O-2101
DESCRIBE HOW ELTs ARE DETECTED

CONDITIONS

You are a Mission Observer trainee and must describe how ELTs are detected and a search is launched.

OBJECTIVES

Describe how ELTs are detected and a search is launched.

TRAINING AND EVALUATION

Training Outline

1. As a Mission Observer trainee, knowing the types of Emergency Locator Transmitters (ELTs), how they can be detected, and how a search is launched is essential. While the observer's role seems to be concentrated in visual searches, her contributions in electronic searches are no less important. The observer's understanding of electronic search techniques, and her ability to assist the pilot, can substantially increase both search effectiveness and the timeliness of recovering accident victims.

2. Types of ELTs. The Federal Aviation Administration (FAA) requires most U.S.-registered aircraft to have operable ELTs installed, which activate automatically when sensing acceleration forces during an accident. An active ELT transmits a continuous radio signal on a specific frequency until it's either deactivated or its battery discharges: most transmit on 121.5 MHz at 60-100 milliwatts (less power than a small flashlight). [Note: After 01FEB09, advanced ELTs that transmit on 406.025 MHz at 25 milliwatts are to be used. They are specifically designed to operate with the Cospas-Sarsat satellite system, and transmit data that contains a unique identifier number that links them to a database containing information on the vessel or aircraft and emergency points of contact. Some advanced 406 MHz beacons also transmit GPS coordinates.]

Military Beacons (e.g., URT-33/C) operate on 253 MHz. Personnel ejecting/parachuting from a military aircraft have this beacon; some pilots may be able to communicate via two-way radio on 243 MHz using a PRC-90 or later military survival radio (this radio also has a beacon mode).

Marine Emergency Position Indicating Radio Beacons (*EPIRBs*) are primarily found on boats and ships. Similar to ELTs, some are automatically activated while others can only be activated manually.

Personal Locator Beacons (PLBs) and Personal Emergency Transmitters (PETs) are currently illegal for general use in the U.S., but the law is about to be changed and they are presently used by some government agencies. They transmit on 121.5 MHz, 243 MHz and 406 MHz or a combination: the new law proposes to license only the 406 MHz version.

Test stations or *practice beacons* like those used by CAP transmit on 121.775 MHz. Some organizations still operate practice beacons on 121.6 MHz, but all CAP practice beacons should be converted by now. [NOTE: ***Avoid calling the practice beacon an "ELT"*** while communicating on the radio; this can cause confusion. The term "practice beacon" is very clear to all concerned and should be used on all drills and exercises.]

3. Approximately 97% of all received ELT signals turn out to be false alarms. For 121.5 MHz ELTs only 1 in 1000 signals is an actual emergency! False alarms cause problems because SARSAT can only monitor 10 ELT signals at a time and because they block the emergency frequencies (thus blocking a real emergency signal). However, you must *always treat an ELT signal as an emergency* because you can't know whether the signal is real or false.

4. In a cooperative effort among several nations, search and rescue-dedicated satellites (SARSAT and COSPAS) orbit the earth and alert to ELT transmissions. Upon receiving an ELT signal, the SARSAT derives the approximate lat/long coordinates of the ELTs position, and the coordinates are passed through the Air Force Rescue Coordination Center (AFRCC) to the incident commander.

5. AFRCC will not launch a search until the signal is picked up by at least two satellites. Also, system accuracy in pinpointing the location varies. For a typical 121.5 MHz ELT, accuracy is limited to a 12 nm radius (452 square nm); a 406 MHZ ELT can be narrowed down to a 2 nm radius (12.5 square nm) and one with GPS can be narrowed down to a 0.05 nm radius (0.008 square nm).

6. Upon receiving SARSAT coordinates, or determining that an ELT was aboard a missing aircraft, the incident commander may launch a combined ELT/visual route search. Search success may depend upon several factors. The fact that an ELT was aboard a missing aircraft does not necessarily guarantee that electronic search procedures will locate it because the unit may have been inoperative or the batteries totally discharged. Also, the crash forces may have been insufficient to activate the ELT or so severe that it was damaged. Incident commanders may attempt to maximize the search effort by conducting an electronic search and a general visual search simultaneously when weather and other circumstances permit.

Additional Information

More detailed information and figures on this topic are available in Chapter 10 of the MART.

Evaluation Preparation

Setup: Provide the student access to an aircraft ELT (or pictures).

Brief Student: You are a Mission Observer trainee asked to describe how ELTs are detected and a search launched.

Evaluation

Performance measures	Results	
1. Discuss the various types of ELTs.	P	F
2. Describe how an ELT is detected and a search is launched.	P	F

Student must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.