor Course (ABIC) or DOD equivalent, Dismounted Counter-IED Tactics Master Trainer (DCT-MT) Course, Combat Life Saver (CLS), Small Group Instructor Course (SGIC), and Hand Held Device (HHD).

Support Personnel Requirements

NONE

Additional Support Personnel Requirements

<u>Name</u>	<u>Student Ratio</u>	<u>Qty</u>	<u>Man Hours</u>
Bus Driver	1:30		1.5
Combat Lifesaver		1	1.0
NCOIC		1	1.0

Equipment Required for Instruction

<u>ID - Name</u>	<u>Student Ratio</u>	<u>Instructor Ratio</u>	<u>Spt</u>	<u>Qty</u>	<u>Exp</u>
* 30-35 - Thor III - Trainer, Crew 3.1, 315 MHZ	0:0		1		No
2310-01-090-7709 - Bus Transit 44 Passenger	1:30	0:0	No	0	No
4110-01-485-3548 - Chest, Ice Storage, White, 162 Quart Capacity	1:30	0:0	No	0	No
5820-00-NSN - SCREEN, PROJECTION	0:0	0:0	No	1	No
5820-00-T93-6432 - PROJECTOR, VIDEO, LCD EPSON ELP33 WITH REMOTE	0:0	0:0	No	1	No
5860-01-363-8730 - Laser Pointer	1:30	0:0	No	1	No
5895-01-540-4543 - Computer, Laptop	0:0	0:0	No	2	No
6530-01-290-9964 - Litter, Folding, Rigid Pole	1:30	0:0	No	0	No
6545-01-532-3674 - Medical Equipment Set, Combat Lifesaver, Version 2005, UA 245A	0:0	0:0	Yes	1	No
6665-01-381-3023 - Wet Bulb-Globe Temperature Kit	1:30	0:0	No	0	No
6665-01-C10-2210 - Detecting Set, Mine: Vallon (Not in AESIP)	1:5	0:0	No	0	No
6685-01-590-1047 - Monitor, Heat Stress: Questemp 44	1:30	0:0	No	0	No
6695-01-I00-0773 - Detector, Body Worn, Strider	1:5	0:0	No	0	No
6695-99-494-7952 - Detecting and Tracing Set, Metal	1:5	0:0	No	0	No
6760-00-985-6749 - Tripod, Photographic	1:30	0:0	No	0	No
7021-01-C17-2297 - PC Tablet, Data Entry: Galaxy Tab 2 WIFI 16GB Samsung	1:1	0:0	No	0	No
7240-00-098-3827 - Can, Military	1:5	0:0	No	0	No

(Note: Asterisk before ID indicates a TADSS.)

Materials Required

Instructor Materials:

1. Lesson plan with Appendix A, C, and D as applicable
2. All references linked to this lesson plan
3. Visitor Book
4. Risk Assessment
5. PowerPoint Presentation

Student Materials:

1. Student disc
2. All references linked to this lesson
3. Pen/Pencil and note taking material

Classroom, Training Area, and Range Requirements

<u>ID - Name</u>	<u>Quantity</u>	<u>Student Ratio</u>	<u>Setup Mins</u>	<u>Cleanup Mins</u>
17120-M-1200-30 Classroom, Multipurpose, 1200 Square Feet, 30 Students		1:30	5	5
72114-0-0 Enlisted Barracks, Transient Training, 0 Square Foot, 0 Starting Point , Service Points, or Persons Supported	1		0	0
74046-0-0 Consolidated Open Dining Facility, 0 Square Foot, 0 Seats	1		0	0
44224-0-0 Organizational Storage Building, 0 Square Foot, 0 Cubic Foot		1:30	0	0

Ammunition Requirements

<u>DODIC - Name</u>	<u>Exp</u>	<u>Student Ratio</u>	<u>Instruct Ratio</u>	<u>Spt Qty</u>
None				

NOTE: Before presenting this lesson, instructors must thoroughly prepare by studying this lesson and identified reference material.

1. Have on hand identified reference materials linked to the lesson plan.
2. Review presentation and develop a list of questions to use during class.
3. Review and prepare conference/discussion material presented.
4. Ensure all equipment listed for this Lesson Plan (LP) is present, operable, and set up for use before class.
5. Refer to the practical exercise, Appendix C, of this lesson plan. When necessary develop additional situations to use during the practical exercise.
6. PowerPoint users: Ensure the Instructor's file has been called up using Microsoft PowerPoint Viewer and Instructor/slide 1 is displayed on the screen before class.
7. Whenever noted, slides are available to assist in explanation of task steps. Use slides as needed during class or practical exercise to reinforce training. The Instructor may choose to use/not use the LP SLIs as developed, modify the existing SLIs content/order or insert new material as is necessary based on audience analysis to assist in Soldier learning. Changes must be annotated as a pen/ink change on the vault file master LP, VIP LP, and Instructor LP.
8. Whenever necessary, ask leading questions of Soldiers in order to prompt Soldier discussion.
9. Most materials associated with this LP are provided to Soldiers in digital format loaded on their school issued CD and student handout unless stated within instructional notes. Instructor will have to issue all necessary materials to Soldiers in hard copy unless they have individual Soldier laptop/digital capability.
10. Encourage Soldiers to relate their first hand experiences during the activities.
11. Facilitate this lesson using Instructor's methodologies.
12. Control group activities using Instructor's techniques.

1. DURING INSTRUCTION

- a. Follow the lesson plan, show and discuss slides as appropriate, and facilitate group discussion.
- b. Ensure students stay attentive and pay proper military respect to senior officers, dignitaries, and/or guest speakers.
- c. Ensure students take notes and actively participate in group discussions and stay focused on the lesson training objectives.

2. AFTER INSTRUCTION

- a. Ensure proper police of classroom and other areas used by the students.
- b. Ensure that no classified/sensitive material is left in the classroom.
- c. Check classroom for security, cleanliness, and energy conservation before departing area.
- d. Annotate FB Form 1087a, Instructor/Evaluator Comment Record as appropriate.

3. BEFORE USING EQUIPMENT

- a. Ensure students are given a specific safety briefing, if necessary.
- b. Perform proper power up/down procedures for computer equipment.

Note: The above examples in no way limit the safety precautions that the individual instructor/facilitator may stress. There may be specific instances during conduct of lesson that the instructor/facilitator may caution students about.

**Proponent Lesson
Plan Approvals**

Name

Rank

Position

Date

None

NO DATA

SECTION II. INTRODUCTION

Method of Instruction: Discussion (small or large group)

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - ICH, ABIC/FIFC Qual and CIED SME (1:5)

Time of Instruction: 10 mins

Motivator

Slide 1: Introduction

Slide 2: Motivator

Currently in theater, the IED is the most lethal weapon employed by the enemy against coalition forces. Counter Radio Controlled-Improvised Explosives Device Electronic Warfare (CREW) Systems, if employed properly, will greatly enhance your survivability and will counter many of the known Radio-Controlled Improvised Explosive Device (RCIED) threats. Do not take this the wrong way. While the system works well and when employed properly, it will protect you from RCIED threats. Like any other system that is employed, it is a combat multiplier. As we adapt to current threats, the enemy is adapting to counter our countermeasures of those same threats. Hence, CREW systems are designed and programmed to counter threats that are known to exist. Upgrades to current CREW systems are enabling them to counter threats that could emerge in the future.

Note: Use this statement or develop one of your own relating to the material.

Instructor's Note:

1. Introduce yourself. Only needed the first you deliver instruction to this class.
2. Per course pre-requisites, the students are supposed to come with foundational knowledge of CREW, therefore, a large part of this lesson can be covered thru Socratic questioning method.
3. **TWO Options** for conducting this class:
 - a. **OPTION 1.** Conduct the entire class thru a hands on Practical Exercise (PE) using actual CREW equipment (THOR III and BALDR).
 - 1) You may use all, or no power point slides to teach this class as long as you meet the class learning objective to include achieving the level of learning.
 - 2) You may have posters of selected power points or have students make notes on butcher paper during the conduct of the class.
 - 3) If time permits, you may choose to make up a simple scenario to add realism to the PE.
 - 4) This can be a standalone PE or can be combined with other enablers PE (MH, DSP/STRIDER, CIEA/GIZMO) during the assessment portion of the course. When combined students will rotate thru pre-established stations.
 - 5) You may be able to conduct the PE during inclement weather using a classroom or other suitable facility.
 - b. **OPTION 2.** Conduct the class as shown in this presentation. Recommend using actual equipment to demonstrate.

Slide 3:

NOTE. Inform the students of the following Terminal Learning Objective requirements.
At the completion of this lesson, you [the student] will:

**Terminal
Learning
Objective**

Action:	Employ Counter Radio Controlled IED Electronic Warfare (CREW) in a tactical mission.
Conditions:	In a classroom and/or field environment, given PowerPoint presentation, student resources, lesson plan, and current reference material.
Standards:	Employment of CREW will be IAW THOR III & BALDR user's manual. Must achieve a score of 80% or greater on examination/rubrics. The employment includes: <ol style="list-style-type: none"> 1. Identify factors that effect CREW 2. List the components of THOR III 3. Employ dismounted CREW in a tactical mission <p style="text-align: center;">Learning Domain: Cognitive Learning Level: (C3) Application</p>
Learning Domain - Level:	None assigned
No JPME Learning Areas Supported:	None

Safety Requirements

Safety Requirements in a Classroom Setting:

Safety is of the utmost importance in any training environment. During the training process, commanders will utilize the 5-Step Risk Management process to determine the safest and most complete method to train. Every precaution will be taken during the conduct of training. Safety is everyone's responsibility to recognize, mitigate, and report hazardous conditions.

Instructor note: The instructor will brief the students on the unit/facility SOP for classroom contingencies (i.e. what doors will be used to exit the classroom, rally points, severe weather, WBGT/Kestrel set up, etc).

Safety Requirements other than Classroom Settings:

Safety must be paramount in the complex outdoor environment. During the training process, commanders will utilize the 5-Step Risk Management process to determine the safest and most complete method to train. Every precaution will be taken while replicating realistic battlefield conditions. Safety is everyone's responsibility to recognize, mitigate, and report hazardous conditions.

Instructor Note: The instructor will brief the unit/site SOP and Risk Management Worksheet for all potential contingencies encountered during that training period/event (i.e., WBGT/Kestrel set up, trail vehicles, for PT/foot marches, severe weather, fire, evacuation routes, muzzle awareness, range safety briefs, required medical FLA with driver and medics with emergency equipment, student injury procedures, rally points, etc.).

Risk Assessment Level

Low - All Army Instructors will conduct a Risk Assessment Worksheet (FB Form 385-1-E, Daily Risk Management Assessment Matrix, OCT 2013) prior to training and brief Soldiers on identified hazards.

Assessment: The Principal Instructor will prepare a risk assessment using the before, during, and after checklist and the risk assessment matrixes contained in Risk Management FM 5-19.

Controls: See Attached FB Form 385-1-E.

Leader Actions: See Attached FB Form 385-1-E.

Environmental Considerations

NOTE: Instructor should conduct a Risk Assessment to include Environmental Considerations IAW FM 3-34.5, Environmental Considerations {MCRP 4-11B}, and ensure students are briefed on hazards and control measures.

It is the responsibility of all Soldiers and DA civilians to protect the environmental from damage. There are no environment concerns during this block of training.

Instructional Lead-in

US Forces have dominated their adversaries in conventional operations. It is not surprising that adversaries respond asymmetrically by avoiding conventional armies' strengths and attacking their weaknesses. Lessons Learned concerning insurgent tactics in Afghanistan and in Iraq since 2003 have shown us how the threat is highly adaptive and can exploit weaknesses to reveal conventional force vulnerabilities. During this lesson, we will address the following topics that pertain to the CREW system and how to effectively integrate the systems into your unit's tactical mission.

Note: Use this statement or develop one of your own relating to the material.

Show Slide 4: Enabling Learning Objectives

At the completion of this lesson, you will be able to:

1. Identify factors that effect CREW
2. List the components of THOR III
3. Employ dismounted CREW in a tractical mission

SECTION III. PRESENTATION

TLO - LSA 1. Learning Step / Activity TLO - LSA 1. Identify factors that affect CREW

Method of Instruction: Practical Exercise (hands-on/written)

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - ICH, ABIC/FIFC Qual and CIED SME (1:5)

Time of Instruction: 20 mins

Media Type: CD-ROM / Actual Equipment / Equipment Based Instruction / Handout / Oral Presentation / Slides / Student Guide

Other Media: Unassigned

Security Classification: This course/lesson will present information that has a Security Classification of: FOUO – For Official Use Only.

Slide 3: Identify factors that affects CREW

- Who can provide an overview of CREW?

1. A special transmitter that prevents a receiver from "hearing" a detonation command.
2. Transmits a similar signal at a much higher volume, which distorts the command signals.
3. Confuses the receiver enough to disable it.
4. Transmits with more power on threat frequencies.
5. Prevents an understandable signal from reaching the receiver.
6. Has no effect on the transmitter.

Instructor/Facilitator's Note:

1. Active Jamming Constant transmission of "white noise" (Broad-band, or barrage jammer),
 - a. Doesn't have to hear a threat signal
 - b. Can interfere with everything that operates on the jamming frequencies.

c Pro's:

- 1) Constantly transmits on all programmed frequencies or bandwidths
- 2) Can defeat multiple threats simultaneously
- 3) Very efficient at defeating low power threats
- 4) Easy to operate

d. Con's:

- 1) Spreads available power across entire bandwidth
- 2) Susceptible to exploitation of programmed frequencies
- 3) Relatively low power per MHz
- 4) May not be efficient vs. high-power threats
- 5) Possibly disrupt communication, including Blue Forces if not de-conflicted

2. Reactive Jamming

- a. Listens with sensitive receiver for threat signals. When it hears a threat signal:
 - 1) Processes signal
 - 2) Transmits a modified "corrupt" signal
 - 3) Goal is to get the corrupt signal into the threat receiver
 - 4) Get the receiver to listen to us instead of the Insurgent
 - 5) Focuses high-power capability on a single signal

b. Pro's:

- 1) Focused "reaction" puts available power directly on threat frequency

- 2) Capable of modifying threat signal
- 3) Low exploitation risk; intermittent transmission
- 4) Most efficient way to defeat high-power threats

c. **Con's:**

- 1) Requires acute receiver sensitivity
- 2) Hears all RF signals in programmed "threat" bands
- 3) Not practical to have receiver sensitive enough to defeat low power threats along with high power

threats

- 4) Jammer Receiver may not be sensitive enough to detect threat signals, due to Transmitter-

Receiver separation

3. THOR III Active/Reactive System

- a. Combines both concepts into one unit
- b. Lower Power threat Efficiency (Active)
- c. High Power threat Adaptability (Reactive)

Slide 4: Which factors affects CREW?

- 1. Frequency/de-confliction
- 2. Power
- 3. Line of Sight (LOS)
- 4. Masking
- 5. Environmental factors

Instructor/Facilitator's Note:

- The various factors that affect your area of protection is difficult to detect because there are so many variables that impact your area of coverage.

Slide 5: Factors that affects CREW (Cont.)

- Describe Frequencies

- 1. Wavelength used by transmitter and receiver to communicate.
- 2. CREW must match Radio-controlled Improvised Explosive Device (RCIED) frequency to prevent it from functioning.

Instructor/Facilitator's Note:

- 1. Radio frequency is the area of the EM spectrum where most Radio communications take place.
 - a. Radio Frequency is measured in hertz (Hz).
 - b. The CREW systems frequency needs to match the frequency of the transmission sent to the RCIED receiver by the enemy's transmitter, in order to stop detonation.
- 2. The picture shows the radio frequency on a graph and how a CREW system must radiate on the same frequency with more power than the enemy in order to interfere with the signal.
- 3. The picture shows an enemy signal being over whelmed with power at its receiver.

Slide 6: Factors that affects CREW (Cont.)

- De-conflict frequencies with other equipment

- 1. Communication Electronic Operating Instructions (CEOI)
- 2. Confirm correct frequency loads
- 3. Know what you can and can't use

Instructor/Facilitator's Note:

1. Just as CREW systems can interfere with enemy receivers, they can also interfere with, or conflict with, friendly communications equipment.

- a. Before employing CREW systems, their settings must be de-conflicted so that communications and other RF equipment frequencies are not neutralized.
 - b. CREW systems may interfere with radio systems, Blue Force Tracker (BFT), and other CREW systems.
 - c. Frequency de-confliction is done at the Operational Level of Command so most soldiers will not have any direct involvement with these procedures.
 - d. However soldiers need to know that it occurs and know that they may influence this by reporting (during debriefs) any communications problems that may have been experienced during a mission.
2. The Communication Electronic Operating Instruction (CEOI) is one product that results from frequency de-confliction.
- a. It details the frequencies that should be communicating on during a certain period of time.
 - b. It is imperative that you emphasize that the newer CREW systems have eliminated much of the conflict problems.
 - c. If the operators perform their PMCS's to confirm that they have the proper RF loads and know how to troubleshoot these systems they should have no problems.

Slide 7: Factors that affects CREW (Cont.)

- Define Power

- 1. Measurement of how much energy transmitter is producing
- 2. Correct combination of frequency and power critical
- 3. Energy of electromagnetic signal decreases significantly the further it travels

Instructor/Facilitator's Note:

- 1. The CREW System must produce more power at the enemy receiver in order for it to jam the RCIED.
 - a. The rule of thumb is you must have 3 times the power on the device (3:1 ratio) in order to defeat it.
 - b. Distance plays an important factor in who will be able to deliver the most power on the enemy receiver.
- 2. Example
 - a. Imagine that the Enemy transmitter is producing 20 watts of power and has a stand off from the enemy receiver of 100m.
 - b. The CREW system (THOR III) is producing 10 watts of power and is with-in 35m of the enemy receiver.
 - c. Energy of electromagnetic signal decreases significantly the farther it travels giving the CREW system a distance advantage.
 - d. Even though the Enemy transmitter is producing more power the CREW system will deliver more power on the receiver.

Slide 8: Factors that affects CREW (Cont.)

- What is line of sight vs masking?

- 1. Line of Sight (LOS)
 - a. Unobstructed path between transmitting and receiving antennas
 - b. Clear LOS maximizes effectiveness of CREW
- 2. Masking
 - Obstructions between CREW Antenna and device

Instructor/Facilitator's Note:

- 1. Line Of Sight – for maximum effectiveness you must have a clear path from the CREW System to the receiver of the RCIED

- a. Radio Frequencies may not penetrate solid objects.
- b. If there is a wall between you and the receiver of the RCIED your CREW System may not protect you from the RCIED. Remember in built up areas your protective coverage will be smaller because of the different infrastructure that is around you.

2. Masking – this is when RF waves radiating from a CREW system antenna do not reach the RCIED receiver because the path is blocked in some way (RF waves may not penetrate solid objects).

a. Masking can occur due to both natural and manmade objects, such as: buildings, terrain, vehicles, metal objects, etc.

b. Never place anything on or around your CREW antenna, as this will degrade your protection. You will still jam signals, however your protection will not be as large as it would be if the antenna was not blocked.

Slide 9: Effects of elevation on CREW Coverage

- As Antenna B is elevated from 3 ft to 10 ft the coverage angle below the antenna increases. The average coverage angle below the antenna is 10-25 degrees. Refer to the figure for a visual representation of what areas the elevated Antenna B will not cover.

Instructor/Facilitator's Note:

- This depicts the effects of elevation as the height of the device increases

Slide 10: Environment factors

1. Protection radius can be affected by:

- Weather
- 1) Sandstorm
- 2) Rain
- 3) Snow

Instructor/Facilitator's Note:

1. The question is always asked, what is the maximum radius of my area of protection?
 - a. There is not set distance.
 - b. The size of your area of protection is based on your surroundings, weather and the CREW System.
2. If you are in a built up area then obviously your area of protection is only as big as the area you are in.
3. Just like satellite television, weather affects your area of protection.
 - a. If it's raining your satellite signal becomes weak.
 - b. If it's raining or you are having a sand storm then your CREW signal becomes weaker.
 - c. Therefore, not giving you as large as your area of protection as it would on a clear sunny day.

Slide 11:

Check on Learning:

1. Which of the following is not an environmental factor that affects CREW.
 - a. Power
 - b. Discardables
 - c. Environmental Factors
 - d. Line of Sight

Answer B: Discardables

2. The CREW System frequency does not need to match the frequency of the transmission sent to the RCIED receiver by the enemy's transmitter in order to stop detonation. **True or False?**

Answer: False

3. The CREW system must produce more power at the enemy receiver in order for it to jam the RCIED. **True or False?**

Answer : True

Review Summary:

In this LSA we covered factors that affect CREW:

1. Frequency/de-confliction
2. Power
3. Line of Sight (LOS)
4. Masking
5. Environmental factors.

TLO - LSA 2. Learning Step / Activity TLO - LSA 2. List the components of THOR III

Method of Instruction: Practical Exercise (hands-on/written)

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - ICH, ABIC/FIFC Qual and CIED SME (1:5)

Time of Instruction: 15 mins

Media Type: CD-ROM / Actual Equipment / Equipment Based Instruction / Practical Exercise / Slides

Other Media: Unassigned

Security Classification: This course/lesson will present information that has a Security Classification of: FOUO – For Official Use Only.

Slide 12: List the components of THOR III

Who can provide a THOR III Overview?

1. USA/USMC system designed for dismounted operations
2. Designed to replace the guardian Quick Reaction Force (QRD)
3. Combination Jammer, active/reactive
4. Records threat detection
5. Usually comprised of 3 separate units
 - a. A (low band coverage)
 - b. B (mid band coverage)
 - c. C (high band coverage)

Instructor/Facilitator's (I/F) Note

1. THOR III Active/Reactive System
2. Combines both concepts into one unit.
 - a. Lower Power threat Efficiency (Active)
 - b. High Power threat Adaptability (Reactive)

Slide 13: List the components of THOR III

- THOR III Overview (cont.)

1. Batteries last up to four hours of continuous operations
2. The system can store up to five separate mission loads and can use Remote Control (RCU)
3. Incorporates vibrate, audible, and visual warnings
4. Weighs approximately 25lbs with batteries
5. Utilizes common timing protocol via Ground Positioning System (GPS)

Instructor/Facilitator's (I/F) Note

1. THOR III Batteries
 - a. It has four hours of continuous operation per set of batteries.
 - b. When dismantled think about how long you are on the ground.
 - c. The batteries are re-chargeable and spares should be taken on patrol.
 - d. Batteries need to be split up amongst the patrol, and there needs to be a battery hot swap SOP in place.
 - e. Make sure you conduct rehearsals with the equipment.
2. Common Timing Protocol
 - a. Allows active and reactive systems to work together.
 - b. Increases compatibility
 - c. Requires GPS Sync
 - d. Most CREW systems are now equipped with CTP

Slide 14: Who can list the THOR III Components

- Describe THOR III Bands Subsystem.

1. LOW - RCU
2. MID - GPS Antenna, Pack Layout
3. HIGH - Battery Module

Instructor/Facilitator's (I/F) Note

1. Low Band Subsystem: 2 ultra-low active only channels, 6 low active/reactive channels, and 8 high reactive channels
2. Mid Band Subsystem: 8 active sources within one output channel bandwidth, 2 active entries per active source, 4 reactive channels, and 16 threat frequencies per reactive channel.
3. High Band Subsystem: 8 active sources within one output channel bandwidth, 2 active entries per active source, 4 reactive channels, and 16 threat frequencies per reactive channel.
4. Not all bands are used in theater. Check on arrival the correct bands that are employed on dismantled patrols.

Slide 15:

Check on Learning:

1. The THOR III is comprised of _____ separate units
Answer: three (a low band, mid band, and a high band unit)

2. The average battery life for a THOR III is _____ Hours.
Answer: four

3. The THOR III can store up to seven separate mission loads and can use a Remote Control Unit (RCU). True or False?
Answer: False [The system can store up to five separate mission loads and can use a Remote Control Unit (RCU)]

Review Summary:

In this LSA we discussed the components of THOR III which

are:

- USA/USMC system designed for dismounted operations
- Designed to replace the Guardian QRD
- Combination Jammer, active/reactive
- Records threat detection
- Usually comprised of 3 separate units

- Batteries last up to four hours of continuous operations.
- The system can store up to five separate mission loads and can use a Remote Control Unit (RCU).
- Incorporates vibrate, audible, and visual warnings.
- Weighs approximately 25lbs with batteries.
- Utilizes common timing protocol via Ground Positioning System (GPS).

TLO - LSA 3. Learning Step / Activity TLO - LSA 3. Employ dismounted CREW in a tactical mission

Method of Instruction: Practical Exercise (hands-on/written)

Mode of Delivery: Resident Instruction

Instr Type (I:S Ratio): Military - ICH, ABIC/FIFC Qual and CIED SME (1:5)

Time of Instruction: 1 hr

Media Type: CD-ROM / Actual Equipment / Equipment Based Instruction / Practical Exercise / Slides

Other Media: Unassigned

Security Classification: This course/lesson will present information that has a Security Classification of: FOUO – For Official Use Only.

Slide 16: Employ Dismounted CREW in a Tactical Mission THOR III Employment

- What are the Patrol Leader responsibilities during THOR III employment?

1. Turn on and allow to warm up for a minimum of 20 minutes prior to leaving on a patrol.
2. Ensures that each THOR III successfully passes both BIT and UTS.
3. Periodically ask for a status to ensure the system is not shut down.
4. During movement continually monitors CREW placement within the patrol.

Instructor/Facilitator's (I/F) Note

- Proper PPC/PCI of all equipment must be conducted prior to execution.

Slide 17: Patrol Leader responsibilities during THOR III employment (cont.)

1. Considers obstacles and other features to maximize the THOR III effectively.
2. Develop battery "hot swap" battle drills.
3. Adjust the antennas prior to entering positions that restrict movement.
4. Develop and rehearse THOR III SOPs.
5. Conduct PMCS before and after every use.
6. Most importantly, understand the THOR III capabilities and limitations.

Slide 18 THOR III Coverage (Transition slide)

Slide 19 THOR III Coverage (Cont.)

- 1. 5m spacing (coverage planning range 35m)

Instructor/Facilitator's (I/F) Note

- The graphic shows a squad in file formation, but other formations can be used as long as squad members remain in THOR III coverage.

1. The file or column formation would be the ideal formation used during clearing operations with other HHDs.
2. Dismounted patrol requirements
 - a. 12 or fewer Soldiers are required to carry a minimum of one THOR III suite.
 - b. 13-24 Soldiers are required to carry two THOR III suites.
 - c. 25 or more Soldiers are required to carry three THOR III suites.

Slide 20: THOR III Coverage (Cont.) (Low, Med, & High)

- 5m spacing (coverage planning range 35m)

Instructor/Facilitator's (I/F) Note

- The graphic shows a squad in file formation, but other formations can be used as long as squad members remain in THOR III coverage.

1. The file or column formation would be the ideal formation used during clearing operations with other HHDs.
2. Dismounted patrol requirements
 - a. 12 or fewer Soldiers are required to carry a minimum of one THOR III suite.
 - b. 13-24 Soldiers are required to carry two THOR III suites.
 - c. 25 or more Soldiers are required to carry three THOR III suites.

Slide 21: THOR III Coverage (Cont.)

- 10m spacing (coverage planning range 35m)

Instructor/Facilitator's (I/F) Note

- The graphic shows a squad in file formation, but other formations can be used as long as squad members remain in THOR III coverage.

1. The file or column formation would be the ideal formation used during clearing operations with other HHDs.
2. Dismounted patrol requirements
 - a. 12 or fewer Soldiers are required to carry a minimum of one THOR III suite.
 - b. 13-24 Soldiers are required to carry two THOR III suites.
 - c. 25 or more Soldiers are required to carry three THOR III suites.

Slide 22: What are some of the common problems with THOR III?

1. THOR III is an air cooled system that will stop functioning at an internal temperature of 120 degrees.
2. Common error is placing a camelback over the system.
3. Positioning the antenna horizontal will affect the capability of jamming.
4. Accidentally causing it to "zeroize".

Instructor/Facilitator's (I/F) Note

1. Ensure that all personnel that carry the THOR III are properly trained and understand the common TTP failures.
2. BALDR and THOR are not acronyms, but are the names of sons of the god Odin in Norse mythology.

Slide 23: What are the common problems with antenna?

- Cable/antenna damage

1. Protect cable when changing antenna direction and from low level trees.
2. Don't over tighten the three screws that secure the antenna to housing.

Instructor/Facilitator's (I/F) Note

1. The antennas for this device are not durable.
2. Extreme care needs to be taken to ensure serviceability.

Slide 24: Common problems with antenna (cont.)

- Broken Low Band Antenna

1. Broken connection for tines, missing more than two tines will affect the jamming capability

- Missing more than two tines will affect the capability of jamming

2. Mounting point (silver ring) for antenna sleeve

Slide 25: Common problems with antenna (cont.)

- Fracture points on Mid Band

1. Do not over tighten; this causes the plastic shell to crack.

2. The inner sleeve should be tightened down by the allen screws.

Instructor/Facilitator's (I/F) Note

- Soldiers should procure the required allen wrenches from the FSR.

Slide 26: Who can provide a BALDR overview?

- Dismounted man-pack CREW system. (MUST BE USED IN CONJUNCTION WITH THOR III)

1. Both active and reactive jammer

2. Designed to jam low and medium power RCIEDs

3. Weighs approximately 5.8lbs without the battery, approximately 8.87lbs with batteries

4. Batteries last up to six and half hours of continuous operations

5. Global Positioning System (GPS) synchronized to operate with other Common Timing Protocol (CTP) compatible jammers

Instructor/Facilitator's (I/F) Note

1. Made by the same company as the THOR III.

2. **BALDR** is a lightweight counter-radio electronic warfare systems (CREW) system designed to enable an individual warfighter to increase survivability against RCIEDs.

3. It is a supplement to the THORIII NOT A REPLACEMENT.

4. **BALDR and THOR are not acronyms**, but are the names of sons of the god Odin in Norse mythology.

Slide 27: BALDR (iCREW) Overview (cont.)

1. Unlike the THOR III, there is only one mission loadset

2. Continuously monitored by an internal Built in Test (BIT)

- Has visual warnings via LED Lights

3. Each of the antennas are for specific frequencies

a. Band 1 (Low)

b. Band 2/3 (Medium)

Instructor/Facilitator's (I/F) Note

1. Same LED light set up as the THORIII but does not have audio warnings.

2. The system does not have an RCU so buddy checks have to be done to ensure

the system is operating without failure.

3. Based on current loadsets the iCREW only covers the top 4 threat frequencies in theater

Slide 28: BALDR Control Panel

1. J4 Band 2/3 Antenna Port
2. J5 Band 1 Antenna Port
3. J2 Communications Cable (Ethernet)
4. Control Panel with Guard, Power button. Mode Button, Bright Button, LED indicator Lights
5. J4 GPS Antenna Port

Slide 29: From this picture, what are the BALDR (iCREW) components?

- Image shows a picture of a BALDR and its components.

1. Band 1 Antenna
2. GPS Antenna
3. Battery Cable
4. Battery
5. Band 2/3 Antenna
6. Receiver Transmitter

Instructor/Facilitator's (I/F) Note

1. Show actual equipment if possible.
2. To make battery changes the iCREW has to be shut down and rebooted.

Slide 30: Carry Configurations

- Image with four Soldiers carrying BALDR

Instructor/Facilitator's (I/F) Note

1. Unlike the THOR III the iCREW can be stored inside of a pack.
2. However the system is carried, the antenna's need to be positioned up right and perpendicular.

Slide 31: BALDR Integration

- Illustrate 5m dispersion spacing (coverage planning range 35m)

Instructor/Facilitator's (I/F) Note

- Discuss how the CREW is effected by the obstacles.

Slide 32: BALDR Integration (Cont)

- Illustrate 5m dispersion spacing (coverage planning range 35m)

Instructor/Facilitator's (I/F) Note

1. Discuss how the BALDR increases flexibility for dispersion and movement.

Remember METTT-C

2. Discuss who and why personnel are equipped with BALDR.

Slide 33: BALDR Integration (Cont) (with Low, Med, & High sets)

- Illustrate 5m dispersion spacing (coverage planning range 35m)

Instructor/Facilitator's (I/F) Note

- Discuss how the CREW is affected by the obstacles.

Slide 34: BALDR Integration (Cont) (with Low, Med, & High sets)

- Illustrate 5m dispersion spacing (coverage planning range 35m)

Instructor/Facilitator's (I/F) Note

1. Discuss how the BALDR increases flexibility for dispersion and movement.
Remember METTTT-C.

2. Discuss who and why personnel are equipped with BALDR.

Slides 35 and 36

Check on Learning:

1. Patrol Leaders are responsible for ensuring that each THOR III successfully passes both ___ and ___.

Answer: BIT and UTS

2. How many THOR III units must be carried with 12 or fewer Soldiers at 5 meter spacing when on patrol?.

- a. 1
- b. 2
- c. 3
- d. 4

Answer: b 2

3. When on patrol there is no need to verify system is on.
True or False?

Answer: False

4. THOR III is an air cooled system that will stop functioning when it reaches 120 degrees. True or False?

Answer: True

5. Missing more than 2 times from the low band antenna will affect the jamming capability of the THOR III. True or False?

Answer: True

6. The BALDR (i-Crew) dismounted man-pack CREW system must be used in conjunction with THOR III.

Answer: True

Review Summary:

In this LSA we discussed patrol leader responsibilities during THOR III employment including:

- Turn on and allow to warm up for a minimum of 20

minutes prior to leaving on a patrol.

- Ensures that each THOR III successfully pass both BIT and UTS.

- Periodically ask for a status to ensure the system is not shut down.

- During movement continually monitors CREW placement within the patrol.

- Considers obstacles and other features to maximize the THOR III effectively.

- Develop battery "hot swap" battle drills.

- Adjust the antennas prior to entering positions that restrict movement.

- Develop and rehearse THOR III SOPs.

- Conduct PMCS before and after every use.

- Most importantly, understand the THOR III capabilities and limitations.

SECTION IV. SUMMARY

Method of Instruction:	Discussion (small or large group)
Mode of Delivery:	Resident Instruction
Instr Type(I:S Ratio):	Military - ICH, ABIC/FIFIC Qual, CIED SME (1:5)
Time of Instruction:	5 mins

Check on Learning

Determine if the students met the lesson objective by asking related questions or thru a short ungraded quiz. The objective of this class was:

Employ Counter Radio Controlled IED Electronic Warfare (CREW) in a Tactical Mission and includes:

- Identify factors that effect CREW
- List the components of THOR III
- Employ dismounted CREW in a tactical mission

Provide feedback and correct misunderstandings.

Review/ Summary

Slide 37: Summary

1. **Lesson:** Employ Counter Radio Controlled IED Electronic Warfare (CREW) in a Tactical Mission

2. **During this lesson we covered:**

- a. Identify factors that effect CREW
- b. List the components of THOR III
- c. Employ dismounted CREW in a tactical mission

Slide 38: Questions

SECTION V. STUDENT EVALUATION

Testing Requirements

This lesson will be tested on Course Examination 2. You must receive a passing score of 80% or greater on the written examination to complete this course.

Feedback Requirements

Note: Feedback is essential to effective learning. Schedule and provide feedback on the evaluation and any information to help answer students and questions about the test. Provide remedial training as needed.

Appendix A - Viewgraph Masters

**Tactical Employment of Counter Radio Controlled IED Electronic Warfare (CREW)
071-FREBB005 / Version 02.0 ©**

Sequence	Media Name	Media Type
0	Integration of Counter Radio Controlled IED Electronic Warfare (CREW)	PPTX

Appendix B - Assessment Statement and Assessment Plan

Assessment Statement: None.

Assessment Plan: None.

Appendix C - Practical Exercises and Solutions

PRACTICAL EXERCISE(S)/SOLUTION(S) FOR LESSON 071-FREBB005 Version 02.0 ©

Appendix D - Student Handouts

**Tactical Employment of Counter Radio Controlled IED Electronic Warfare (CREW)
071-FREBB005 / Version 02.0 ©**

Sequence	Media Name	Media Type
None		

Tactical Employment of Counter Radio Controlled IED Electronic Warfare (CREW)

071-FREBB005 / Version 02.0 ©

DRAFT

1. The importance of this lesson: (Why)

Identify how to integrate Counter Radio Controlled IED Electronic Warfare (CREW) into a tactical mission. Domain: Cognitive Level 2: Comprehension

2. What we want our Soldiers to Achieve: (Outcomes/Standard)

Identify how to integrate Counter Radio Controlled IED Electronic Warfare (CREW) into a tactical mission and achieve a score of 80% or greater on the written examination.

3. Tasks to be taught

<u>Task Number</u>	<u>Task Title</u>	<u>Task Type</u>
071-420-0009	Conduct Dismounted Movement by an Infantry Platoon	Individual SUPPORTED
551-751-3402	Plan Mounted/Dismounted Movement of Personnel and Equipment	Individual SUPPORTED
150-COM-6001	Integrate CREW Systems	Individual TAUGHT
052-703-9113	Plan for the Integration of Counter-Improvised Explosive Device (C-IED) Assets (UNCLASSIFIED//FOR OFFICIAL USE ONLY) (U//FOUO)	Individual TAUGHT
150-COM-6002	Manage CREW Systems	Individual TAUGHT
171-121-4024	Conduct a Mounted/Dismounted Patrol	Individual SUPPORTED

Additional Non-Standard Tasks

None

4. References:

<u>Reference Number</u>	<u>Reference Title</u>	<u>Date</u>
ATP 3-90.37	COUNTERING IMPROVISED EXPLOSIVE DEVICES	29 Jul 2014
ATP 5-19 (Change 001 09/08/2014 78 Pages)	RISK MANAGEMENT http://armypubs.army.mil/doctrine/DR_pubs/dr_a/pdf/atp5_19.pdf	14 Apr 2014
DD FORM 2977	DELIBERATE RISK ASSESSMENT WORKSHEET	01 Jan 2014
FB (Safety) Form 385-1-E	Daily Risk Management Assessment Matrix	01 Oct 2013
FM 3-34.5	Environmental Considerations	16 Feb 2010
FM 3-36	Electronic Warfare in Operations	09 Nov 2012
THOR III	Technical Manual, Operation and Maintenance With Parts Breakdown Organization Level for the THOR III System P/N 118600-001	29 Sep 2009

Additional Non-Standard References

References located on Student Disc

BALDR class

THOR III class

i-CREW briefing

GTA 90-10-047 CREW System Smartcard dated 1 Aug 2010

Dismounted C-IED Smart-Book version 2.1 dated 31 Oct 2012

Smartcard Pipper 411

5. Resources

TIME: Time of Instruction: 2 hrs 0 mins

LAND: Classroom, Training Area, and Range Requirements

<u>Id</u>	<u>Name</u>
17120-M-1200-30	Classroom, Multipurpose, 1200 Square Feet, 30 Students
72114	Enlisted Barracks, Transient Training
74046	Consolidated Open Dining Facility
44224	Organizational Storage Building

AMMO: Ammunition Requirements

<u>DODIC</u>	<u>Name</u>
None	

MISC: Materiel Items and TADSS Requirements

<u>Id</u>	<u>Name</u>
* 30-35	Thor III - Trainer, Crew 3.1, 315 MHZ
2310-01-090-7709	Bus Transit 44 Passenger
4110-01-485-3548	Chest, Ice Storage, White, 162 Quart Capacity
5820-00-NSN	SCREEN, PROJECTION
5820-00-T93-6432	PROJECTOR, VIDEO, LCD EPSON ELP33 WITH REMOTE
5860-01-363-8730	Laser Pointer
5895-01-540-4543	Computer, Laptop
6530-01-290-9964	Litter, Folding, Rigid Pole
6545-01-532-3674	Medical Equipment Set, Combat Lifesaver, Version 2005, UA 245A
6665-01-381-3023	Wet Bulb-Globe Temperature Kit
6665-01-C10-2210	Detecting Set, Mine: Vallon (Not in AESIP)
6685-01-590-1047	Monitor, Heat Stress: Questemp 44
6695-01-100-0773	Detector, Body Worn, Strider
6695-99-494-7952	Detecting and Tracing Set, Metal
6760-00-985-6749	Tripod, Photographic
7021-01-C17-2297	PC Tablet, Data Entry: Galaxy Tab 2 WIFI 16GB Samsung
7240-00-098-3827	Can, Military

(Note: Asterisk before ID indicates a TADSS.)

Additional Non-Standard Resources

None

6. A possible technique to achieve the outcome:

None

7. Conduct AAR with Soldier and Cadre.

None

NOTE: Before presenting this lesson, Instructors must be thoroughly prepared by studying the appropriate lesson plan and identified reference material.