

# ARCHIVED REPORT

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## PRC-112(V)

### Outlook

- The last known order was placed by the U.S. National Guard in October 2007
- U.S. military switched from PRC-112 to Boeing's Combat Survivor Evader Locator (CSEL), which entered full-rate production in March 2005
- General Dynamics needs to look to international markets to support PRC-112 production
- PRC-112 is currently in use with the U.S. military and several international militaries
- Barring further developments, this report will be archived in July 2011

### Orientation

**Description.** Hand-held survival transceiver.

**Sponsor**

U.S. Army  
Communications-Electronics Command (CECOM)  
Fort Monmouth, NJ  
USA  
(Tri-service program management)

**Status.** In service.

**Total Produced.** According to General Dynamics, more than 31,000 PRC-112 radios have been produced and fielded to customers.

**Application.** Aircrew and SOF survival radio.

**Price Range.** The PRC-112 ranges in price between \$6,000 and \$10,000, depending upon the quantity purchased. An average price would be \$8,000. A USAF \$8.9 million contract in 2005 for 1,402 PRC-112G radios yields a unit price of \$6,348. A U.S. \$912,000 contract in 2003 for 100 radios yields a unit price of \$9,120. Prices would probably be higher for a smaller quantity buy and if additional options are included, such as training, spares, and manuals.

### Contractors

#### Prime

<b>General Dynamics C4 Systems</b>	<a href="http://www.gdc4s.com">http://www.gdc4s.com</a> , 8201 E McDowell Rd, Scottsdale, AZ 85252-3812 United States, Tel: + 1 (877) 449-0600, Fax: + 1 (877) 449-0599, Email: <a href="mailto:info@gdc4s.com">info@gdc4s.com</a> , Prime
<b>Tadiran Spectralink Ltd</b>	<a href="http://www.tadiran-spectralink.com">http://www.tadiran-spectralink.com</a> , 29 Hamerkava St, PO Box 150, Holon, 58101 Israel, Tel: + 972 3 557 3216, Fax: + 972 3 557 3285, Email: <a href="mailto:info@tadspec.com">info@tadspec.com</a> , Licensee

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## Technical Data

	<u>Metric</u>	<u>U.S.</u>
<b>Dimensions</b>		
Weight, without battery	0.9 Kg	31.8 oz
Size	19.56 cm x 9.83cm x 5.33 cm	7.7 in x 3.87 in x 2.1 in
Immersion	To 15.25 m	To 50 ft
Frequency Range	118-125 MHz; 225 to 320 MHz; 340-390 MHz Tx 406 SARSAT	
Channels	2,999 programmable UHF channels	
Modes	Voice Swept-tone beacon 121.5 MHz, 243 MHz DME Transpond GPS Interrogation 406 SARSAT UHF SATCOM	
Tuning Increments	25 kHz steps, 5 kHz steps	
Power Output	1 W UHF, 100 mW VHF	
Temperature Range		
Operational	-40°C to +55°C	-40°F to +131°F
Storage	-40°C to +80 °C	-40°F to +176°F

**Design Features.** The PRC-112(V) is a rugged, lightweight survival radio. The transceiver weighs 31.8 ounces without battery, and has 2,999 UHF channels available in the AM 225-MHz to 299.975-MHz range. The radio has 121.5-MHz and 243-MHz survival beacons, and is the tri-service replacement for GTE's PRC-90 transceiver.

The PRC-112(V) has 25-kHz channel spacing, and, according to General Dynamics, a mean time between failures (MTBF) of 3,904 hours. The transceiver has the following advantages: broadband UHF frequency coverage; channelized 25-kHz frequency operation; transponder for ranging; individual ID codes; large-scale integrated (LSI) circuits to reduce size, weight, and power consumption; increased transmitter output power; easy-to-maintain modular construction; extended battery life (exceeds 14 hours); multimode operation; and an AM and swept-tone beacon.

**Operational Characteristics.** The radio performs beacon/voice survival functions and acts as a transponder by supplying ranging and personnel-identification information. When combined

with the ARS-6(V), Cubic Corporation's Personnel Locator System (PLS), it can precisely locate a survivor through range and bearing data. The PLS can compute the range and bearing of a survivor's location up to 100 nautical miles with an accuracy of 1 percent of the distance between the survivor and the rescue team. Interim tests indicated a 99 percent success rate in the PLS' location of targets. ARS-6(V)-designated platforms include the U.S. Army UH-1, UH-60, and Special Operations Forces (SOF) MH-60, as well as MH-47 helicopters.

To perform with the PLS, the PRC-112(V) is programmed with two preset frequencies between 225 MHz and 299.975 MHz, and with a six-digit decimal code enabling recognition of the PLS interrogations. The preset frequencies and codes are changed from mission to mission using program loader KY-913/PRC-112. The KY-913 has a liquid-crystal display (LCD) and keypad, and mates with the PRC-112 through the radio's battery port. Also, the PRC-112 has been upgraded to include a GPS receiver (see **Variants/Upgrades** section below).

## Variants/Upgrades

**COMSEC.** During the 1991 Gulf War, Iraqi forces monitored the transmissions of downed air crews using emergency radios. This raised the issue of communications security (COMSEC) capability for air-crew rescue operations. Motorola subsequently developed the PRC-122A(C) variant, which offers embedded COMSEC.

**GPS-112 Appliqué.** The GPS-112 appliqué adds encrypted global positioning and two-way messaging functions to the PRC-112. When the GPS-112 is turned on, it automatically contacts global positioning satellites. Because standard latitude, longitude, and Universal Transverse Mercator (UTM) or Military Grid Reference System (MGRS) coordinates (accurate within 25 meters) are transmitted in one short burst to search-and-rescue (SAR) aircraft, there is a low probability of detection and interception. This attachment improves combat SAR capabilities for agencies that cannot afford to replace their PRC-112s. The GPS-112 is part of the ARS-6(V) PLS, which is composed of a receiver/transmitter, mounting base, control display unit, remote display unit, antenna switching unit, and antenna set.

**PRC-112B1.** A legacy PRC-112 radio upgraded with the GPS appliqué.

**PRC-112G.** This software-defined version was first shipped in December 2002. It was designed to be upgradeable with new features and waveforms via software downloads or hardware upgrades. This radio transmits voice and secure data via line-of-sight (LOS) as well as over-the-horizon (OTH) ranges and sends encrypted global positioning data in three formats: latitude/longitude, UTM, and MGRS. It also comes with GPS interference detection to indicate the awareness and strength of any GPS interference with DME (distance measuring equipment) as an independent geo-location. Optional software upgrades are available for incorporation of two-way UHF satcom data and 406 SARSAT global beacon mode. Future upgrades are planned, such as the L-band Global Personnel Recovery System (GPRS) and DAMA-C.

**HOOK2 GPS CSAR System.** This combat search-and-rescue system consists of a PRC-112G or a PRC-112B1 transceiver, plus a hand-held GPS Quickdraw Interrogator. It adds two-way messaging and GPS positioning data. The Quickdraw Interrogator plugs into the intercom system of most aircraft to provide direct, two-way communications between the flight deck and survivors on the ground.



PRC-112

Source: U.S. Army

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## Program Review

**Background.** Motorola and GTE were both awarded competitive development contracts for the PRC-112(V) in 1978. The new radio would replace the tri-service PRC-90, which had been in service since 1971. This competition ran through 1980, and in 1983, the U.S. Air Force awarded Motorola a \$6.2 million contract.

Later, in 1988, the U.S. Army awarded Motorola a \$6.2 million contract to produce 1,500 sets. Motorola was then awarded a \$7.7 million contract for 3,682 radios in August 1990. This was followed by a \$19.2 million option in June 1991, and another \$10.8 million option in February 1992. A further modification, awarded in June 1993, called for 611 units by September of that year, with an option for another 1,583 units.

In 1994 it was revealed that the Air Force was working on Talon Hook (renamed Project Hook), which would combine a PRC-112 radio with a GPS receiver that could send a coded data-burst communication to give the sender's identity and location. The USAF believed that the lack of interceptable radio transmissions and use of GPS satellites would improve the chances of a timely rescue and enhance the SAR team's survival chances.

### *Downed Pilots and Soldier 911*

The GPS-112 was under development in 1995 when pilot Scott O'Grady was shot down in Bosnia, and the PRC-112 he carried was criticized for its limited line-of-sight capability. This ordeal prompted the Air Force to speed development and procurement of the GPS-capable variant. Delivery of the first batch of 1,000 GPS-112-equipped units began toward the end of that year. The enhancement was also available as a backfit to previously sold PRC-112s.

Around the same time, "Soldier 911" was born when three U.S. soldiers inadvertently crossed the Macedonia-Kosovo border and were captured. Soldier 911 consists of a base station and hand-held PRC-112 units fitted with GPS-112. With the capability to track up to 12 hand-held units, the Soldier 911 base can warn patrols of possible incursions into enemy territory. It began testing in April 1995 and was successfully deployed in South Korea and Macedonia.

During USAF field test Tandem Thrust, rescue teams claimed that the PRC-112 simplified finding downed air crews. The validation process was so successful that plans called for all military branches to use the improved device. The enhanced PRC-112 is credited with aiding in a successful two-person rescue during Operation Allied Force.

### *CSEL a Major New Player*

USAF RDT&E documents for 1997-98 indicated the fate of the PRC-112: it was to be replaced by the more advanced Combat Survivor Evader Locator (CSEL). Procurement of CSEL began in 2002.

### *PRC-112 Radio Becomes the Standard*

The PRC-112 became the standard U.S. military survival radio when used with the ARS-6(V) Personnel Locator System (PLS). The improved GPS-enhanced version extended the life of the PRC-112, which had been criticized for its outdated technology.

In 1999, Cubic Corp was awarded a four-year contract to supply the Air National Guard (ANG) with the PLS. The first order, which was scheduled for delivery in November 1999, was for 10 units. The ANG had options for up to 28 units. These PLS units were designated for use on C-130 aircraft.

A contract for the upgrade of 1,422 PRC-112 radios was issued in December 2001. By December 2002, the GPS appliqué was added to bring these radios up to the PRC-112B1 standard. Also, 222 PRC-112B1 radios were purchased during 2002, according to the U.S. Special Operations Command FY04/FY05 defense-wide procurement budget estimates.

In early 2002 it was reported that the U.S. Army had placed an order with Tadiran Spectralink to upgrade 500 PRC-112C radios; this contract appears to upgrade the radios to the "D" configuration. An early 2003 follow-on order added an additional 500 radios. If all contract options are exercised, 12,000 PRC-112 radios valued at \$52 million could be obtained under this agreement. Of these 12,000 radios, 8,500 would be older radios upgraded to the -D configuration and the remaining 3,500 units would be new PRC-112D units.

### *International News*

The Hellenic Air Force ordered 650 PRC-112G radios in January 2004 via a General Dynamics contract with the Greek firm TEOTEC SA. An option for 300 additional units was included in the deal, but there have been no reports indicating whether this option was exercised.

### *National Guard Places Order*

In August 2005, an order for 1,402 PRC-112G CSAR radios was placed by the Air Force Special Operations Command. This was probably the last large U.S. military order. The U.S. active-duty military is now purchasing the PRC-112's replacement, Boeing's

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Combat Survivor Evader Locator (CSEL). In March 2005, Boeing received an order for 5,053 CSEL radios.

In September 2007, the U.S. National Guard Bureau placed an \$8.64 million order for PRC-112G radios and GPS-112 program loaders. It is unclear whether this is the beginning of several orders from the National Guard or just a one-shot deal.

### *The Writing is on the Wall*

U.S. Army, Air Force, and Navy FY07 budget documentation confirmed that CSEL is replacing the PRC-112. Moreover, no PRC-112 orders are mentioned in U.S. military procurement documentation.

## Contracts/Orders & Options

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
General Dynamics Decision Systems	4.95	Sep 2002 – FFP contract to upgrade 772 PRC-112B1 survival radios and procure ancillary equipment for aircrew survival gear. Work performed in Scottsdale, AZ. The Naval Air Systems Command, Patuxent River, MD, was the contracting agency.
General Dynamics Decision Systems	8.0	Dec 2002 – U.K. Ministry of Defence contract for PRC-112G CSAR radios.
General Dynamics Decision Systems	6.4	Jun 2003 – FFP contract for assembly appliqué to configure a PRC-112 or PRC-112C radio into a PRC-112B1 GPS capability radio. Price includes installation on 1,167 customer-furnished PRC-112s at \$5,445 per kit. Completed Sep 2003. The 16th Special Operations Wing, Hurlburt Field, FL, was the contracting agency. (08620-03-F-0154)
General Dynamics C4 Systems	4.8	Aug 2003 – USAF Air Combat Command order for 744 PRC-112G radios.
General Dynamics C4 Systems	N/A	Jan 2004 – Athens-based TEOTEC SA to provide 650 PRC-112G HOOK2 CSAR radios to the Greek Main Armaments Directorate. The contract includes an option to purchase 300 additional radios.
General Dynamics C4 Systems	8.9	Aug 2005 – A delivery order from the U.S. Air Force Special Operations command for 1,402 PRC-112G CSAR radios.
General Dynamics C4 Systems	8.64	Sep 2007 – A contract for PRC-112G radios and GPS-112 program loaders. Completed Sep 30, 2008. The National Guard Bureau, Port Hueneme, CA, was the contracting agency. (W912LA-07-F-9095)

## Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1978	Motorola and GTE compete for PRC-112 program
	1983	Motorola awarded first production contract from U.S. Air Force
	1988	Contract to equip U.S. Army awarded
Early	1990s	Series of option contracts awarded
	1995	Air Force pilot Scott O'Grady uses PRC-112 after being shot down in Bosnia
	1995	First deliveries of GPS-capable PRC-112B
Through	1999	PRC-112 overstock remains available
Early	2002	Tadiran Spectralink awarded contract to upgrade 500 PRC-112C radios to "D" configuration
Mid	2002	CSEL scheduled for full-rate production
Dec	2002	\$8 million order for U.K. received
Early	2003	Tadiran Spectralink awarded a contract to upgrade additional 500 PRC-112C radios – apparently to "D" configuration
Jun	2003	Contract awarded to upgrade PRC-112C radios to PRC-112B1 GPS capability radios

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<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Aug	2003	USAF Air Combat Command orders 744 PRC-112G radios
Jan	2004	Greece orders 650 radios
Aug	2005	USAF Special Operations command orders 1,402 PRC-112G radios
Sep	2007	U.S. National Guard places an \$8.64 million order
Sep	2008	U.S. National Guard order expected to be completed

## Worldwide Distribution/Inventories

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General Dynamics reports that the PRC-112 is being used by all major branches of the U.S. military, as well as 11 NATO countries and 10 other nations. The PRC-112 is said to be utilized in **Australia, Ecuador, Germany, Greece, New Zealand, Portugal, Spain, Sweden, the United Kingdom**, and the **U.S. Israel** is also believed to be a PRC-112 customer.

## Forecast Rationale

In March 2009, two pre-solicitations were issued by the U.S. Defense Logistics Agency for 2,670 PRC-112 non-rechargeable batteries and an unspecified number of headphones. Also, the Air Force is offering PRC-112 training and refreshers to airmen who have been deployed to Southwest Asia. These factors indicate that the PRC-112 is in use by U.S. forces at this time.

### *Platform News*

The current USAF combat search-and-rescue (CSAR) helicopter, the HH-60G Pave Hawk, has a Personnel Locating System that is compatible with the PRC-112. The HH-60G is a modified version of the Army Black Hawk, and it achieved Initial Operational Capability (IOC) in 1982. One Pave Hawk replacement, the CSAR-X, was recommended for termination by Defense Secretary Robert Gates in April 2009. The Air Force is currently looking to replace its Pave Hawks under a new program called the HH-60 Personnel Recovery Recapitalization Program. *Defense News*

reported that the USAF plans to award a contract in 2012 and achieve IOC in late 2015.

### *Future Orders Unlikely*

Now that CSEL has entered full-rate production, General Dynamics will need to aggressively market the PRC-112 to generate sales. General Dynamics already reports 21 international customers, so the market is somewhat saturated.

On the plus side, the PRC-112 is less expensive than a CSEL radio, and CSEL is currently a U.S.-only program. The September 2007 National Guard order was a positive development, but no orders are known to have been placed since that time. A large order seems highly unlikely, but small orders may come as countries find they need to upgrade older versions or replace radios that have been damaged in field operations. Orders may also come from police departments or homeland security operations.

## Ten-Year Outlook

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Because all current orders have been fulfilled and no new contracts have been announced, this report contains no **Ten-Year Outlook** chart.

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