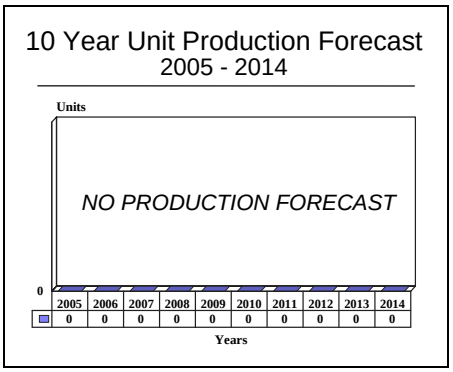
APN-209(V) - Archived 3/2006

Outlook

- Production for helicopters finished, follow-on production not likely
- Not suitable for next-generation stealth airframes
- RFI for LPI replacement published



Orientation

Description. Radar altimeter.

Sponsor

U.S. Army
Army Communications-Electronics Command (CECOM)
AMSEL-IO
Ft. Monmouth, New Jersey (NJ) 07703-5000
USA
Tel: +1 201 532 2534
Web site: http://www.monmouth.army.mil

Status. In service, ongoing logistics support.

Total Produced. An estimated 17,274 units had been produced.

Application. AH-1, UH-1, OH-58, and CH-47.

Price Range. Unit cost is approximately $32,000.

Price is based on an analysis of contracting data amd other available cost information, and a comparison with equivalent items. It represents the best-guess price of a typical system. Individual acquisitions may vary, depending on program factors.

Contractors

Honeywell Aerospace - Defense & Space Electronic Systems, http://content.honeywell.com/dses/, 2600 Ridgway Pkwy, Minneapolis, MN 55413 United States, Tel: 1 (612) 951-6779, Fax: 1 (612) 951-5110, Prime

Technical Data

	Metric	U.S.
Dimensions		
Weight	1.9 kg	4.2 lb
Volume	0.19 m³	0.68 ft³
Characteristics		
General	Accurate to zero altitude Immune to Doppler effect Variable configuration for installation flexibility Accurate over ice and snow All-weather operation	

Characteristics

Operational

Power requirements	28 VDC (25W), 5 V lighting
Pulse width	25 to 75 ns, low to high altitude
Operating frequency	4.3 GHz
Transmitted power	5 W peak at high altitude
PRF	18 kHz

Performance

Altitude range	0 to 1,500 ft
Accuracy	± (3 ft = 3% of range)
Track rate capability	± 1,000 ft
System sensitivity	-76 dBm
Search rate	6000 fps minimum
Environment	MIL-E-5400, Class 1A

Design Features. Radar altimeters are relatively simple systems that focus a radio frequency beam downward and use the returns to determine altitude above terrain. Such a sensor can be small and low-powered, and use a wide beam. This latter feature significantly simplifies antenna design.

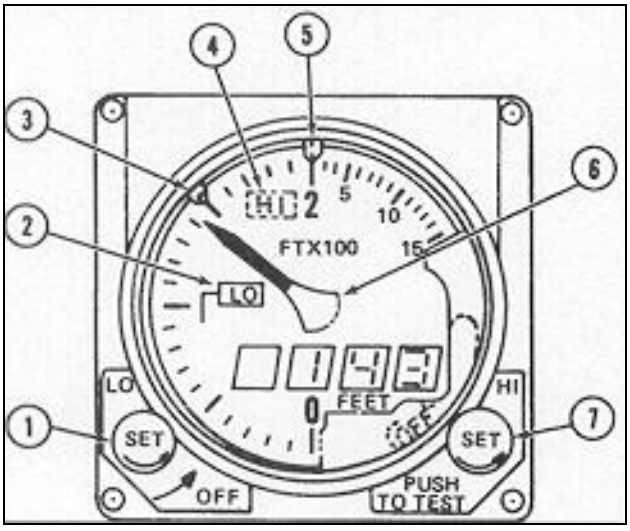
Radar altimeter designers selected the 4 to 8 GHz band because it was possible to use inexpensive transmitting components that are readily available on the market. Range, and therefore altitude, can be determined by pulse of swept FM techniques.

The APN-209(V) consists of the RT-1115(V) transceiver, ID-1917(V) indicator, and two AS-2924 flush-mounted antennas. It was designed to be compatible with night vision goggles, and produced in an integrated receiver/transmitter/indicator configuration or with the indicator separate.

Operational Characteristics. The APN-209(V) radar altimeter generates a cockpit readout of the aircraft's precise altitude above ground level (AGL), and provides various altitude alarms for the pilot. It offers both digital and analog readouts as well as high- and low-altitude set capability.

Variants/Upgrades

Upgrades through APN-209H have been identified. Most modifications were to meet specific airframe requirements or to enhance performance and reliability/maintainability.



APN-209(V) Display

Source: U.S. Army

1. LO SET control knob
2. LO level warning flag
3. LO limit index
4. HI level warning flag
5. HI limit index
6. Altitude pointer
7. HI SET control knob

Program Review

Background. Installation of the APN-209(V) began in FY77 for OH-58C helicopters. UH-1H installation began in FY78, followed by the AH-1 and CH-47 programs in FY79. The initial program involved 659 OH-58s, 230 UH-1Hs, 262 CH-47s, and 899 AH-1s. The estimated cost for this program, including installation, mod kits, and spares, was $16 million.

In early FY81, Honeywell received a contract for retrofitting 200 PRE-ECP/0100 receiver-transmitter assemblies into the APN-209(V). In March 1982, the company received a $3.3 million contract for 233 APN-209(V)s. During FY83, Honeywell received $8.4 million for a variety of component orders. These were probably for spares and repair work.

In December 1991, the Army initiated a market survey to locate additional sources for the RT-1115D (241 each) and RT-1411A (12 each). The contract would contain a 200 percent option. An award for 604 RT-1115D receiver-transmitters and 100 RT-1411A receiver-transmitters went to Honeywell in August 1993.

A December 2000 issue of *Commerce Business Daily* published a market survey to locate additional sources for manufacture of the RT-1115J and RT-1411B units.

An August 2002 Pre-solicitation Notice (USZA95-02-R-0039) announced a U.S. Special Operations Command, Technical Applications Contracting Office requirement to modify existing APN-209(V) Radar Altimeters (RADALT) via an Engineering Change Proposal (ECP) to provide a low probability of intercept and low probability of detection (LPI/LPD) capability, as well as altitude readout to a minimum of 8,000 feet. The U.S. government intended to award this effort sole source to Honeywell Inc, Sensor and Guidance Products.

The initial effort would modify five existing systems to provide an 8,000 ft (true), 10,000 ft (offset) digital output and significant reduction in fore/aft and left/right detectable signature. Following successful qualification and testing, the government may elect to upgrade the remaining aircraft to the modified configuration.

In an October 2004 *Federal Business Opportunities*, the Naval Air Systems Command Air Combat Electronics Program Office (PMA-209) announced plans for a market survey of industry information to aid in the upgrading/replacing of the radar altimeter for U.S. Navy aircraft using APN-209(V), APN-171(V), and APN-194(V) Altimeter Sets. This was a request for information (RFI) only, not a Request for Proposals (RFP) or an indication that the Navy will contract for these supplies. The RFI sought to ascertain information relative to current and/or future Radar Altimeter capabilities. The new radar altimeter would have to include Low Probability of Intercept/Low Probability of Exploitation operation, as well as highly accurate and reliable measurement of altitude over a variety of terrain and sea states at high bank angles, subsonic/supersonic speeds and all types of weather. It would have to be capable of supporting low-level, nap-of-the-earth flight, as well as flight to 40,000 feet.

The unit must also be able to operate in the presence of electromagnetic interference (EMI) and electronic countermeasures (EMC) where multiple aircraft are operating in close proximity. The altimeter receiver/transmitter should be form, fit and function interchangeable with the APN-194(V) RT-1015, RT-1015A, RT-1042 and RT-1042A; however, this should not be a deterrent to submission of information for systems that do not meet these criteria.

It must be capable of operating with existing height indicators, aircraft wiring, connectors, electrical connections and antennas. Outputs must include analog, digital and MIL-STD-1553, as well as unit BIT status for input to TCAS.

The information submitted on currently available systems must describe what integration may be anticipated for installation in Navy aircraft, along with impact descriptions of electrical, weight, space, power and environmental conditions (the Navy shipboard and aircraft flight environment including carrier launch and landing), and processing parameters of the platforms. Supportability must be described in sufficient detail, including maintenance concept, BIT, support equipment, supply and computer resources support, and training.

Respondents would have a notional delivery schedule for systems currently available and/or anticipated time frames for proposed systems, as well as information on availability of current components and obsolesence planning for updating those components.

Funding

Current funding is from O&M accounts.

Recent Contracts

No recent contracts over $5 million listed.

Timetable

Month	Year	Major Development
	FY74	First development contract
	FY76	Initial production award
	FY77	OH-58C installation initiated
	FY78	UH-1H installation initiated
	FY79	AH-1, CH-47 installation initiated
	FY84	Last major procurement contract
Dec	1995	Navy LPI radar altimeter solicitation notice published
	2001	Production continues
	2005	Current estimate of production end

Worldwide Distribution

Because of the popularity of the helicopters in which this altimeter is installed, the APN-209(V) is found in the inventory of just about every major market, including **Argentina**, **Australia**, **Canada**, **Greece**, **Iran**, **Italy**, **Korea**, **Morocco**, **Peru**, **Somalia**, **Spain**, **Taiwan**, **Thailand**, the **United Kingdom**, and **Venezuela**.

Forecast Rationale

Although the market for the APN-209(V) was very large, low probability of intercept (LPI) systems were developed for newer applications. Next-generation altitude sensors feature LPI and stealth design. The APN-209(V) cannot meet the requirements of the next generation, low-radar-cross-section airframes.

The limited market new production is ending. Replacement units, spare and repair parts, and line-replaceable units for the APN-209(V) will support ongoing use of installed equipment. The platforms equipped with this altimeter are used for air assault, front-line troop support, and transport. Limited production will continue to support current airframe production or retrofits, applications that would not benefit from adding an LPI sensor.

The APN-209(V) has not been considered for the newer airframes and future helicopters. These will use newer technology, with low probability of intercept systems preferred. The recently released RFI highlights the Navy's desire to replace this and similar systems with a Low-Probability-of-Intercept design.

Ten-Year Outlook

Production finished, except for ongoing logistics support.

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