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APN-171(V) - Archived 3/97

Outlook

- In service; ongoing logistics support
- Production complete except for limited number of spares

10 Year Unit Production Forecast
1997 - 2006



Orientation

Description. Radar altimeter, terrain avoidance/following sensor.

Sponsor

US Air Force
AF Systems Command
Aeronautical Systems Center
ASC/PAM
Wright Patterson AFB, Ohio (OH) 45433-6503
USA
Tel: +1 513 255 3767

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

US Navy
Naval Air Systems Command
Washington, DC 20361-2140
USA
Tel: +1 703 692 3122
(NAVAIR HQ is in the process of moving to the Naval Air Warfare Center, Patuxant River, Maryland)

Contractors

Honeywell, Inc
Military Avionics Division
2600 Ridgeway Pkwy
Minneapolis, Minnesota (MN) 55413
USA
Tel: +1 612 951 1000

Status. In service, ongoing logistics support.

Total Produced. It is estimated that over 8,500 units have been produced.

Application. Altitude determination, low-altitude warning, rate-of-change indication. It has been installed on the following airframes: AC-130, AH-1, C-130, CH-3, CH-46, CH-53, E-2, EC-130, EH-1, HC-130, HH-1, HH-2, HH-3, HH-46, HH-53, LC-130, MC-130, OV-10, RH-53, RV-1, S-3, SH-2, SH-3, TH-1, UH-1, UH-3, UH-46, VH-3, Nimrod, Shackleton, Vulcan, as well as the Wessex 1 and 2.

Price Range. Approximately US\$7,000 each.

Technical Data

Dimensions	Metric	US
Length:	91 cm	35.9 in
Diameter:	20.3 cm	8 in
Weight:	27 kg	59.9 lb
Characteristics		
Frequency:	Upper J-band	
Peak power:	10 kW	
Terrain clearance:	61 to 304 m (adjustable) 200 to 1,000 ft (adjustable)	
Mode:	Monopulse	
MTBF:	1.2 hr	

Design Features. The APN-171(V) radar altimeter is an all-weather airborne low-level terrain tracking and altitude sensing radar that provides accurate and continuous indication of aircraft altitude. Altitude information is derived by utilizing a lock track loop, which allows tracking of terrain ahead of or adjacent to the aircraft. The system provides warning of rapid changes in absolute altitude.

The APN-171 uses a modular architecture, and a cylindrical configuration that allows installation within the platform or as an attached pod. Components include the TR-804 transceiver, RT-1345 height indicator and the AS-1358 antenna.

The radar altimeter uses solid-state circuitry and computation is accomplished in analog components. Height setting or terrain clearance is provided by the control of the antenna depression angle. An accuracy of three

percent with stepless resolution during pitch and roll and over heavy ice or snow is available. No CRT display is provided, but a simple cockpit-mounted indicator provides warning of terrain in the flight path or a "fly-up" demand signal.

Operational Characteristics. The APN-171(V) is designed to supply terrain avoidance/terrain following information for aircraft, helicopters, missiles or drones. With the APN-171(V), the pilot has the option of flying manually, relying on an autopilot or using an autopilot/manual override system.

Complete and continuous system checking is provided by sending an RF signal into the waveguide feed and then through the system. An automatic climb command is sent to the autopilot in case of failure during automatic flight. The APN-171(V) can also operate over water up to 50 feet deep.

Variants/Upgrades

The series has four variants:

The **APN-171(V)1** uses the RT-804/ID-1345, the AS-1358 antenna, and MT-4167 shock mount base, and provides coverage from 0 to 5,000 feet.

The **APN-171(V)3** uses the RT-806 (HG9010) transceiver and ID-1346 height indicator, and provides altitude coverage from 0 to 1,000 feet.

The **APN-171(V)4** uses the RT-804/ID-1345, along with the AS-1358 Antenna and MT-4167 shock mount base. It operates from 0 to 5,000 feet.

The **APN-171(V)5** uses the RT-1062/ID-1345, along with the AS-1358 Antenna and MT-4167 shock mount base. It operates from 0 to 5,000 feet.

Program Review

Background. Feasibility studies for the APN-171 began in 1958. Engineering design began in 1962 and production started in the early 1960s. In 1974, the Navy began the Aircraft Equipment Reliability and Maintainability Improvement program to improve the state of carrier aircraft readiness. This program involved ways to modify

a number of aircraft avionics systems, including the APN-171, to reduce the time necessary to repair a component and, more importantly, to increase the Mean Time Between Failure (MTBF) of the systems.

The APN-171 receiver/transmitter (RT) configuration experienced high failure rates that resulted in very high

maintenance requirements and an unsatisfactorily low mean flight hours between failures (MFHBF). Replacing the limited-life tube-style cavity oscillator in the receiver assembly and the existing transmitter module with solid-state components resulted in a significant increase in MFHBF from 51.2 hr to about 600 hr. The changes also reduced repair time.

Approximately 1,408 APN-171s were converted to the solid-state configuration. APN-171 production was terminated during the mid-1970s. The United States has replaced it in most newer aircraft.

Low Probability of Intercept Altimeter (LPIA). On November 5, 1993, the Naval Air Systems Command announced that it intended to procure the Engineering and Manufacturing Development (EMD) of a Low Probability of Intercept Altimeter (LPIA). The award would include options for initial production quantities. The F/A-18 would be the lead platform, but any Navy aircraft carrying an APN-171 or APN-194 was a potential platform. There could also be Air Force interest, with an option to modify the Navy systems to meet unique Air Force requirements. Modified non-developmental items

were desired, and a laboratory demonstration of existing altimeters would be required as part of the proposal evaluation.

On December 22, 1995, the Naval Air Systems Command published a notice of intent to develop a Low Probability of Intercept Altimeter Receiver Transmitter under Solicitation N00019-95-R-0029. NAVAIR proposed procuring the Engineering and Manufacturing Development (EMD) of a Low Probability of Intercept Altimeter Receiver Transmitter (LPIA RT) to replace the RT-1015 and RT-1015A, as well as RT-1042 and RT-1042/APN-194. The contract would contain the EMD effort of six to fifteen units and two production options of 25 to 200 units each.

In addition, the contract would provide for three optional EMD efforts for an LPIA Receiver/Transmitter of six units to replace the Navy's RT-829A/APN-171; the RT-1411D/APN-209 for the Army; and the RT-1438 & RT-1692/APN-232 used by the Air Force. This Request for Proposals followed a previous (July 19, 1991) Sources Sought Synopsis, a Draft RFP (N00019-92-R-0020), as well as a Request for Information dated June 9, 1995.

Funding

Funding is from O&M lines.

Recent Contracts

There are no recent, significant contract awards. A flow of parts requests continues.

Timetable

	1958	Feasibility studies began
	1962	Production engineering design began
	1974	Navy modification program began
	1982	Navy test of APN-171 with solid-state devices completed
	1983	Solid-state modifications to Navy APN-171s begun
	1988	Navy modification program completed
Dec	1995	LPI altimeter announcement

Worldwide Distribution

The majority of APN-171 applications were with the US Navy. The US Air Force, US Army, and a number of foreign countries use the APN-171 in limited applications on their aircraft. It is in scattered use around the world on older airframes purchased by allies.

United States Individual units are still operational in some older aircraft that have not been upgraded to newer equipment.

Forecast Rationale

The APN-171 is still used around the world. Production has been completed, but a market for spare parts and repairs will continue to support these systems. A totally new system is being installed on new airframes, and many

of the APN-171s aboard relatively new aircraft have been, or soon will be, replaced by Honeywell's APN-194 or similar radar altimeters with more advanced characteristics. This report will be discontinued next year.

Ten-Year Outlook

Production is complete except for a limited number of replacement or spare units.