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SPN-43(V) - Archived 2/97

Orientation

Description. Naval ship Air Traffic Control 2D aircraft marshalling radar.

Sponsor

US Navy

Naval Air Systems Command
Washington, DC

Contractors

ITT Corp

ITT Gilfillan

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Status. In service, in production, ongoing logistics support.

Total Produced. An estimated 29 systems have been produced.

Application. Aircraft carriers and select amphibious assault ships.

Price Range. Estimated cost is approximately US\$4.0 million per system.

Technical Data

Dimensions	Metric	US
Antenna:		
Size	305 x 381 cm	120 x 150 inches
Weight	1,543 kg	3,400 pounds
Characteristics		
Range:	50 nm (maximum) 300 yd (minimum)	
Coverage:	360° Up to 30,000 ft at the radar horizon	
Frequency:	3.5 to 3.7 GHz	
Power:	850 KW peak	
Pulse Width:	0.6 or 0.25 usec	
PRF:	1125 pps	
Beam:	1.5° by 45°	
Scan rate:	15 rpm	
Polarization:	Horizontal	
Antenna tilt:	2.5° to 6.0°	

Design Features. The SPN-43(V) is the Carrier Marshalling or Air Traffic Control medium-range radar system used as the primary sensor for Shipboard Air Traffic Control (SATC). The SPN-43(V) is currently

installed as standard equipment onboard most US Navy aircraft carriers and LHD amphibious assault ships.

The pulse radar is equipped with an identification friend or foe system and interfaces with the precision carrier

approach (PCA) radar for landing operations. It is mounted on a gyro-stabilized platform which keeps the radar level and aligned with the horizon. This compensates for ship pitch and roll.

Operational Characteristics. The SPN-43(V) serves the same role as an airport surveillance radar at land

installations. Controllers in the carrier's radar operations center provide traffic control, separation, and sequencing for aircraft returning to the ship for recovery. Once aligned with the carrier's flight deck, the pilot can complete the approach using visual techniques or the Automatic Carrier Landing System (ACLS), which uses the SPN-42 radar (soon to be replaced by the SPN-46).

Variants/Upgrades

The original SPN-43 has been modified several times, and all CV/CVN-class ships are equipped with an improved SPN-43B radar. This included upgrading then-existing radars with solid-state field changes. These changes improved the reliability of the radar sets and enhanced fleet operational safety.

The SPN-43C upgrade replaces all below-decks electronics in existing A and B variants with dual-channel equipment, and includes solid-state transmitter and receiver modifications to enhance performance and increase availability. It provides improved tracking during landing operations, and enhanced detection range.

Program Review

Background. In September 1984, the Navy ordered 12 SPN-43B radar sets, plus an additional 19 conversion modification kits. Further procurement included 28 SPN-43(V) solid-state radar field changes and nine moving target detection receiver modifications to improve the reliability and safety of operational SPN-43As.

The most recent SPN-43(V) activity centered on providing a dual-channel capability which replaces all below-decks equipment for the SPN-43A and SPN-43B, along with further solid-state transmitter and receiver modifications. This upgrade program was scheduled to be completed in 1994; no information has been published to indicate that this did not occur.

Funding

All funding is from Shipbuilding, Overhaul, and Operations & Maintenance accounts.

Analysis. The Navy continues to develop the concept of a passive aircraft landing system that would not necessitate turning on the SATC radar with its distinctive, decidedly non-stealth signature. Rapidly maturing GPS technology which is being developed, evaluated and incorporated in the commercial aviation sector will almost certainly form the core of the next-generation carrier ATC landing aid marshalling system. The final configuration may well be a dissimilar redundant, multi-sensor approach which may combine additional sensors, such as passive IR sensors and a laser range finder to address the issue of the availability the GPS in a hostile electronic counter-measures environment.

A development program leading to a turn-of-the-century production decision is planned. Few details have been released. A system of this type makes tactical sense, however, because of the vulnerability of carriers in modern sea warfare.

Other air traffic control development efforts concentrate on replacement equipment for the approach/landing equipment on aircraft carriers and amphibious ships. This is being funded under Program Element 0604504N, Project W0993, Carrier Air Control. The marshalling radar is not included in these efforts.

Recent Contracts

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

Timetable

1967	SPN-43 began development
1975	First system operational
1981	SPN-43B (circular polarization and receiver improvements) appeared
1982	SPN-43SS (solid-state modernization kit) appeared
1991	Scheduled beginning of deliveries of dual-channel kits
1994	Scheduled completion of deliveries of dual-channel kits
FY94	Began investigating GPS shipboard data link/landing system

Worldwide Distribution

This is a US only program.

Forecast Rationale

Production of the SPN-43(V) is essentially complete. Most required systems have been built, and some removed from retired ships are being rehabilitated for future use. The last two Nimitz-class carriers are under construction

and the fourth of six Wasp-class LHDs has been christened. It is unlikely that requirements for the SPN-43(V) beyond those currently established will come to pass.

Ten-Year Outlook

No further production expected.