ARCHIVED REPORT

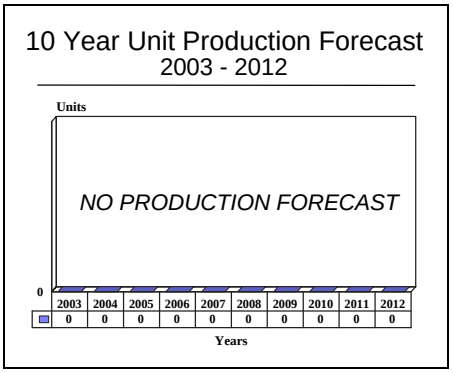
For data and forecasts on current programs please visit

www.forecastinternational.com or call +1 203.426.0800

ARA-63 - Archived 7/2004

Outlook

- Last contract for ARA-63 components awarded in 2001
- Production of ARA-63 ended circa 1997 after sufficient inventory had been manufactured
- Barring any new developments, this report will be archived in the near future



Orientation

Description. Receiver-decoder integrated landing system.

Sponsor
US Navy
Naval Air Systems Command
Arlington, Virginia (VA)
USA

Contractors
Herley Chicago
(formerly Stewart Warner Electronics)
1117 Entry Drive
Bensenville, Illinois (IL) 60106
Tel: +1 630 616-8633
http://www.herley.com

Status. In service.

Total Produced. An estimated 3,565 systems had been produced through 2002.

Application. Microwave landing aid for carrier-based fixed-wing aircraft.

Price Range. The per unit price runs from US$50,000 to US$75,000.

Technical Data

	Metric	US
Dimensions		
Volume		
Receiver	21.33 x 12.7 x 6.35 cm	8.4 x 5.0 x 2.5 in
Decoder	27.68 x 11.17 x 10.92 cm	10.9 x 4.4 x 4.3 in
Receiver Control	14.73 x 8.38 x 38.1 cm	5.8 x 3.3 x 1.5 in
Weight		
Receiver	1.86 kg	4.1 lb
Decoder	3.22 kg	7.1 lb
Receiver Control	0.36 kg	0.8 lb

	Metric	US
Power Requirements	115/200 V AC, 400 Hz, 3 phase, 520 mA 28 V DC, 360 mA 5 VAC, 400 Hz, single phase, 1 A	
Number of Channels	20	
Frequency Range	15.412 to 15.688 GHz	
Dimensions (continued)		
Proportional Azimuth	+/- 6 degrees	
Selectable Glideslope	2 to 5 degrees in 0.5 degree increments	
Proportional Elevation	+/- 1.4 degrees	
Full Fly Right/Left	+/- 20 degrees	
Full Fly Up	Above 0 degrees	
Full Fly Down	Below 10 degrees	
Receiver Sensitivity	-72 dBm	
Intermediate Frequency	150 MHz	
IF Bandwidth	10 MHz	
Built-In Test (BIT)	Checks mixer operation and signal path from IF input to display output	

Design Features. The ARA-63 Receiving-Decoding Group is the airborne segment of the US Navy Automated Carrier Landing System (ACLS) and the Marine Corps Remote Area Approach and Landing System (MRAALS) – all-weather aircraft approach guidance systems. The latest version, the ARA-63D, comprises three line replaceable units (LRUs): the R-1379B radio receiver, the KY-651C pulse decoder, and the C-7949B receiver control unit. The hardware set is a solid-state design. It incorporates an extensive Built-In Test (BIT) capability, meets the environmental requirements for Class II equipment, and has a mean time between failures (MTBF) rating of 1,000 hours.

Operational Characteristics. The ARA-63 uses signals transmitted from either carrier- or ground-based approach radars such as the SPN-41 and TRN-30. The ARA-63 has a 20-channel capability in the 15.412-to-15.688-GHz frequency range. A centerline display of both elevation and azimuth on the cockpit crossbar indicator depicts the flight path the pilot must follow to line up correctly with the carrier deck or air-base runway. By consecutively scanning through azimuth and elevation and decoding the information for display, the system provides continuous measurement of the lateral and vertical deviations of the aircraft in space from the optimum approach line. The glide scope is selectable from two to five degrees. The landing system allows aircraft to make approaches in visibility of one-quarter mile and below ceilings of 100 feet, the equivalent of Category II approaches at civilian airfields.

Variants/Upgrades

ARA-63. This is the original design introduced in 1966. The set consists of a C-7949 control, R-1379 receiver, and KY-651 decoder.

ARA-63A. For the ARA-63A, components underwent switch changes. LRUs are designated C-7949A, R-1379A, and KY-651A.

ARA-63B. For this model, a Built-In Test (BIT) line driver is added to the KY-651A. LRUs are designated C-7949A, R-1379B, and KY-651B. The ARA-63B was introduced in the late 1970s.

ARA-63C. In this variant, the on/off function is deleted from the C-7949A, which is redesignated C-7949B. Other LRUs remain unchanged.

ARA-63D. This is the most current model, introduced in 1985. It incorporates unspecified avionics changes. Components are designated C-7949B, R-1379B, and KY-651C.

ARN-145 Micro-PCAS. This Plessey/GEC-Marconi-designed system uses existing ARA-63 radio receivers as part of a tactical microwave landing system designed for military helicopters. The ARN-145 allows landing operations in adverse weather up to Category II utilizing a Ku-band scanning beam. Approaches can be made down to a 100-foot cloud base and one-quarter-mile visibility, with range accuracy of 25 feet using a standard L-band TACAN. The pilot can select a glide slope between 3 degrees and 12 degrees.

The F-18A Hornet; one of the ARA-63's platforms

Source: US Navy

Program Review

Background. Development of the ARA-63 was begun in 1966 by Cutler-Hammer Airborne Instrument Laboratories Division (which later became Eaton/ AIL Systems Inc). Production for the US Navy began in 1969, changing hands from AILS to Stewart-Warner in 1974.

In 1981, the Navy awarded GEC-Marconi (formerly Plessey Electronic Systems Corp) a development contract for the ARN-138 multimode receiver (MMR) that was designated to supersede the ARA-63 series receivers by the late 1980s. The ARN-138 was specified to be a truly interoperable system capable of functioning with a broad spectrum of landing systems, including the SPN-41, the MRAALS (Navy and Marines), and the Instrument Landing System (ILS) and Microwave Landing System (MLS) planned for new civil/military airfields. The GEC-Marconi ARN-138 design was intended to combine all these needs into one system occupying a smaller aircraft-installed volume with reduced power requirements.

The US Navy, however, has periodically reassessed ARN-138 requirements based on changing technology and functional requirements. In early 1994, the program was listed as "on indefinite hold."

A study to analyze emerging precision approach landing system technologies was initiated by the Assistant Secretary of Defense in 1992. The Precision Landing Study Advisory Group in charge of the study produced a Mission Needs Statement (MNS) for a Joint Precision Approach Landing System (JPALS). This new system would be a differential Global Positioning Satellite (GPS) that provides a rapidly deployable precision landing system in support of joint service, civil, and multinational interoperability. The MNS was validated by the Joint Requirements Oversight Council in August 1995.

In May 1999, Raytheon was awarded a contract for risk reduction research and development in support of JPALS. By September 2001, Raytheon and the US Air Force had successfully completed the initial phase of flight testing of JPALS. The program, however, has reportedly been pushed back by approximately five years. This delay is a result of efforts to better coincide with the Federal Aviation Administration's schedule for installing related systems.

For the ARA-63 program, the "indefinite hold" of the ARN-138 and the development of the JPALS meant that this mature equipment needed to be maintained and supported in the field for a longer period before a replacement could be fully specified, developed and brought to Full Operational Capability (FOC). Then, because inventory was sufficient, production of the ARA-63 ended circa 1997. In August 2001, however, an indefinite number of pulse decoder and radio receiver components of the ARA-63 were ordered by the US Navy for use on the F/A-18.

Funding

Funding for the ARA-63 is not allocated in current US Navy budget documents.

Recent Contracts

Contractor	Award ($ millions)	Date/Description
Stewart-Warner Corp	16.5	Aug 2001 – Firm fixed-price, indefinite-quantity contract for a pulse decoder and radio receiver which are components of the ARA-63 tactical instrument landing system used on the F/A-18 aircraft. Work will be performed in Lancaster, Pennsylvania, and is expected to be completed by September 2003. The Naval Inventory Control Point, Philadelphia, Pennsylvania, is the contracting agency. (N00383-01-D-025H)

Timetable

Year	Major Development
1966	System development begins
1969	Production begins
1974	Stewart-Warner assumes production role
1977	Development of MRAALS to be compatible with ARA-63
1985	ARA-63D introduced
1997	Production completed
2001	Pulse decoder and radio receiver components of ARA-63 ordered

Worldwide Distribution

The ARA-63 series has been the standard on all **US Navy** carrier-based aircraft. This group includes the A-6 (retired), A-7 (retired), F-14 and F/A-18 attack and fighter aircraft, and special-mission aircraft such as the C-2 Greyhound, E-2C Hawkeye, EA-6 Prowler, and S-3 Viking.

Forecast Rationale

The ARA-63 has been in service guiding aircraft on their landing approach for the US military for over three decades. The ARA-63 aircraft approach control system is composed of three line replaceable units: a radio receiver, a pulse decoder, and a receiver control unit.

As new demands for civil, inter-service and international capabilities emerge, the ARA-63's basic architecture is becoming obsolete. A new system, the Joint Precision Approach and Landing System (JPALS), was designed to replace the ARA-63. In 2001, JPALS successfully completed its initial phase of flight testing. The program, however, has reportedly been pushed back by approximately five years.

Despite this delay in the JPALS program, further production of the ARA-63 is unlikely. After having produced a sufficient supply of ARA-63 components, the Stewart-Warner Corporation, now owned by Herley, stopped production in 1997. Barring any further developments, this report will be archived in the near future.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

			High Confidence Level			Good Confidence Level				Speculative			
Designation	**Application**	**Thru 02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**Total 03-12**
ARA-63	Prior Prod'n:	3565	0	0	0	0	0	0	0	0	0	0	0