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ALR-62(V) - Archived 6/96

Orientation

Description. Airborne radar warning receiver (RWR).

San Jose, CA

Sponsor

US Air Force
Warner Robins Air Logistic Center
Robins AFB, GA

Status. In service, upgrade kits in production, ongoing logistics production.

Total Produced. An estimated 341 ALR-62(V) units and 186 ALR-62I kits have been produced.

Contractors

Litton Industries
Applied Technology Division

Application. F-111, EF-111A, and F-111C aircraft.

Price Range. Estimated unit cost is approximately \$600,000.

Technical Data

Design Features. The ALR-62(V) is an improved radar warning receiver (RWR) which evolved from the APS-109 radar homing and warning system (RHAW). The ALR-62(V)4 was specifically designed to operate effectively despite the high power jamming of the ALQ-99(V) Tactical Jamming System carried in the EF-111A. The receiving antennas for the ALR-62(V) are located as far from the jamming transmitters as possible; in this case, in an avionics pod located at the tip of the vertical stabilizer.

The antenna system of the ALR-62(V), with forward and aft receivers, is connected to a digital signal processor. Threat warnings are displayed on a cockpit threat indicator. The ALR-62(V) system works in conjunction with an ALQ-137 self protection jammer and an AAR-44 infrared warning receiver. A countermeasures control unit is also part of the ALR-62(V) system.

The ALR-62(V)6 incorporates a variety of technology advancements. They include:

- * New frequency sorting techniques.
- * Multiple pre-processors and processors.
- * Gate arrays.

* Independent receivers:

Instantaneous Frequency Measurement (IFM)

Superheterodyne Receiver

Crystal Video Receiver

YIG-controlled Receiver

Integrates with chaff and flare dispensers and Missile Warning Systems

Forward-looking PDF

Operational Characteristics. The ALR-62(V) is the standard radar warning set for all F/FB-111 and EF-111A aircraft. It warns the crew of hostile threat radars and was designed to give the aircraft a viable defense capability through the '90s.

The system monitors the electronic environment and compares inputs to preprogrammed parameters, using the findings to identify signals which represent a potential threat to the aircraft. The ALR-62(V)4 is especially able to "look through" the high power jamming signals of the ALQ-99 Tactical Jamming System carried by the EF-111A.

Variants/Upgrades

ALR-62(V)3. This variant is used in the FB-111 aircraft.

ALR-62(V)4. This variant is used in EF-111A electronic warfare aircraft. It is a major element of the EF-111A Terminal Threat Warning System (TTWS). This system analyzes and monitors radar threats and has the capacity to "look through" high-power jamming from the ALQ-99(V) transmitters also carried aboard the EF-111A.

ALR-62(V)6. The Air Force and Australia upgraded their F-111 fleets with this enhanced system. The improved system provides frequency extensions to cope with the expanded combat threat scenario the aircraft are expected to face in the future and improved situational awareness. It has a demonstrated MTBF of 300+ hrs.

Program Review

Background. The original ALR-62 was an updated version of the APS-109 Radar Homing and Warning Receiver (RHAW). It featured an extended frequency capability, programmable digital signal processing and a Compass Sail (C/D band direction finding capability) interface.

The ALR-62(V) is a third-generation improvement to the original system and was designed to work in conjunction with the ALQ-137 internal jammer and the AAR-44 infrared warning receiver to form a Defensive Electronic Countermeasures (DECM) suite on the F/FB-111 and the EF-111A.

Development of the original ALR-62 began in the late 1960s. In 1971, Sanders received a \$9 million contract for the QRC-536 program, which was designed to increase the effectiveness of its ALQ-94 deception set. The program included updating the APS-109 into the ALR-62, as well as updating the ALQ-94 into the ALQ-137 configuration.

In November 1977, Dalmo Victor was awarded a contract to begin production of the ALR-62 for integration into all F-111 aircraft. In the late 1970s, the Air Force began funding a program to modify and update the APS-109 RHAW system into the ALR-62 configuration on F/FB-111 aircraft.

Initial plans called for modification of 327 systems at a cost of \$109 million. These modifications were finished in 1982. Forty-two modified versions were produced through 1983 for the EF-111A program.

The DoD chose Dalmo Victor's updated ALR-62I as the radar warning portion of the F/FB-111 suite in March 1985. The Air Force originally had narrowed the selection to the ALQ-189/ALR-62 and ASPJ/ALR-74 suites.

The DoD and Congress entered the decision-making process and favored an ASPJ/ALR-62 combination as a

more cost-effective measure. It was chosen because the antenna system planned for the F/FB-111 could be more effectively integrated with the ALR-62 than the ALR-74. In addition, it offered lower aircraft modification costs and the work could be completed more rapidly.

Dalmo Victor delivered the first of two prototypes in early 1987. Initial production of the ALR-62I began in 1988. System integration in F/FB-111s took place during the early 1990s.

Integration of the ALR-62I into the EF-111A required additional developmental efforts to allow for aircraft peculiarities. In FY89, the Air Force defined the system configuration for the upgrade and developed system performance specifications. Engineering design began, as did GFE support activities.

In FY90, four production systems were used to support test and integration efforts. Plans were to define the production configuration during FY91. In late 1990, congress directed the Air Force to evaluate the feasibility of installing the ALR-62I on the B-1B as a substitute radar warning receiver for the bomber's troubled defensive avionics system. In subsequent years, funding for the RWR integration effort was reduced or eliminated.

ALR-2002. In late 1993, it was revealed that the Australian Air Force would contract AWA Defense Industries Pty. Ltd of Adelaide, Australia, to complete development of a new radar warning receiver to replace the ALR-62I in 21 F-111Cs. The full-scale engineering and development effort was expected to last until the latter half

of 1996.

Funding

Current funding is from operations & maintenance or airframe accounts.

Analysis. The F-111 and EF-111A are capable, reliable performers in the type of combat the force can expect to face in the future, and many of the older airframes are

being retired, reducing the tendency to embark on further upgrades of the system. Changes will tend to be

enhancements rather than replacement of operational systems.

Some F-111s will remain operational through the latter half of the decade in a conventional weapons delivery role. By the mid-1990s, the USAF will be retiring all but the F-111F fleet. These aircraft carry the advanced

avionics suite and will be used to deliver precision-guided munitions. The Avionics Modernization Program (the integration of the ALQ-131 or ALQ-184 ECM pods, plus the improved ALQ-62(V)I) will go far to help this force remain operational and effective against any possible future threats.

Recent Contracts

No recent DoD contracts over \$5 million recorded.

Timetable

	1979	Update APS-109 to ALR-62 on F-111 aircraft.
	1981	USAF planned to modify F-111A aircraft to EF-111A configuration by including ALR-62, along with the ALQ-137 self-protection system and the ALQ-99 Jammer
	1987	Delivery of first two prototypes of ALR-62(V)I
Aug	1988	Dalmo Victor awarded \$199 million contract for ALR-62(V)I production
Late	1989	ALR-62(V)I deliveries began
	1994	Completion of ALR-62(V)6 deliveries

Worldwide Distribution

Australia uses the ALR-62 on its fleet of F-111C aircraft. The **United States** uses the system on EF-111As, F-111s, and FB-111As.

Forecast Rationale

The F/FB-111 had been the mainstay of the tactical fighter/bomber fleet, and as such was expected to face a heavy ground threat environment during combat operations. Providing these aircraft with capable threat warning equipment was considered critical by Air Force

tactical planners. Combat operations have proven the F-111E/F aircraft amply capable of meeting today's tactical threat; but cost and age are prompting the retirement of many airframes.

Ten-Year Outlook.

No further production expected.