

## Combat Survivor Evader Locator (CSEL) System

### SUMMARY

- In our beyond low-rate initial production report to Congress, we assessed the Combat Survivor Evader Locator (CSEL) multi-Service operational test and evaluation (MOT&E) adequate to determine the CSEL effective in notifying, locating, and authenticating survivor/evaders.
- CSEL was not suitable due to low rescue center-to-survivor message success rates, and supportability problems including inadequate training and less-than-required radio reliability.
- DOT&E also recommends follow-on operational testing to evaluate improvements in radio reliability and training, and operations employment improvements that could improve message success rate.



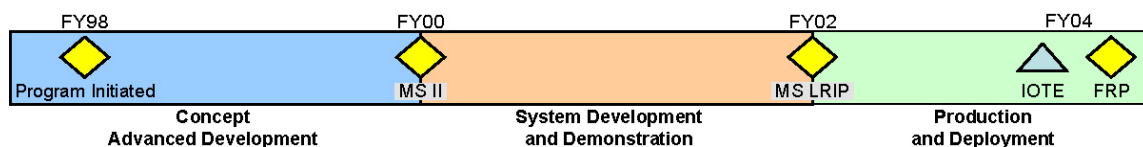
*The hand-held radio uses line-of-sight UHF/VHF voice, rescue beacon, GPS, and over-the-horizon data modes for worldwide coverage.*

### SYSTEM DESCRIPTION AND MISSION

The CSEL is a personnel locator system designed to provide survivor/evader location and a method for two-way communications between survivor/evaders and rescue forces. It enables command elements and search and rescue forces to locate and maintain contact with CSEL-equipped personnel. CSEL is a new type of survivor communication system that includes hand-held radios, unmanned base stations, and rescue center workstations. It uses UHF satellite communications, the Secret Internet Protocol Network (SIPRNET), national systems, Search and Rescue Satellite Aided Tracking system, and the Global Positioning System (GPS). The hand-held radio uses line-of-sight UHF/VHF voice, rescue beacon, GPS, and over-the-horizon data modes for worldwide coverage. The over-the-horizon segment includes four unattended UHF base stations that control satellite communication links with hand-held radios and interface with national assets, the Search and Rescue Satellite Aided Tracking system, and Joint Search and Rescue Centers via the SIPRNET.

CSEL also uses a new concept in rescue communications. A survivor sends a message with their GPS location (in a matter of minutes) via satellites to the appropriate rescue center. The centers can reply, authenticate the survivors' identity, or communicate additional messages with the survivor. The rescue centers also assign and coordinate rescue forces to speed recovery of the survivor. Once the rescue forces are within handheld radio range, they begin direct communication with the survivor to complete the recovery.

### TEST AND EVALUATION ACTIVITY



## AIR FORCE PROGRAMS

CSEL MOT&E, completed in April 2004, conducted 91 recovery mission scenarios, day and night, in forested, desert, littoral, and open-ocean environments. The mission scenarios included 21 immediate recoveries, 14 pre-planned task force recoveries, and 56 unconventional assisted recoveries. The immediate recoveries simulated a rapid operation where recovery forces were readily available and already nearby. The pre-planned recoveries simulated a planned recovery operation from a central location. They used all available mission information to plan and implement the recovery using dedicated recovery forces. The unconventional assisted recoveries simulated a longer duration evasion, and used a wide range of forces (not just those typically used in recovery). These missions were scored as successes (the survivor was recovered) or failures (the survivor was not recovered due to inability to communicate or recover based on a CSEL failure).

### TEST AND EVALUATION ASSESSMENT

CSEL is highly effective in communicating a survivor situation, providing precise location and authenticating the survivor's identity in approximately 5 minutes. CSEL is able to support survivor evasion and navigation, and provides voice capability to rescue forces. CSEL achieved an 82 percent mission success rate during MOT&E. If the developer and user address the problems identified in MOT&E, this rate could rise much higher.

CSEL was very effective at communications from the survivor to the rescue center (success rate 96 percent), but much less so with communications from the rescue center back to the survivor (success rate 58 percent).

The single greatest detractor from CSEL success was inadequate training. Several other supportability issues (such as determining an operational agency to manage the CSEL communications architecture) also contributed to DOT&E rating CSEL as "not suitable."

CSEL plans to conduct follow-on operational testing in FY05/FY06. This testing should prove improvements in radio construction and address those unmet communication requirements that CSEL implements in its next block increment. The program office is also attempting to find sufficient funds to develop a terminal area communication capability. This would allow rescue forces to receive a CSEL position directly without using voice as they approach the survivor. This capability exists with one other survivor radio, the "Hook" variant of a PRC-112. Users conducting MOT&E felt this is the most important capability CSEL should pursue. DOT&E supports this approach.

The Services have been purchasing Hook radios using operational funds, based on developer marketing. The Air Force last conducted operational testing of these radios in 1996; those radios did not include features used today. The Air Force is completing a utility evaluation of Hook survivor radios this fall, reporting on operational capability, limitations, and supportability. Initial assessment shows that training is a significant problem. O&M procurement and developer marketing is leading to a greater number of radio variants, which lead to training and supportability problems. There are a number of technical and usability issues with Hook radios, since they use commercial technology and do not incorporate DoD-mandated standards.

The Services should conduct follow-on operational testing that evaluates the updated CSEL, as well as the latest variant Hook radio. DOT&E believes a combination of Hook and CSEL radios will likely best meet user needs until Joint Tactical Radio System can be fully developed and fielded. Based on concerns with radio fielding and similar issues found between Hook and CSEL, DOT&E is nominating the Hook survivor radios for OSD oversight.