

**INITIAL**  
**NAVY TRAINING SYSTEM PLAN**  
**FOR THE**  
**COMBAT SURVIVOR EVADER LOCATOR**

**JANUARY 1998**

**Enclosure (1)**

# COMBAT SURVIVOR EVADER LOCATOR

## EXECUTIVE SUMMARY

This Initial Navy Training System Plan (NTSP) for the Combat Survivor Evader Locator (CSEL) was developed by Naval Air Systems Command using the Training Planning Process Methodology. This document provides an early-on estimate of the manpower, personnel, and training system requirements needed to support and sustain the CSEL program. These concepts will be further defined in document updates as the program matures and will be presented in the final NTSP. CSEL is currently in acquisition Phase II, Engineering and Manufacturing Development, of the Weapon System Acquisition Process.

CSEL is a communication system designed to provide secure, encrypted, two-way communication to United States military personnel in a survival and evasion scenario. The CSEL will be capable of near real time communications with a low probability of interception and detection. It will provide precise Global Positioning System-based geoposition and navigation data, two-way Over-The-Horizon (OTH) secure data communication to Joint Search and Rescue Centers, OTH beacon operation, and Line-Of-Sight voice communication and beacon capabilities.

This Initial NTSP focuses on the CSEL system in general terms of system description and capabilities and specifically as it applies to Navy and Marine Corps aircrew employment. Although CSEL will be employed by Navy SEALs and Navy and Marine Corps Special Forces, this Initial NTSP does not address these users.

Preliminary analysis indicates that the introduction of CSEL could generate additional enlisted manpower requirements at the squadron level. Whether it does or not is dependent on which enlisted rating(s) is tasked with programming, loading, issuing, maintaining, and storing the CSEL components and each squadron's utilization rate. This document presents four manning options to aid in determining which enlisted Navy rating and Marine Corps Military Occupational Specialty will perform these functions. When this issue is decided, the results will be included in future updates to this Initial NTSP.

CSEL training will consist of several methods and mediums, and may include formal courses and On-the Job Training (OJT) using CSEL equipment, videos, slides, and interactive software. Navy and Marine Corps aircrew personnel entering flight training will receive training in their appropriate flight schools, Aviation Survival Training Centers, and Survival, Evasion, Resistance, and Escape training. At the squadron level, aircrew will receive OJT from Fleet Air Introduction Liaison Survival Aircrew Flight Equipment (FAILSAFE) personnel and during pre-deployment flight training. CSEL operation and maintenance training for enlisted personnel will be provided by FAILSAFE Tiger Teams. Additional training will be provided through proficiency training and OJT at the squadron level. Potentially, CSEL training could be added to Class A1 training as well.

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## LIST OF ACRONYMS

ALSS	Aviation Life Support Systems
AM	Amplitude Modulation
AMSO	Air Medical Safety Officer
ASTC	Aviation Survival Training Center
AT	Aviation Electronics Technician
CM	Corrective Maintenance
CNO	Chief of Naval Operations
COBRA	Collection of Broadcasts from Remote Assets
COE	Common Operating Environment
COSPAS	Cosmicheskya Systemya Poiska Avararihich Sudov
CPC	CSEL Planning Computer
CPE	CSEL Planning Equipment
CSC	CSEL Support Center
CSEL	Combat Survivor Evader Locator
DII	Defense Information Infrastructure
DISN	Defense Information System Network
FAILSAFE	Fleet Air Introduction Liaison Survival Aircrew Flight Equipment
GDN	Ground Dissemination Network
GPS	Global Positioning System
HARDMAN	Hardware and Manpower
Hz	Hertz
IS	Intelligence Specialist
JSRC	Joint Search and Rescue Center
JTPT	Joint Training Planning Team
LOS	Line Of Sight
LPD	Low Probability of Detection
LPI	Low Probability of Interception
MOS	Military Occupational Specialty
NA	Not Applicable
NAVAIRSYSCOM	Naval Air Systems Command

# COMBAT SURVIVOR EVADER LOCATOR

## LIST OF ACRONYMS

NFO	Naval Flight Officer
NSA	National Security Agency
NTSP	Navy Training System Plan
OA	Operational Assessment
OJT	On-the-Job-Training
OPO	OPNAV Principal Official
OTH	Over-The-Horizon
PC	Personal Computer
PM	Preventive Maintenance
PMA	Project Manager, Air
PR	Aircrew Survival Equipmentman
RFT	Ready For Training
RSA	Radio Set Adapter
S/E	Survivor-Evader
SAR	Search And Rescue
SARSAT	Search and Rescue Satellite Assisted Tracking
SERE	Survival, Evasion, Resistance, and Escape
SMC	Space and Missile System Command
TFS	Total Force Structure
TYCOM	Type Commander
UHFSATCOM	Ultra-High Frequency Satellite Communications
USAF	United States Air Force
USMCC	United States Mission Control Center
VAC	Volts Alternating Current
VHF	Very High Frequency
YN	Yeoman

# **COMBAT SURVIVOR EVADER LOCATOR**

## **PREFACE**

This is the first iteration of the Initial Navy Training System Plan (NTSP) for the Combat Survivor Evader Locator (CSEL). It includes CSEL implementation concerns that will affect operational, maintenance, manpower, and training concepts which ultimately drive the manpower, personnel, and training system requirements to support the CSEL.

This Initial NTSP is a product of the Training Planning Process Methodology which is the Navy's replacement for the Hardware and Manpower (HARDMAN) Integration Program Methodology. As such, the format of this document is somewhat different than its predecessor, the HARDMAN Concept Document. However, their purposes are the same.

**PART I - TECHNICAL PROGRAM DATA**

**A. NOMENCLATURE-TITLE-PROGRAM**

- 1. **Nomenclature-Title-Acronym.** Combat Survivor Evader Locator (CSEL)
- 2. **Program Elements.** 35176F and 65712F

**B. SECURITY CLASSIFICATION**

- 1. **System Characteristics** ..... Unclassified
- 2. **Capabilities** ..... Unclassified
- 3. **Functions**..... Unclassified

**C. MANPOWER, PERSONNEL, AND TRAINING PRINCIPALS**

- OPNAV Principal Official (OPO) Program Sponsor..... CNO (N880G)
- OPO Resource Sponsor ..... CNO (N880G)
- Air Force Program Sponsor (Program Lead) ..... SMC/CZ
- Developing Agency..... SPAWARSSYSCOM (PMW/PMA187)  
NAVAIRSSYSCOM (AIR 3.1.4)
- Training Agency ..... CINCLANTFLT (N721)  
CINCPACFLT (N342)  
CNET (T251)
- Training Support Agency ..... NAVAIRSSYSCOM (PMA205)
- Manpower and Personnel Mission Sponsor ..... CNO (N12)  
BUPERS (PERS-40, PERS-404)
- Director of Naval Training ..... CNO (N7)
- Marine Corps Combat Development Command  
Manpower Management ..... TFS Division

## **D. SYSTEM DESCRIPTION**

**1. Operational Uses.** The Combat Survivor Evader Locator (CSEL) is a communication system that will provide United States military forces with secure, encrypted, two-way communication for personnel in a survival and evasion scenario. The CSEL will be capable of near real time communications with a low probability of interception and detection. It will provide precision Global Positioning System (GPS) -based geoposition and navigation data, two-way Over-The-Horizon (OTH) secure data communication to Joint Search and Rescue Centers (JSRCs), OTH beacon operation, and Line-Of-Sight (LOS) voice communication and beacon capabilities.

This Initial Navy Training System Plan (NTSP) focuses on the CSEL system in general and specifically as it applies to Navy and Marine Corps combat aircrew usage. Although CSEL will be employed by Navy SEALs and Navy and Marine Corps Special Forces, this Initial NTSP does not address these users.

**2. Foreign Military Sales.** The Air Force is the lead service for the CSEL with procurements by the Navy and Army. The Air Force program manager for CSEL is Space and Missile Systems Center, code SMC/CZ. Future Foreign Military Sales to United States allied nations and North Atlantic Treaty Organization countries are under consideration but their requirements are not included in this document.

**E. DEVELOPMENTAL TEST AND OPERATIONAL TEST.** Operational Assessment (OA) of 30 CSEL units is scheduled to begin in January 1998 and will be completed by March 1998. The OA will be coordinated by the Joint Program Office, the 746th Test Squadron at Holloman Air Force Base, New Mexico, and the Air Force Operational Test and Evaluation Command in conjunction with Navy and Army Operational Test and Evaluation Teams and Boeing North America, Inc. An Initial Operational Test and Evaluation is scheduled for May 1998.

**F. AIRCRAFT AND/OR EQUIPMENT/SYSTEM/SUBSYSTEM REPLACED.** The CSEL will not replace any existing personnel locator devices currently in use. However, in combat situations and possible Survivor-Evader (S/E) scenarios, the CSEL will be employed instead of the AN/PRC-90 Survival Beacon or the AN/PRC-112 Radio Set currently used in the fleet. The CSEL will be added to the Navy and Marine Corps locator devices inventories.

## **G. DESCRIPTION OF NEW DEVELOPMENT**

**1. Functional Description.** The CSEL system will provide global coverage with the following capabilities: continuous access, two-way directionality, less than five minute time-lines, 40 character messages, data security, reliable satellite, ground, and user links, continuous broadcast, Low Probability of Interception and Low Probability of Detection (LPI/LPD), LOS communications, OTH user-to-user communication, OTH and LOS tracking, Selective Availability/Anti-Spoofing Module, and built-in commercial growth. The CSEL system will consist of three segments as shown in Figure I-1: OTH, Ground, and User. (The User Segment



directly applies to Navy and Marine Corps squadrons.) These segments are described in the following sub-paragraphs.

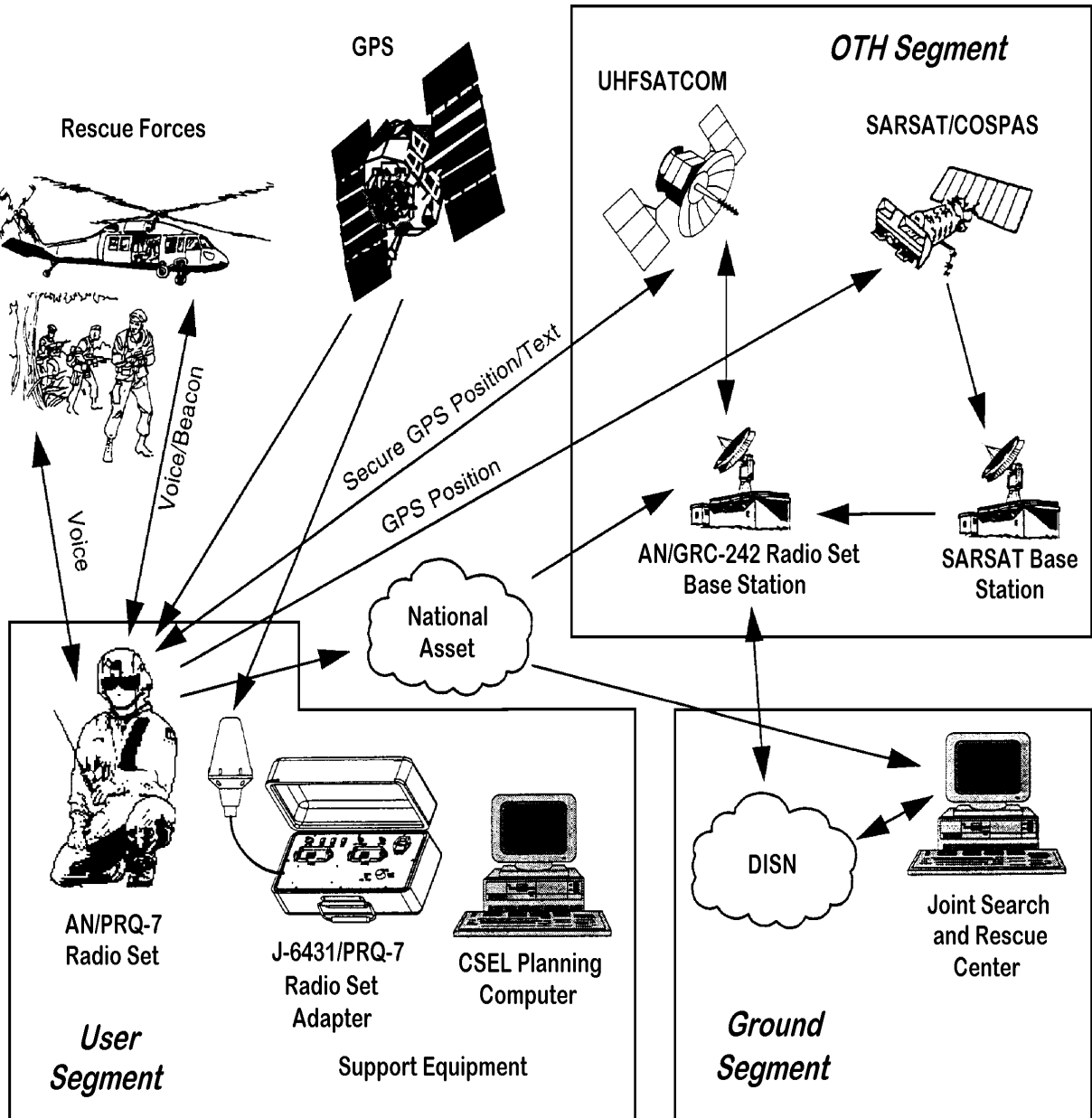


Figure I-1 CSEL System Architecture

**a. Over-The-Horizon Segment.** The OTH Segment will consist of the OTH Communication Systems and the AN/GRC-242 Base Station that interconnects the OTH and Ground Segments. The OTH Communication System will relay critical information from isolated personnel to the appropriate JSRCs for decision making and response planning. The OTH Communication System will operate over three systems: Ultra-High Frequency Satellite Communications (UHFSATCOM) satellites, Collection of Broadcasts from Remote Assets (COBRA) capabilities, and Search and Rescue Satellite Assisted Tracking (SARSAT)/Cosmicheskaya Systemya Poiska Avararihich Sudov (“Space System for the Detection of Vessels in Distress,” a.k.a. COSPAS) satellites. The AN/GRC-242 Base Station will be capable of two-way communication relays, such as location information, identification, and authentication information, between the individual in distress and the Ground Segment.

**(1) Satellite and COBRA Communication.** The UHFSATCOM mode will support two-way messaging, which includes geoposition information, between an AN/GRC-242 Base Station and a S/E’s AN/PRQ-7 Radio Set through an allocated UHFSATCOM channel. The COBRA mode will support one-way messaging, including geoposition information, from the Radio Set using LPI/LPD COBRA waveform. The SARSAT mode will operate over the international SARSAT/COSPAS Low Earth Orbit and geosynchronous satellite systems, with connectivity through the United States Mission Control Center (USMCC) and will be intended for one-way communications where UHFSATCOM and COBRA support are not available. An acknowledgment of any OTH transmission will be provided to the user via the UHFSATCOM satellite.

**(2) AN/GRC-242 Radio Set Base Station.** The AN/GRC-242 Base Station will be capable of supporting two-way OTH data communication with as many as 200 CSEL Radio Sets in a Time Division Multiple Access protocol through the UHFSATCOM satellite system. The AN/GRC-242 Base Station will automatically relay messages to the JSRCs through a Ground Dissemination Network (GDN). The AN/GRC-242 Base Station will also be capable of receiving messages transmitted via COBRA broadcasts and the SARSAT satellite system, but will not be able to return messages via these two systems. COBRA messages will be delivered to the AN/GRC-242 Base Stations via Tactical Radio Applications Data Dissemination System broadcasts. The AN/GRC-242 Base Station will encrypt and decrypt messages to and from the S/E. The AN/GRC-242 Base Station will consist of two equipment consoles: one active unit and one backup unit on standby at all times. The two units will be identical and share a common antenna.

**b. Ground Segment.** The Ground Segment will be composed of JSRCs and the GDN that interconnects with the AN/GRC-242 Base Station. The Ground Segment functions will include CSEL data receipt, display, and dissemination capabilities in the JSRCs; data receipt and processing to and from the AN/GRC-242 Base Stations; and existing and evolving Defense Information System Networks (DISNs) that interconnect the USMCC with an AN/GRC-242 Base Station. The AN/GRC-242 Base Stations will be connected to the multiple JSRCs via the DISN architecture, including the JSRC serving as the CSEL Support Center (CSC). The evolving Defense Message System protocols will be used to provide message routing between nodes in the CSEL System’s Ground Segment.

**(1) Joint Search and Rescue Centers.** JSRCs will be designated in operational theaters to coordinate the rescue operations for downed aircrew, isolated personnel, or other forces. A JSRC may be located at a fixed ground site, in a mobile unit, or aboard a ship. The CSEL System will establish primary and back-up JSRCs. The primary JSRC will usually be in the user's operational theater and assume the primary responsibility for coordinating rescue or other operations. A back-up JSRC will be assigned if the operational situation warrants.

JSRCs will be equipped with Defense Information Infrastructure Common Operating Environment (DII COE)-compatible workstations. The JSRC operational software program will operate simultaneously with other functions within the DII COE. The JSRC software will control Search and Rescue (SAR) messaging activity, display locations on maps, provide graphical user interfaces, interface with CSEL systems through GDN, display scheduled and immediate messaging, display message alerts, and confirm an Isolated Personnel Report.

**(2) CSEL Support Center.** The CSC will be equipped identically to the JSRCs and provide round-the-clock staffing to handle S/E messages not delivered to any other JSRC; e.g., messages that become "lost," corrupted, or not addressed to a specific theater of action. The CSC will be located at the Joint Services Survival Evasion Resistance Escape Agency.

**c. User Segment.** The User Segment will consist of the AN/PRQ-7 Radio Set which will be employed by combat aircrew personnel (as well as other military personnel) and the CSEL Planning Equipment (CPE). The CPE will consist of the CSEL Planning Computer (CPC) used to load mission-specific information into the Radio Sets prior to a mission and the J-6431/PRQ-7 Radio Set Adapter (RSA) that provides the interface between the CPC and the Radio Sets.

**(1) AN/PRQ-7 Radio Set.** The Radio Set will provide data communication for all OTH modes, SAR aircraft-compatible LOS voice communication, and SARSAT/COSPAS 406 megahertz beacon while providing precise geopositioning to the user. The Radio Set will be designed for one-handed operation (right or left) with flight gloves or modified winter gloves. Once the Radio Set is activated, it may be polled by the JSRC workstation without further action.

The Radio Set will consist of earphone jack, speaker-microphone, keypad, volume control, push-to-talk button, Light Emitting Diode, Liquid Crystal Display, alarms, and three power modes: User Mode for normal operation, Sleep Mode for battery conservation, and Extended Mission Mode for low power storage (provides memory retention and a low accuracy clock, but disables the high accuracy internal clock and automatic scheduled GPS fix or UHFSATCOM message exchange). Two batteries will provide power to the Radio Set. The main battery will be a Lithium-Sulfur Dioxide battery which, when new, will provide a maximum life of 21 calendar days (at 25 degrees Celsius) with a duty cycle of one GPS fix and one data burst transmission per hour, plus 15 minutes of Amplitude Modulation (AM) voice communication at the end of the 21st day. Power saving features and operation of the Radio Set above 25 degrees Celsius will extend the life of the battery. The other battery is a coin cell battery which retains volatile memory during main battery replacement. One antenna will be an integral

omnidirectional whip antenna for UHF and Very High Frequency (VHF) LOS voice, beacon, and UHFSATCOM data. The other will be a patch antenna for GPS.

## (2) CSEL Planning Equipment

(a) **J-6431/PRQ-7 Radio Set Adapter.** The RSA will provide the mechanical and electrical interface between the CPC and two Radio Sets; one Radio Set will be used as a reference and the other will be the target. The RSA will couple GPS signals from the external GPS antenna to the reference Radio Set. The RSA will provide a fill port and switch to load GPS crypto keys into either Radio Set and load GPS data from an external source or reprogram the GPS module in the Radio Set. The communication ports will connect directly with the Radio Sets to control and load mission data. The RSA will be a suitcase unit that houses the power supply, interface connectors, and switches. The RSA will have an external GPS antenna and preamplifier housed in a ruggedized enclosure with a 10-foot cable. The RSA will have a cable set consisting of two standard RS-232 cables and one power cable.

(b) **CSEL Planning Computer.** The CPC will be any IBM-compatible laptop or desktop personal computer (PC) that uses a Microsoft Windows operating environment, either Windows 95 or Windows NT. The CPC will host CSEL application software that allows an operator to control the operation of the RSA. The CPC and RSA will be used to load a target Radio Set with mission specific data including communications frequencies and channels, waypoints, standardized messages, Unit Identification Code, call signs, and passwords. The CPC must be dedicated to the CSEL System.

## 2. Physical Description

a. **AN/GRC-242 Radio Set Base Station Console.** The AN/GRC-242 Base Station Console will measure 84 inches high, 22.5 inches wide, 30 inches deep (42 inches with the keyboard extended), and weigh 300 pounds. It will require 115 Volts Alternating Current (VAC), single phase, and 60 Hertz (Hz) at 20 amperes (from two independent sources). The GPS Antenna will measure 3.9 inches height and 5.8 inches diameter, and weigh 0.9 pounds. It will require 12 Volts Direct Current and 0.2 amperes (supplied from AN/GRC-242 Base Station). The dimensions of the UHF Antenna/Preamplifier have not been determined.

b. **AN/PRQ-7 Radio Set.** The Radio Set will be able to withstand salt water immersion and the shock, vibration, and G-force associated with aircrew emergency egress and personnel recovery operations. The Radio Set will be designed to fit into all current survival vests, packs, and ejection seat packs. It will measure 7.8 inches high, 3.2 inches wide, and 1.6 inches deep, and weigh 28 ounces. The Radio Set will also have a lanyard attachment point. The main power source of the Radio Set will be a Lithium-Sulfur Dioxide battery with a maximum life of 21 calendar days (at 25 degrees Celsius) when a fresh battery is installed.

c. **J-6431/PRQ-7 Radio Set Adapter.** The RSA will be a suitcase unit that measures 10 inches high, 16 inches wide, 8 inches deep, and weighs less than 10 pounds. The RSA power requirements will be 115/240 VAC, single phase, 50/60 Hz at one ampere. The GPS Antenna will be 0.8 inches high, 2.1 inches diameter, and weigh five ounces.

**d. CSEL Planning Computer.** The CPC will be a standard IBM-compatible PC capable of running Windows 95 or Windows NT operating system. The CPC must have two serial ports that do not conflict with mouse operation. Because some of the information loaded from the CPC to the Radio Set will be classified, the CPC must have a removable hard drive.

**3. New Development Introduction.** The CSEL Radio Set, RSA, and AN/GRC-242 Base Station equipment, as well as CSEL software for the AN/GRC-242 Base Station, JSRC, and CPC, will be introduced into the fleet as new production items.

#### **4. Significant Interfaces**

**a. CSEL Systems.** The CSEL System will provide interfaces between the S/E, JSRCs, and several different satellite and communications systems for a variety of available communications capabilities including GPS, voice, and data link. The AN/GRC-242 Base Station will link UHFSATCOM, SARSAT/COSPAS, and COBRA systems to the JSRCs. In addition, the CSEL System will allow rescue forces to interface directly with the S/E with LOS communications.

**b. Communications Security.** The Radio Set will incorporate National Security Agency (NSA) approved Communications Security techniques to protect the unit against extraction of crypto keys. An NSA approved encryption algorithm will be used to protect UHFSATCOM and COBRA transmissions. A zeroizer feature will be included to permit the user to purge volatile memory. There will be two levels of zeroization available to the user. If the Radio Set is zeroized once, the user may continue to use the Radio Set; however, the JSRC operator will be alerted that the Radio Set may be in hostile hands and must re-authenticate the user's identification. If the Radio Set is zeroized a second time, the Radio Set will provide AM voice communication on factory-set frequencies and course acquisition code GPS capabilities.

**5. New Features, Configurations, or Material.** The Radio Set will be designed for future growth to include a commercial L/S Band module and antenna for interfacing with commercial satellite communications systems.

## **H. CONCEPTS**

**1. Operational Concept.** At the squadron level, the CSEL operational concept will consist of two groups of personnel operating different CSEL equipment. Navy and Marine Corps aviators (i.e., pilots, Naval Flight Officers (NFO), and enlisted aircrew) will operate the Radio Set in an S/E situation. Navy and Marine Corps enlisted personnel will operate the CPE to load critical data into the Radio Set. It has not yet been determined which enlisted ratings and Military Occupational Specialties (MOS) will operate the CPE. Four options are addressed under the Manning Concept in paragraph H.3.b on page I-8.

### **2. Maintenance Concept**

#### **a. Organizational**

**(1) AN/PRQ-7 Radio Set.** Preventive Maintenance (PM) is limited to performing self-test using Built-In Test. Corrective Maintenance (CM) is limited to replacing the main and back-up batteries and replacing the UHF/VHF antenna. PM and CM may be performed by either Navy Aviation Electronics Technician (AT) or Aircrew Survival Equipmentman (PR) personnel or Marine Corps MOS 63XX (for the appropriate aircraft) or 6060 personnel. If any of these ratings or MOSs are selected as CPE operators, that same rating or MOS should also perform the maintenance actions.

**(2) CSEL Planning Equipment.** PM is limited to operational checkout and periodic inspections and cleaning. CM includes troubleshooting to fault isolate to a particular equipment item or cable and on-equipment repair by removal and replacement procedures.

**b. Intermediate.** Not Applicable (NA).

**c. Depot.** For the Radio Set and RSA, all maintenance beyond the organizational level will be accomplished by the manufacturer, Boeing North American, Inc., under the provisions of the warranty.

**d. Interim Maintenance.** Currently, there is no plan for interim maintenance for the Radio Set and CPE. If interim maintenance requirements are determined at a later date, it will be under the cognizance of the United States Air Force.

**e. Life Cycle Maintenance Plan.** NA.

**3. Manning Concept.** At the squadron level, the manpower requirements for CSEL will consist of operators and maintainers. Operators of the Radio Set will include officer and enlisted aviators. The RSA and CPC will require enlisted operators and maintenance personnel. An analysis of the operation and maintenance functions associated with these CSEL components indicates these tasks are within the capabilities of existing Navy Officer Billet Code, Navy Enlisted Occupational Standards (ratings), and Marine Corps MOS structures.

**a. Aircrew.** The CSEL Radio Sets will be operated by Navy and Marine Corps aircrew members as S/Es requiring rescue. For each type of aircraft, aircrew manpower requirements are determined by the seat factor and crew ratios listed in the appropriate Required Operating Capability and Projected Operational Environment documents. Since CSEL will not impact these factors, current aircrew requirements will not change as a result of the introduction of CSEL.

**b. Enlisted.** It has not been decided which Navy rating(s) and Marine Corps MOS(s) will be assigned to operate and maintain the RSA and CPC components of CSEL. In addition, it has not been determined if CSEL will increase manpower requirements at the squadron level. There are many factors that impact final determination of both quality and quantity of manpower requirements for CSEL. The following sub-paragraphs present these factors.

**(1) Quality.** There are three distinct factors affecting manpower quality. First is the type of information to be loaded into the Radio Set. Mission parameters, waypoints, frequencies, call signs, passwords, and personnel information are examples of data which will need to be loaded into the Radio Sets but is not readily available to a single enlisted rating. The second factor is the physical requirements to load the Radio Sets. The selected personnel must obtain a GPS fix from an orbiting satellite and load the GPS crypto keys prior to loading any data into the Radio Sets. The RSA and CPC must then be cabled together. Whether the same enlisted rating or another, all pertinent data must then be loaded from the CPC to each Radio Set via the RSA. Much of the information will be the same for each Radio Set, but not all. For example, radio call signs must be entered for the individual Radio Set. The third factor is which enlisted rating will control, store, and maintain the Radio Sets and the CPE. The majority of survival equipment is the responsibility of the Aviation Life Support Systems (ALSS) Branch of fleet squadrons with PR personnel maintaining this equipment. However, since the Radio Sets will contain classified information, it is not currently feasible for the ALSS shops to store, load, and maintain this equipment. (Without mission data, the Radio Set is not classified but is considered a controlled item.) These shops do not have secure areas such as a safe or vault (for crypto keys and PC hard drive), nor do PR personnel usually have security clearances.

Based on the three items affecting manpower quality described above, there are four possible manning options:

**(a) Option 1.** Under this option, the RSA and CPC would be operated by Navy Intelligence Specialist (IS) or Yeoman (YN) personnel, or Marine Corps MOS 0231 Intelligence Specialist or MOS 0151 Administrative Clerk personnel, assigned to the Operations Department. Either PR or AT personnel would perform the maintenance on the CPE and Radio Set. The IS and YN personnel will already have the required security clearance and storage area and have access to the personnel and mission data to be loaded. They will also be familiar with operating a computer but will not be familiar with the processes associated with the RSA. Another consideration is the physical location of their normal working spaces. IS and YN personnel are normally in close proximity to the Ready Room where aircrew receive their pre-flight briefs. (Note: Not all squadrons have IS personnel.)

**(b) Option 2.** Within this option, the RSA and CPC would be operated and maintained by Navy AT personnel or Marine Corps MOS 63XX Aircraft Avionics Technicians in the maintenance department of a squadron. These personnel usually have a security clearance for maintaining sensitive equipment but do not have access to mission planning and aircrew personnel information. They would however, by prior training, be naturally adept to the physical aspects of operating the RSA. These personnel would also be capable of maintaining the CPE and Radio Sets. A downside of this option is that AT personnel are normally assigned to the Maintenance Department. If CSEL Radio Sets are stored in the Maintenance Department, the AT personnel must first receive the data to be loaded from the Operations Department. Then, either the loaded Radio Sets must be transported to the aircrew or the aircrew must go to the Maintenance Department to receive their Radio Sets. Another downside of this option is that AT personnel operating the CPE would not be available to perform aircraft maintenance during Radio Set loading, typically pre-launch and post recovery times.

(c) **Option 3.** Normally, ALSS equipment is controlled and maintained by Navy PR personnel and Marine Corps MOS 6060 Flight Equipment Marine personnel. However, the CPE operator requires a security clearance that PR personnel do not usually receive. This option suggests that selected PR personnel would be required to obtain the required clearances and training to operate the RSA and CPC in order to retain control of this new ALSS. Under this option PR and MOS 6060 personnel would also maintain the CPE and Radio Sets. In addition, the PR shop is usually in close proximity to the Ready Room since the normal routine is for aircrew to receive their survival gear immediately after their pre-flight brief.

(d) **Option 4.** The fourth option is a combination of Options 1, 2, and 3 which can involve any combination of Navy ratings or Marine Corps MOSs. This option suggests a team approach to loading, controlling, issuing, storing, and maintaining all CSEL user assets. The enlisted ratings or MOSs making up the CSEL team would be at the discretion of each Fleet activity and as a result, could be tailored to best suit the needs of each type of squadron. For example, IS (or YN) personnel could provide the necessary data and operate the CPC while PR (or AT or AE) personnel could obtain the GPS fix, load the crypto keys, cable the RSA to the CPC, and maintain the CPE and Radio Sets.

(2) **Quantity.** There are two factors that will impact the quantity of manpower required to support CSEL. First, is the programming limitations of CSEL. Based on a review of the current CSEL design, the RSA is designed to load only one Radio Set at a time (11 to 14 minutes each). To keep all aircrew equipped with a CSEL Radio Set during typical flight deck operations, a sudden threat situation, or “hot seat” scenario (all common occurrences) will require hours of preparation and programming prior to use as well as after. It is expected this workload, as well as storing and issuing the Radio Sets, will stress existing manpower requirements. Second, is the 21-day battery life of the Radio Set. This 21-day battery life has been determined under extreme conditions and the “shelf life” of a Radio Set stored in the Extended Mission Mode is considerably longer than 21 days (up to one year under optimum conditions). However, this indicates that the battery will require periodic checks at close intervals and will need replacement at some point prior to the battery expiring. Depending on the frequency of these checks, the time required to perform them (including battery replacement), and the number of Radio Sets in a command, this could generate sufficient workload to increase manpower requirements.

Considering these physical requirements, possible effects on quantitative manpower for each manning option is addressed below. Under all options listed herein, and any possible options not addressed in this Initial NTSP, several key personnel in each squadron must be trained to establish a pool of available CPE operators.

(a) **Option 1.** This option calls for IS or YN personnel, or Marine Corps MOS 0231 or MOS 0151 personnel, to operate the RSA and CPC and either PR or AT personnel to maintain the Radio Sets. This spreads the CSEL workloads among two or three ratings. Each type of squadron would require a detailed functional workload analysis of current IS and YN workloads to determine the impact of performing CSEL operator functions on these two ratings. It is estimated this analysis will show squadrons with a high usage rate of CSEL (such as fighter or attack squadrons) will require an additional IS or YN billet to absorb the



additional workload. Conversely, squadrons expected to have a low usage rate (such as transport or patrol squadrons) will not require additional billets. It is further estimated that the CSEL maintenance workload could be absorbed by existing PR and ATs without an increase to manpower requirements.

**(b) Option 2.** Under this option, AT personnel and Marine Corps Aircraft Avionics Technicians (MOS 63XX) would operate and maintain the CPE and Radio Sets. This compresses all CSEL workloads into a single rating and MOS (by aircraft type). It is estimated that squadrons with a high usage rate of CSEL (such as fighter or attack squadrons) will require an additional billet to absorb the additional workload. Those squadrons expected to have a low usage rate (such as transport or patrol squadrons) will not require additional billets.

**(c) Option 3.** This option suggests that PR personnel and Marine Corps MOS 6060 operate and maintain the CSEL CPE and Radio Sets. This option also compresses all CSEL workloads into a single rating and MOS. It is estimated that squadrons with a high usage of CSEL (such as fighter or attack squadrons) will require an additional billet to absorb the additional workload. Those squadrons expected to have a low usage rate (such as transport or patrol squadrons) will not require additional billets.

**(d) Option 4.** This option calls for several ratings (i.e., IS, YN, PR, and AT), assigned by each individual activity, to work together to operate and maintain CSEL equipment. This spreads the CSEL workloads among two or more Navy ratings or Marine Corps MOSs. Under this concept each activity would absorb the CSEL workload and receive no additional billets for CSEL support.

**4. Training Concept.** A Joint Training Planning Team (JTPT) has been established to ensure that all military services provide consistent CSEL training. However, the JTPT will not dictate how each service should train their personnel. The Navy and Marine Corps CSEL training concept covered in this Initial NTSP will consist of initial and follow-on training for CSEL operators and maintenance personnel. CSEL training will consist of several methods and mediums and may include formal courses, On-the Job Training (OJT) using CSEL equipment, videos, slides, and interactive software.

The CSEL training concept will be similar to other ALSS equipment in that pilots, NFOs, and enlisted aircrew will need to become familiar with the Radio Set as soon and as often as possible. This familiarization will be in the form of Radio Set training at basic pilot and NFO schools, Aviation Physiology Training courses, and Survival, Evasion, Resistance, and Escape (SERE) training. At the squadron level, aircrew, CPE operators, and maintainers will receive their initial training from Fleet Air Introduction Liaison Survival Aircrew Flight Equipment (FAILSAFE) teams and from the 22 Air Medical Safety Officers (AMSOs) stationed around the globe.

**a. Initial Training.** CSEL initial training will be required for OA personnel as well as any personnel conducting test and evaluation of the CSEL system following OA. Other personnel requiring CSEL initial training will include AMSO and FAILSAFE personnel (includes

Tiger Teams). OA initial training is depicted below and will be provided by the CSEL manufacturer or the development activity.

<b>Title .....</b>	<b>CSEL Operation and Maintenance</b>
Description .....	CSEL operation and maintenance training will be provided to Air Force, Army, Navy and Marine Corps personnel for OA.
Location .....	Contractor facilities
Length .....	26 days (estimated)
RFT date .....	November 1997
TTE/TD .....	CSEL Equipment

FAILSAFE Tiger Teams will provide CSEL cadre training to support the introduction of CSEL. This training will include CPE operation and maintenance and Radio Set maintenance training. The Tiger Teams will provide initial training to Fleet squadrons as they receive their CSEL assets, the Aviation Survival Training Center (ASTC) for follow-on physiology training, and activities providing SERE training.

**b. Follow-on Training**

(1) **Aircrew.** Navy and Marine Corps aircrew personnel entering flight training will receive CSEL Radio Set follow-on training as a part of existing courses in their appropriate flight schools and at the ASTCs. Existing SERE training and pre-deployment flight training will also include CSEL training. Radio Set operation training will range from 30 minute familiarization videos to several hours of hands-on operational skills training. Estimated course requirements include 16 hours covering Radio Set controls and indicators, operation, and battery conservation.

**(2) Operator-Maintainer**

(a) **Option 1.** Under this option, the RSA and CPC would be operated by Navy Intelligence Specialist (IS) or Yeoman (YN) personnel, or Marine Corps MOS 0231 Intelligence Specialist or MOS 0151 Administrative Clerk personnel, assigned to the Operations Department. Either PR or AT personnel would perform the maintenance on the CPE and Radio Set. Follow-on operator (IS or YN or Marine Corps MOS 0231 or MOS 0151) and maintenance training (PR or AT or Marine Corps MOS 6060 or 63XX) for this option would be via OJT after initial Tiger Team training.

(b) **Option 2.** Within this option, the RSA and CPC would be operated and maintained by Navy AT personnel or Marine Corps MOS 63XX Aircraft Avionics Technicians in the maintenance department of a squadron. Like Option 1 (above), follow-on operator and maintenance training (AT or Marine Corps MOS 63XX) for this option would be via OJT after initial Tiger Team training.

(c) **Option 3.** This option suggests that PR personnel and Marine Corps MOS 6060 operate and maintain the CSEL CPE and Radio Sets. CSEL follow-on operation and maintenance training for this option will be satisfied by the PR Common Core Class A1 school which would be modified to include CSEL equipment.

(d) **Option 4.** This option calls for several ratings to work together, at the discretion of each activity, to operate and maintain CSEL equipment. CPE operation and maintenance training, as well as Radio Set maintenance training, would be OJT for all ratings of MOSs selected by the individual activities.

**c. Student Profiles**

<b>SKILL IDENTIFIER</b>	<b>PREREQUISITE SKILL AND KNOWLEDGE REQUIREMENTS</b>
AT	<ul style="list-style-type: none"> <li>° C-100-2020, Avionics Common Core Class A1</li> <li>° C-100-2018, Avionics Technician O Level Class A1</li> </ul>
IS	<ul style="list-style-type: none"> <li>° J-242-0010, Intelligence Specialist Class A1</li> </ul>
PR	<ul style="list-style-type: none"> <li>° C-602-2035, Aircrew Survival Equipmentman Common Core Class A1</li> </ul>
YN	<ul style="list-style-type: none"> <li>° A-510-0012, Yeoman Class A1</li> </ul>

**d. Training Pipelines.** CSEL Radio Set operator training will be incorporated into existing schools and courses for officer and enlisted aircrew members. It has not been determined what the training time and extent of training at each level will be for the Radio Set. A training pipeline for CPE operators and maintainers cannot be determined until a decision is made as to which rating(s) will be responsible.

**I. ONBOARD (IN-SERVICE) TRAINING**

**1. Proficiency or Other Training Organic to the New Development.** Aircrew personnel will receive Radio Set proficiency training from FAILSAFE personnel prior to deployment. Training will be provided at Naval Air Station Fallon, Nevada, and Marine Corps Air Station Yuma, Arizona, as well as other sites as needed. All aircrew members will also receive Radio Set training during refresher aviation physiology training at ASTCs as prescribed.

**2. Personnel Qualification Standards.** Personnel Qualifications Standards have not yet been determined.

**3. Other Onboard or In-Service Training Packages.** Other Onboard or In-Service Training Packages have not yet been determined.

## J. LOGISTICS SUPPORT

### 1. Manufacturer and Contract Numbers

CONTRACT NUMBER	MANUFACTURER	ADDRESS
F04701-96-C-0020 (USAF)	Autonetics and Missile Systems Division, Boeing North American	3370 Miraloma Avenue Post Office Box 3105 Anaheim, CA 92803-3105

**2. Program Documentation.** The following documents are currently available addressing various aspects of the CSEL system:

- Operational Requirements Document CAF (USAF) 019-92-I-A for the Combat Survivor/Evader Locator System, 25 October 1995
- Concept of Operations, December 1996
- Draft NAVSTAR GPS Integrated Logistics Support Plan for CSEL (in progress)

**3. Technical Data Plan.** The following documents are currently available addressing various technical aspects of the CSEL system. (These documents are in draft form and are not yet complete.)

- Operator's Manual, Radio Set, AN/PRQ-7, P/N 4866110-101, TO 31R2-2PRQ7-1, 1 July 1997
- Operations and Maintenance, UHFSATCOM Base Station, TO Number - TBD, P/N 4866130-101, 31 October 1996
- Operations and Maintenance, CSEL Planning Equipment (CPE), TO 31R2-4-1679-1, 1 July 1997
- Software Operator's Manual, Joint Search and Rescue Center, TO 31R2-4-1678-8-1, 1 July 1997

In addition, a pocket sized checklist for the Radio Set will be developed for the user. All technical manuals will be validated by the contractor and verified by the government, and updated as required.

**4. Test Sets, Tools, and Test Equipment.** NA.

**5. Repair Parts.** Spare Radio Sets, RSAs, and CPC will be available through the normal supply channels. Batteries, antennas, and accessories (i.e., case and handstrap) will be stock listed

and available through the Department of Defense Supply System. The Material Support Date has not yet been determined.

**6. Human Systems Integration. NA.**

**K. SCHEDULES**

**1. Installation and Delivery Schedules.** A total of 9660 Radio Sets, 820 RSAs, and 820 CPCs will be procured by the Navy. The following schedule depicts the planned procurement of CSEL equipment for the Navy and Marine Corps.

**CSEL PROCUREMENT SCHEDULE**

<b>EQUIPMENT</b>	<b>FY97</b>	<b>FY98</b>	<b>FY99</b>	<b>FY00</b>	<b>FY01</b>	<b>FY02</b>
Radio Set	32	158	1050	2678	2856	2886
RSA	11	38	176	203	198	194
CPC	11	38	176	203	198	194

The CSEL procurement quantities shown in the above table will not provide CSEL capabilities to every Navy and Marine Corps aircrew member. As a result, Type Commanders (TYCOM) will determine which squadrons will employ CSEL and which squadrons will use the AN/PRC-90 and AN/PRC-112 radios. It is expected the TYCOMs will distribute the limited CSEL assets in anticipation of a possible threat or in reaction to a known threat.

There is a risk associated with insufficient quantities of CSEL assets. For example, CSEL assets may be inconveniently located if an unexpected situation arises in another theater and the closest unit to respond is only equipped with AN/PRC-90 and AN/PRC-112 radios. This scenario could result in a delayed response or a response without the CSEL capability. Another possible example is that forward-deploying activities are assigned a limited number of CSEL assets. Depending on the situation or threat, there may not be enough assets for all aircrew members. This could cause units to respond to a particular situation or threat with some aircrew carrying AN/PRC-90 and AN/PRC-112 radios and others equipped with CSEL Radio Sets.

**2. Ready For Operational Use Schedule.** The Ready For Operational Use Schedule has not been determined. The TYCOMs will determine which squadrons will deploy with CSEL assets. Initial Operational Capability is expected to be reached in the third or fourth quarter of 1998.

**3. Time Required to Install at Operational Sites. NA.**

**4. Foreign Military Sales and Other Source Delivery Schedule.** Delivery schedules for other United States Military Forces is available through the CSEL program office for each branch. The lead program manager for CSEL is the United States Air Force, code SMC/CZ.

**5. Training Device and Technical Training Equipment Delivery Schedule.** CSEL user assets will be required for training at the various schools, ASTCs, and by AMSOs and Tiger Teams. Since it is not currently feasible to train for the Radio Set using actual UHFSATCOM, AN/GRC-242 Base Stations, and JSRCs, consideration should be given to developing a simulator that provides the Radio Set user with realistic communication capabilities. Much like other survival equipment, aircrew personnel should have a good understanding of the Radio Set's operation and required responses well before they are in a S/E situation. Otherwise, they may be in additional peril by trying to operate the Radio Set with little knowledge and a checklist.

**L. GOVERNMENT FURNISHED EQUIPMENT AND CONTRACTOR FURNISHED EQUIPMENT TRAINING REQUIREMENTS. NA.**

**M. RELATED NTSPs AND OTHER APPLICABLE DOCUMENTS**

<b>DOCUMENT OR NTSP TITLE</b>	<b>DOCUMENT OR NTSP NUMBER</b>	<b>PDA CODE</b>	<b>STATUS</b>
Operational Requirements Document (ORD) CAF (USAF) 019-92-I-A for the Combat Survivor/Evader Locator System	F04701-96-C-0020	HQ ACC/DRSD	Final 25 Oct 96
Combat Survivor/Evader Locator System Concept of Operations	NA.	NA.	Draft Dec 96
Test and Evaluation Master Plan for the Combat Survivor/Evader Locator System	NA.	SMC/CZ (USAF)	Dec 96
Technical Manual of Operations and Maintenance for the UHFSATCOM Base Station, P/N 4866130-101	NA.	NA.	Draft 31 Oct 96
Software Operator's Manual for the Joint Search and Rescue Center	TO 31R2-4-1678-8-1	NA.	Draft 3 Jun 97
Technical Manual of Operations and Maintenance for the CSEL Planning Equipment (CPE)	TO 31R2-4-1679-1	NA.	Draft 19 Jun 97
Operator's Manual for the AN/PRQ-7 Radio Set, P/N 4866110-101	TO 31R2-2PRQ7-1	NA.	Draft 12 Jun 97

<b>DOCUMENT OR NTSP TITLE</b>	<b>DOCUMENT OR NTSP NUMBER</b>	<b>PDA CODE</b>	<b>STATUS</b>
NAVSTAR Global Positioning System Integrated Logistics Support Plan for Combat Survivor/Evader Locator (CSEL)	TBD	PMW/PMA187 AIR 3.1.4I	Draft Sep 97
Aviation Life Support System (ALSS)	A-50-9206/D	PMA202	Draft Mar 96
NAVSTAR Global Positioning System (GPS)	E-70-8215F/A	PMW/PMA177	Approved Jul 95

**APPENDIX A - POINTS OF CONTACT**

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