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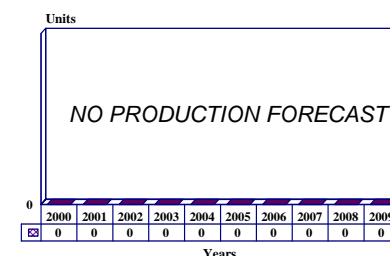
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APX-103(V) - Archived 04/2001

Outlook

- In service, ongoing support, limited production as needed
- Designed to operate with the AWACS radar
- New NATO interrogator ordered

10 Year Unit Production Forecast
2000-2009



Orientation

Description. Identification friend or foe (IFF) transponder.

Sponsor

US Air Force
Warner Robins Air Logistics Center (WRALC)
Robins AFB, Georgia (GA) 31098
USA
Tel: +1 912 468 1001

Status. Production as needed for new AWACS, ongoing logistics support.

Total Produced. Through 1999, approximately 80 units had been produced.

Application. E-767, E-3 AWACS aircraft.

Price Range. Unspecified

Contractors

Telephonics Corp
815 Broad Hollow Road
Farmingdale, New York (NY) 11735
USA
Tel: +1 516 755 7000
Fax: +1 516 755 7644

Technical Data

Design Specifications. The APX-103(V) IFF transponder was developed solely for the E-3 Airborne Warning and Control Systems (AWACS) aircraft. Production of the E-3 AWACS, based on a Boeing 707 airframe, has ended, and has been replaced by an AWACS version of the Boeing E-767.

The receiver/processor section automatically decodes the identities and locations of cooperative aircraft and

feeds digital data to the aircraft's central command and control computer where primary radar data are also stored. Both types of data can then be called up by radar operators.

The processor directs a received mode of operation and generates interrogations to the active receiver/transmitter (R/T), which modulates and sends them to target aircraft within the surveillance range, which in turn

reply in coded radio frequency (RF) terms. Replies are detected by the active R/T and sent to the processor, which detects and decodes them and sends them to the E-3 (or 767) as target reports.

Operational Characteristics. Used in conjunction with the APY-1/2(V) radar, the APX-103(V) functions by

tagging echoes received as either “friendly” or “hostile.” The interrogator section can query other aircraft in either conventional air traffic or military modes.

Variants/Upgrades

APX-103(V)B. Telephonics is developing upgrades to add a monopulse capability and improve target extraction processing. The enhanced system would feature scan-to-scan correlation to meet new operational requirements.

An upgrade has been developed that would reduce azimuth jitter and improve code reliability. The jitter

was caused by a susceptibility of the “beamsplit” azimuth determination technique to interference. Multipath effects and closely spaced targets made it difficult for the system to sort real from extraneous signals. These improvements were developed to increase track quality, cut AWACS crew confusion, and decrease the chances of fratricide.

Program Review

Background. The 34 E-3 AWACS in USAF inventory have all been upgraded to E-3B and E-3C variants. These were delivered to the USAF after modification with a bigger and faster computer (the IBM 4-pi CC-2), improved communications and radar capability, and five additional controller stations. The E-3Bs are also being provided with an austere maritime radar surveillance capability and provisions for JTIDS and HAVE QUICK.

Boeing produced kits in 1986 that upgraded 10 AWACS to the E-3C configuration. These AWACS were already equipped with an advanced computer and maritime surveillance capability that could track slow-moving ships. They received five additional controller stations and communications equipment. There are also provisions for HAVE QUICK secure communications.

In 1992, Japan announced that it planned to order two 767-based AWACS (E-767) in its FY93 budget. In October 1994, Boeing received the order for the second of two 767 AWACS, a US\$773 million order that comprised a Foreign Military Sale (FMS) of the AWACS mission equipment, and a commercial sale of two Model 767-200 aircraft modified to carry the mission electronics and related equipment.

In December 1996, the Boeing Co awarded Telephonics Corp a US\$17.2 million contract to update the APX-103(V) IFF system with a monopulse capability, enhanced target extractor and scan-to-scan correlation. Also in December, six upgraded APX-103(V)B systems were delivered for flight testing. These featured the reduced jitter and improved code reliability. Plans are to incorporate the APX-103(V)B

features on all US AWACS and the four Japanese 767Es.

The first two 767 AWACS aircraft produced for Japan completed production acceptance testing in February 1998, with delivery set for March 1998. The third and fourth aircraft were delivered in early 1999.

NATO Replacement. GEC-Marconi's, Marconi Communications received a US\$47 million order from Boeing Co for a “mid-term modernization” of NATO's AWACS aircraft. Teamed with Telephonics, designers will develop new technology to improve performance, reliability, and maintainability, as well as reduce life-cycle costs. The new system will interrogate and identify friendly or hostile aircraft and must be installed without having to modify the aircraft. Installation is scheduled to start in December 1999.

Korean AWACS Program. The Korean plan to acquire up to four 767 AWACS aircraft has been derailed by the Asian fiscal crisis impacting the Pacific Rim. The Northrop Grumman Multi-role Electronically Scanned Array (MESA) being developed for the Australian Wedgetail program is probably going to replace the costly AWACS aircraft in many airborne early warning (AEW) applications around the world. At a cost of US\$150 to US\$190 million per aircraft, four of the 373-based aircraft would cost less than half that of the new AWACS, based on the last Japan Air Self-Defense Force (JASDF) cost. Re-starting the 767 AWACS line could increase this difference significantly.

The new sensor features an active array mounted on top of the aircraft and includes a built-in IFF capability, eliminating the need for a separate system.

Funding

No recent funding has been identified.

Recent Contracts

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Telephonics	17.2	Dec 1996 – Contract from Boeing for updates to the APX-103(V).
Boeing Defense and Space Group	16.8	Aug 1997 – FVI to an FFP contract to provide for 18 improvement kits, 22 circuit card assemblies, upgrade of 32 receiver/transmitters, and five radar target data processors applicable to the IFF system in support of the E-3 AWACS aircraft. This effort also updates the IFF technical orders and manuals. Completed Dec 1999. (F19628-95-C-0241)
Boeing Defense and Space Group	7.7	Sep 1997 – FVI to an FFP contract to provide for seven improvement kits, eight circuit card assemblies, and the update of associated documentation, in support of the Block 20/25 IFF system on the E-3 AWACS. Supports FMS to the United Kingdom. (F19628-95-C-0241)
GEC-Marconi	48	Jan 1999 – Contract from Boeing to develop a new interrogator system for NATO's AWACS fleet. Installation start Dec 1999.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Mar	1974	First flight
Mar	1977	First production E-3 with APX-103(V) system delivered to USAF
	1981	Contractor changed from Cutler-Hammer's AIL Division to Eaton Corp AIL Division
Dec	1978	NATO approval for 18-aircraft buy
Jun	1983	Contract for five Saudi Arabia aircraft
	1985	NATO deliveries of AWACS completed
	1986	Delivery of Saudi AWACS commenced
Sep	1986	AWACS and Nimrod selected as finalists in UK competition to provide the RAF with an airborne early warning aircraft
Jan	1987	UK MoD awarded contract for six AWACS with an option for two more. Has exercised option for one additional AWACS
Feb	1987	France awarded contract for three AWACS, with an option for two more. Has exercised option for one additional AWACS
	1987	Saudi Arabia AWACS deliveries complete
	1991	Production completed for E-3 demand
Oct	1994	Contract for AWACS integration into two Boeing 767s for Japan Self-Defense Force, announcement of contract for two more
Sep	1997	South Korea pending purchase of four E-767 AWACS announced
	1998	First E-767 delivery to Japan
Jan	1998	Last E-767 aircraft delivered, sent for mission equipment installation

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Feb	1998	Production acceptance of aircraft 1 and 2
	1999	Last E-767 delivery to Japan
Jan	1999	Order to develop new NATO interrogator
Dec	1999	First new NATO interrogator to be installed

Worldwide Distribution

France. 4 E-3Es

Japan. 4 E-767s

NATO. 18 E-3As

Saudi Arabia. 5 E-3As, 8 KE-3As

United Kingdom. 7 E-3Es

United States. USAF: 34 E-3A/B/Cs

Forecast Rationale

The last E-3 Boeing 707 aircraft were delivered to France and the United Kingdom in 1991. Japan became the launch customer for a new Boeing AWACS design based on its 767-200ER twin-engine airframe. The Japan Air Self-Defense Force (JASDF) ordered four of these aircraft, all of which were delivered by 1999. The JASDF E-767s were delivered with essentially the same equipment as the E-3s, minus the Radar Systems Improvement Program and the Electronic Signals Monitoring upgrade.

The decision to use the 767-200ER airframe ensured further production of AWACS. Based on the proven abilities of E-3s in the Persian Gulf, interest in acquiring them increased, but affordability problems prevent many who want the airplane from ever acquiring it. The aircraft is affordable only for major nations, and release of the superstar technology continues to be tightly controlled.

Boeing Co has been cleared to brief Saudi Arabia and South Korea on the aircraft. The South Koreans requested price and availability information on up to four aircraft. Saudi Arabia is interested in four, considering

the proposed sale of four AWACS to the Saudis during the Gulf War that was never finalized. The South Korean acquisition is in the initial approval stages, but delivery will be delayed by a lack of cash due to the fiscal collapse of the nation in 1997. Turkey, Italy and Australia have also entered into discussions over possible sales. All of these countries face daunting affordability and requirements questions that must be addressed before an AWACS procurement can be considered.

Australia's Project Wedgetail will have a significant impact on this potential market. An active array radar mounted on top of a Boeing 737 airframe will create a smaller, less expensive, very capable airborne surveillance platform whose design is not dependent on technology perceived as decades old. It is going to be made available at half the cost of a 767-based AWACS. The MESA sensor will not require an IFF system. This is being built into the radar itself.

No further production of the APX-103(V) is expected except to support ongoing fleet support.

Ten-Year Outlook

No further production expected.

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