

## Combat Survivor Evader Locator (CSEL) and the PRC Family of Handheld Survivor Radios

### Executive Summary

- Multiple versions of mission capable radios exist. They have common and radio-unique problems that need attention.
- Fielding and correction of radios with suspect components continue, while planning is underway for follow-on testing and multi-Service operational testing of next increment radio versions.
- Problems with the management of the Combat Survivor Evader Locator (CSEL) architecture require long-term solutions.

### System

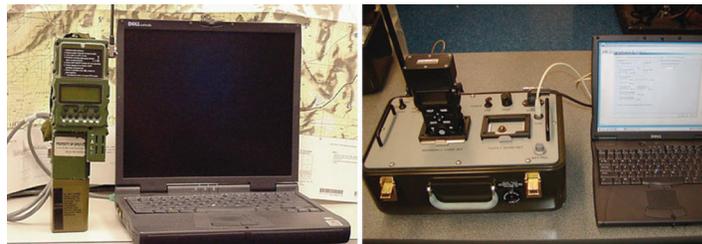
The CSEL is a radio system that allows a survivor to contact rescue forces, report status, and communicate for recovery. It includes:

- A handheld radio that includes a military Global Positioning System (GPS) receiver and navigation system
- A satellite communication system
- Encrypted data and voice capability on multiple programmable frequencies
- Ultra High Frequency base station computers that route the data messages to rescue command and control elements
- Programming equipment that support personnel use to program and update the handheld radios

PRC radios are similar. There are several variants of PRC radios that are fielded, including the 112B, 112D, and 112G J001.

Differences from CSEL include:

- Commercial GPS and navigation system.
- Line-of-sight communication with unique receivers carried on theater force aircraft.
- Commercially-encrypted data and voice capabilities on programmable frequencies.



- General Dynamics latest version is the PRC-112G J002. This radio incorporates new features including an over-the-horizon data messaging capability, more software-programmable waveforms for beacons and messages, and has an option for military-only GPS.

### Mission

Survivors and isolated personnel equipped with CSEL or PRC radios have GPS position accuracy and navigation capabilities should they need to travel and navigate to another location for recovery, or identify common navigation points for rescue. Both systems provide rescue forces with an ability to identify, locate, and authenticate isolated personnel quickly and accurately. The two systems operate slightly differently:

- CSEL sends a data message via satellite to a central rescue center. The center forwards that message to rescue forces, who then travel to the location, communicate with the survivor via voice, and recover them.
- PRC radios send a data message that is received by aircraft that are pre-positioned in theater and specially equipped to receive those messages. These aircraft may be rescue forces themselves, or may pass the messages to rescue forces. Rescue forces travel to the location, contact the survivor either via data or voice, and then recover them.

### Activity

- The Air Force Operational Test and Evaluation Center completed and submitted an Operational Utility Evaluation of the previously fielded versions of PRC-112 radios, including the 112B and 112G J001 in March 2005.
- DOT&E is engaged with the Services to plan realistic operational tests for CSEL and PRC radios.
- The CSEL test team is planning follow-on operational testing for FY06 that will address deficiencies and corrections from previous operational testing.
- The CSEL program office continued to retrofit radios that received a suspect GPS circuit card. Retrofit of radios suspected of receiving a bad card is being worked around operational unit schedules.
- The Air Force requested reprogramming of CSEL production funds into development funds to support development and implementation of fixes to the most important CSEL limitation: terminal area communication with rescue helicopters.

# AIR FORCE PROGRAMS

- PRC-112G J002 has not yet been operationally tested, but planning is underway.
- Air Force Special Operations Command (AFSOC) purchased 1,402 PRC-112G J002 radios.
- Shortly after AFSOC purchased their radios, General Dynamics announced that they are recalling all 112G J002 radios for defective printed circuit boards. Impact to AFSOC radios is not yet known.

## Assessment

- Reprogramming production funds into research, development, test, and evaluation will support development of terminal area communication for CSEL. Lack of this feature was highlighted as the most serious shortcoming of CSEL during multi-Service operational testing.
- Bad CSEL and PRC circuit cards impact operational units in that they must return radios to the developer for retrofit. This reduces the number of radios operationally available.
- The CSEL developer corrected the initial batch of suspect cards before any radios were operationally deployed and found some flawed cards. The list of suspect cards expanded later in FY05, and the developer continued to replace cards but found no other flawed cards.
- The Operational Utility Evaluation of PRC radios identified a number of issues that should be corrected as soon as possible. Some were similar to CSEL test results, such as inadequate training and a lack of well-defined operations concepts. Others are unique to PRC radios and may not be easily fixed, such as non-accredited encryption for secure communication, and batteries that discharge and expel toxic gas when in contact with salt water.
- Operational units assume undetermined risks when they purchase products without adequate and realistic operational

testing. Previous versions of PRC radios have been tested and employed operationally, and the latest version is similar but has new capabilities. Operational units are relying on manufacturer information about capabilities instead of adequate operational test data. Rapid acquisition does not equate to rapid capability. Purchasing radios directly provides the radio and immediate support equipment, but does not provide all parts of the system or the training needed to use the newly purchased radios.

- The recall of suspect printed circuits for direct-purchase 112G J002 radios highlights another risk for operational units. Operational units incur additional burdens because they must assign and task manpower to identify, package, and return affected radios, accurately track the radios they have, and introduce corrected radios back into the field.

## Recommendations

1. The Air Force Operational Test and Evaluation Center should plan and conduct CSEL follow-on operational testing in FY06. AFOTEC should lead the other services in multi-Service operational testing in FY07 that tests an upgraded CSEL system (with terminal area communication) and the latest generation PRC radio (with over-the-horizon communication) in similar environments and scenarios.
2. The Air Force has not determined an operational agency to supervise and manage CSEL architecture, as recommended by DOT&E in our FY04 report. DOT&E also recommended that the Services develop a strategy for updating and replacing the oldest survivor radios with newer advanced radios. At this time, we have not seen this strategy. Operational units continue to procure radios directly. While the need is understandable, this approach sidesteps Service efforts to develop and support a survivor radio system for the long term.