

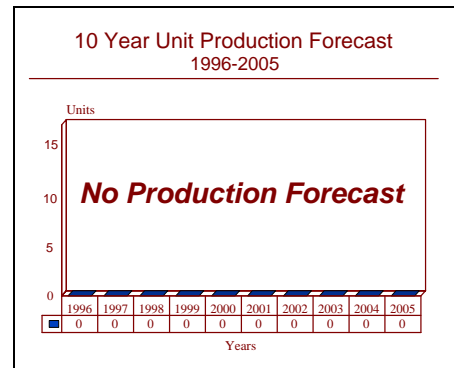
ARCHIVED REPORT

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ARN-138 - Archived 7/97

Outlook

- Full-scale development has been completed
- Production has been put on indefinite hold
- The ascendancy of GPS over MLS has likely truncated the multimode receiver's naval career



Orientation

Description. Multi-Mode Receiver (MMR).

Sponsor

US Navy
Naval Air Systems Command (NAVAIR)
Washington, DC
USA

Contractors

GEC-Marconi Electronic Systems Corp
164 Totowa Rd, Box 975
Wayne, New Jersey (NJ) 07474-0975
USA
Tel: +1 201 633 6000
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(MMR Prime: development)

Status. Full-scale development complete. Procurement on hold indefinitely.

Total Produced. About 20 preproduction units.

Application. Precision landing system receiver for US Navy fixed- and rotary-wing aircraft.

Price Range. Unit cost is estimated at US\$75,000.

Technical Data

Design Features. The use of three operational landing aids [ILS, MLS, and Ku Band Pulse Coded Scanning Beam (PCSB)] requires that the Navy's carrier- and land-based aircraft be able to receive and decode these widely divergent ground signal formats. To this end, the Multi-Mode Receiver (MMR), nomenclatured the ARN-138, entered development for anticipated interoperability with the Automated Carrier Landing System (ACLS), the

Marine Corps Remote Area Approach and Landing System (MRAALS), Navy TACAN systems, and/or existing international standard ILS or MLS systems. The ARN-138 MMR equipment set consists of the R-2196 radio receiver, the CP-1449 navigation computer, the CU-2278 DME coupler, the ID-2253 range height display, the C-10926 receiver control panel and the AM-7108 RF

amplifier. The latter three items are optional equipment for non MIL-STD-1553B databus-equipped aircraft.

Operational Characteristics. In the ACLS application only, the MMR provides an Independent Landing Monitor for the primary system. In other applications, it can act as the primary and only precision landing receiver on the aircraft. The MMR is a replacement for the Stewart-Warner ARA-63 single-mode Receiving-Decoding Group receiver that became standard equipment on Navy/Marine fixed-wing aircraft.

Additional features of the ARN-138 MMR include outputs in both analog and MIL-STD-1553B databus format,

selectable glide slope, course softening and minimum usable glide slope. It displays range, range rate and height above touchdown, while providing visual and audio advisories and built-in test. The core MMR ship set consists of three units for MIL-STD-1553B-compatible aircraft: the radio receiver, navigation computer and the DME coupler calibrator. For aircraft that are not MIL-STD-1553B-compatible, three additional units are integrated: the range/height/rate unit, receiver control unit and C-Band RF amplifier. With this configuration, the MMR is fully interfaced with the aircraft TACAN system.

Variants/Upgrades

Improved Accuracy. During the TECHEVAL phase, GEC-Marconi was able to recalibrate the accuracy of the MMR receiver from 300 ft down to 30 ft. While the goal was to bring the MMR's accuracy within the 5-to-15 ft

range, 30 ft still marked a major leap in improving system accuracy.

Further tests and improvements have been canceled as the entire program is now on hold. (See Program Review.)

Program Review

Background. The MMR concept began its evolutionary process in the mid-1970s as a result of the operational experiences of US Navy pilots. In the early 1980s, Singer Kearfott was awarded a competitive contract for engineering development of a three-band precision landing receiver. Four engineering development models (EDM) were produced and extensively flight tested under this contract.

The favorable results of the EDM program led to Singer Electronic Systems Division (Singer-Kearfott) being competitively selected as prime on the preproduction program in 1987. Subsequently, the development program was continued by Singer's new owners, Plessey, and — as of 1990 — GEC-Marconi.

GEC-Marconi Electronic Systems Corp was awarded a \$15.7 million development contract for delivery of 20 preproduction units in September 1987. Despite delays in its development cycle, the ARN-138 completed the TECHEVAL phase in the third quarter of FY90, and began transitioning to OPEVAL during FY92.

By February 1993, the Navy had completed TECHEVAL, but postponed OPEVAL and the Milestone III low-rate production decision pending review of the Federal Aviation Administration's (FAA) evaluations of Navstar GPS as an alternative landing aid. The FAA review dealt a potentially fatal blow to MLS when it concluded that GPS stood a far better chance of being the landing aid of the 21st century than any other product in production or development.

Funding

No current funding has been identified.

Recent Contracts

The most recent ARN-138 contract activity was in 1988 when Plessey received a \$7 million funding increment for a FFP contract for 20 ARN-138 receivers. This transaction brought the total amount spent on fulfillment of contract N00019-85-C-0532 to approximately \$29 million.

Timetable

1984	Navy initiated MMR development, test and acquisition program
1986	Singer selected as prime for MMR
1987	Singer awarded contract for 20 preproduction units
1991	Completed TECHEVAL
1993	Program placed on indefinite hold

Worldwide Distribution

Exclusive to the US Navy.

Forecast Rationale

MLS has been in planning and development since the late 1970s, with several manufacturers contracted to develop and supply various segments of the system. Considerable time and funding have been spent to convince the international aviation community to adopt MLS as the new standard, and to renew the process would be equally costly and time-consuming. In view of the improvements steadily being made in GPS technology - especially DGPS (differential global positioning) techniques - such expenditures would be wasted.

There is still considerable conjecture regarding the ideal GPS backup system - which the ARN-138 MMR could

well have been. However, there are other types of multimode receivers being developed commercially that can accommodate GPS as well as MLS or ILS systems. Compared with these, the ARN-138, with no GPS capability, would have only very limited usefulness. While MLS is still necessary for severe-condition landings, GPS will undoubtedly be able to replace it even in these instances in the near future. Thus the ARN-138 has a role to play in current naval landing systems, but this role likely will not extend beyond the forecast period.

Ten-Year Outlook

With the program on hold, and GPS systems development in high gear, we are not predicting further ARN-138 production. Therefore, the funding chart has been omitted. Barring a revival of activity over the next 12 months, this report will be omitted from future supplements.

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