

# ARCHIVED REPORT

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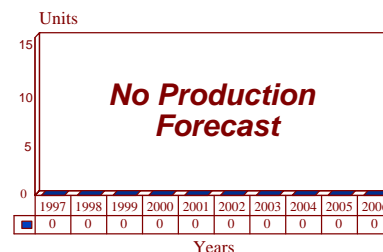
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## APQ-175(V) - Archived 11/98

### Outlook

- In production; ongoing logistics support
- Future challenged by APN-241 with wind shear capability, or whichever radar is selected as the C-130 replacement radar
- Some international users may find APQ-175(V)X attractive

10 Year Unit Production Forecast  
1997 - 2006



### Orientation

**Description.** Dual-frequency, multi-mode navigation and weather radar. The Adverse Weather Aerial Delivery System Radar.

#### Sponsor

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

#### Contractors

Electronics and Space Corp  
8100 W. Florissant Ave  
St Louis, Missouri (MO) 63136  
USA  
Tel: +1 314 553 4529  
Fax: +1 314 553 4555

**Status.** In production, ongoing logistics support.

**Total Produced.** An estimated 50 units were produced.

**Application.** C-130E Adverse Weather Aerial delivery System (AWADS) aircraft.

**Price Range.** Estimated unit cost is US\$3.6 million.

### Technical Data

#### Characteristics

Frequency:

Peak power:

PRF:

Pulse width:

Antenna:

Display:

Beamwidth (gnd map):

#### Metric

8 to 12 GHz (X-band)

27 to 40 GHz (Ka band)

90 kW

250, 420, and 925 pps

0.53 and 2.35  $\mu$ sec

Parabolic

■ 135° of aircraft heading

2.4° (azimuth)

#### US



Polarization:	Pencil & csc <sup>2</sup> shapes available	
Range resolution:	Linear	
CEP:	212.75 km	115 m
	35 m @ 9.25 km nm	115 ft @ 5 nm
	555 m @ 444 km	1,820 ft @ 240 nm
Range:		
Long-range gnd map	444 km	240 nm
Precision gnd map	55.5 km	30 nm
Weather detection	444 km	240 nm
Beacon	444 km	240 nm
Beacon/precision ground map overlay	55.5 km	30 nm
LRUs:	Six	
MTBF:	160 hr	
Modes:		
<u>APQ-175(V)</u>	Weather detection/avoidance	
	Long-range ground map (X-band)	
	Short-range precision ground map (Ka-band)	
	Beacon interrogation/reception	
	Display/control of station keeping data	

APQ-175(V)X

Ground mapping (GMAP) for navigation and INS updates  
 Weather (WX) penetration/avoidance  
 Beacon (BCN) interrogation/location for air refueling and  
 certain air-to-ground operations

**Design Features.** The APQ-175 is a dual-frequency radar especially designed to upgrade US Air Force C-130s used for Adverse Weather Aerial Delivery System (AWADS) operations. It replaced the APQ-122(V) on select C-130E aircraft. The radar provides the pilot with the necessary information to air-drop and land personnel and equipment in landing zones during adverse weather conditions.

The original design of the system called for the APQ-175 to be dual-frequency. Long-range (8 to 12 GHz) and short-range (27 to 40 GHz) precision ground mapping modes are available. For users who do not need the short-band capability, a single-frequency variant (8 to 12 GHz) was made available.

**Operational Characteristics.** The APQ-175 provides information which updates the Inertial Navigation

System by using fixes on known geographical points. This increases the ability of the pilot to locate drop/landing zones independently based on onboard information. Low-level air-drop accuracy can be planned to be within 75 meters of a targeted spot using this system.

The weather mode can map out to a range of 240 nm. The system can identify rainfall rates to help determine the optimum point for storm penetration and weather information is presented on a high-resolution, color display. A high-resolution monochrome display presents ground map information to the navigator.

The radar interrogates and processes replies from the PPN-19, SST-181, APB-69, and APX-105 beacon systems. It also works with the APN-169C station-keeping system and the Self-Contained Navigation System (SCNS).

## Variants/Upgrades

**APQ-175(V)X.** This is a single-frequency system. It has all of the operational capabilities of the original system except for the Precision Ground Mapping mode.

## Program Review

**Background.** Texas Instruments developed the original APQ-122 radar for the Lockheed C-130E as part of the USAF Adverse Weather Aerial Delivery System (AWADS) program. Used for navigational purposes, AWADS allows a plane to fly a specific route to a drop zone for aerial resupply of ground units in adverse weather conditions. The original systems entered production in the early 1960s.

On December 5, 1986, the US Air Force issued an RFP for replacement of the APQ-122(V)1 radar onboard C-130E AWADS aircraft. Texas Instruments and

Emerson Electric competed for the contract. In late 1987, the Air Force awarded Emerson Electric (now Electronics and Space Corp) a contract to replace the APQ-122(V)1 radars onboard 50 C-130E aircraft. The replacement radar was nomenclatured the APQ-175. Installations began in FY92 and were finished in 1994.

In January 1997, the Air Mobility Command released a draft Performance Specification for a replacement for the APN-59 radars on C-130 aircraft. Included in this specification was the requirement to support AWADS operations.

## Funding

Funding is from platform lines.

## Recent Contracts

No recent DoD contracts over US\$5 million recorded.

## Timetable

Aug	1987	Initial multi-year contract award
	1991	Flight testing began
	1994	Final deliveries

## Worldwide Distribution

This is a **US** only program at this time.

## Forecast Rationale

The Adverse Weather Aerial Delivery System is an important conventional combat asset, and this operational capability will become increasingly important in the future. The change in the international threat climate from superpower confrontation to contingency operations increases the need for such equipment. The C-130 will continue to be a tactical workhorse, with delivery of troops and supplies/equipment an increasingly important role.

Special Operations is becoming an increasingly valuable part of military planning, and the ability to accurately pinpoint equipment and personnel delivery areas is crucial. So is the ability to drop humanitarian supplies, as was done in Bosnia. Air Force Special Operations aircraft are flying an extraordinarily heavy

OPTEMPO, and have been involved in almost every recent military operation, combat and non-combat.

The new radar was developed to get the drop aircraft exactly to the desired location, even in poor weather, limited visibility, and at night. Such pinpoint accuracy will be the mark of future combat operations.

There could have been a more significant future for the radar until the APN-241 broke into the market. That radar adds an all-important wind shear detection capability, making it more versatile. Tests have shown the new radar to be better able to pinpoint drop points with its sophisticated mapping capability than originally expected. It has been selected for all new-build C-130H and C-130J aircraft. The C-130 Multi-Mode Color

Radar must have an AWADS capability and will probably eliminate any chance of future APQ-175 procurement. It could become a replacement for select fielded systems because it will have the latest in weather, wind shear, and precise navigation technology.

The APQ-175 has been retrofitted into the AWADS fleet. As more C-130s have their avionics systems upgraded, these newer radars will be more appropriate and their capabilities better utilized. The less-accurate APQ-175(V)X was designed as a lower cost alternative

to the full-up system. This was an obvious attempt to move the radar into the international market. Since over 2,000 C-130s are in use around the world, there are potential customers who could find such a system attractive if it were affordable. There will, however, be some limits placed on who will be licensed for export.

The APN-241, or an export variant, may become a more attractive sensor as the added features attract attention and potential customers become familiar with its capabilities.

## Ten-Year Outlook

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No further production expected.

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