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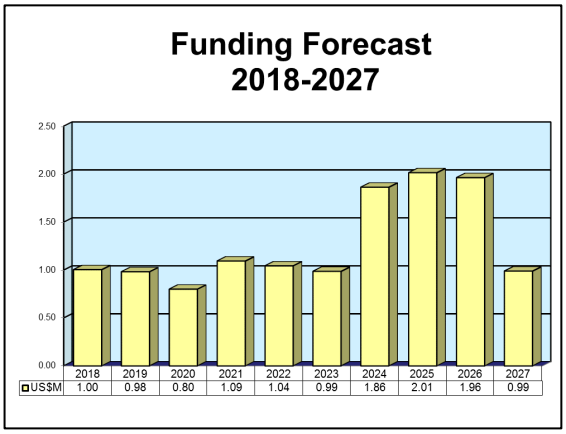
SPS-67(V)

Outlook

- SPS-67 production has ceased
- A small amount of funding will sustain the SPS-67s still carried on board the U.S. Navy fleet
- Funding will be awarded to a variety of contractors



Orientation

Description. The SPS-67 is a 2-D surface search and navigation radar.

Sponsor
U.S. Navy
Naval Sea Systems Command (NAVSEA)
1333 Isaac Hull Ave SE
Washington Navy Yard, DC 20376
USA
Tel: + 1 (202) 781-0000
Website: http://www.navsea.navy.mil

Status. In service and production; ongoing support.

Application. The SPS-67(V) has been installed on coastal patrol craft, frigates, destroyers, amphibious ships, and aircraft carriers in Australia, Germany, Norway, Spain, and the United States.

Price Range. In a fact file retrieved in February 2014, the U.S. Navy shows the unit cost of the SPS-67 to be $3.16 million. More recent contracts gave the SPS-67 a price varying from $2.75 million to $3.4 million, depending on the number procured and other factors.

Contractors

Prime

Leonardo DRS	http://www.leonardodrs.com, 2345 Crystal Dr, Ste 1000, Arlington, VA 22202 United States, Tel: + 1 (703) 416-8000, Email: info@drs.com, Prime

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

SPS-67(V)

Technical Data

	Metric	U.S.
Characteristics		
Frequency	5.4 to 5.8 GHz	
PRF	750, 1,200, 2,400 Hz	
Peak power	280 kW	
Pulse width	0.1, 0.25, 1.0 µsec	
Azimuth beamwidth	1.5°	
Elevation beamwidth	SPS-67(V)1: 12°	
	SPS-67(V)2/3: 31°	
Scan rate	15 or 30 rpm	
Scan period	SPS-67(V)1: 4 sec	
	SPS-67(V)2/3: 2/4 sec	
Minimum range	(short pulse width)	
	69 m	75 yd
Instrumented range	103 km	56 nm
Track initiation -(V)3	Automatic	
Track file size -(V)3	128 (expandable)	
Coherent Receive Auto Clutter Lock DMTI	>24 dB improvement factor	
MTBF	>600 hr	
MTTR	<0.5 hr	
Units	Transmitter/receiver	
	Video processor	
	Radar set control	
	Antenna controller	
	Antenna safety switch	
Track data provided to	Surface gunfire system	
IFF	Integrated	

Design Features. The SPS-67(V) solid-state, 2-D radar replaced the three-decades-old SPS-10(V) surface search radar. The SPS-10(V) antenna was originally retained on some ships, and all below-deck equipment was replaced by new hardware featuring standard electronic modules in place of vacuum tubes. The SEM technology significantly improved reliability and lowered life-cycle costs.

The radar includes an automated built-in test equipment system, and incorporates 92 percent SEM and 8 percent non-SEM technology. The system uses a proven coaxial magnetron transmitter that was developed for the SPS-55(V).

An add-on unit is available to provide the Digital Moving Target Indicator (DMTI) with a digital video clutter suppressor, an automatic target detector, and a digital noise suppression system. This facilitates the integration of the SPS-67(V) into the SYS-1(V) Integrated Automatic Detection and Tracking System (IADTS), which automatically correlates information from several radars to present a single tactical track to operators. The performance of the SPS-67(V) is enhanced by the addition of a very narrow pulse mode (0.1 µs) for improved navigation and better resolution of small targets at short ranges.

An upgrade program developed a new antenna system, the OE-374/SPS-67(V) Antenna Group. The honeycomb-laminate composite antenna was combined with an AS-4305/U identification friend or foe antenna to provide both primary radar and IFF capability in a lighter, more rugged unit for the DDG-51. This upgrade of the SPS-67(V)3 Antenna Group configuration led to Field Change 3 (FC-3) for installation aboard DDG-51 AEGIS destroyers. The FC-3 configuration consists of a modified C-band antenna, the AS-3828; a pedestal assembly, the AB-1337A; and a lightweight, high-performance AS-4305/U antenna assembly that supports SLQ-20(V) operation. The new OE-374A/SPS-67(V) Antenna Group meets the U.S. Navy's stringent requirements for shipboard systems, and provides improved target recognition, the desired system weight, and monopulse and interrogation sidelobe suppression capabilities. It is also compatible with SPS-48(V) and SPS-49(V) radar upgrades.

Featuring honeycomb-laminate construction for light weight and mechanical integrity, and a density of less than 10 pounds per cubic foot, the AS-4305/U antenna was subjected to the MIL-STD-901 Navy hammer shock test (100 *g*'s net).

Operational Characteristics. The SPS-67(V), the Navy's primary non-weapons control surveillance radar, was designed for enhanced surveillance and navigation performance in both clutter and clear conditions. Performance is especially effective against sea and weather clutter. A gunfire control capability was added for the DDG-51. Track firing information is provided to the surface gun system via the AEGIS command and decision system.

The short-pulse-width mode is especially suited for detecting buoys and small craft during harbor navigation. This mode improves the surveillance and detection of low-flying and surface targets.

Long- and medium-pulse (1 µs and 0.25 µs) modes are available for use in open sea for the detection of long- and medium-range targets. An interference suppressor and digital video clutter suppressor are used to improve performance.

A U.S. Navy Sailor examines an SPS-67 radar readout screen.

Source: U.S. Navy

Variants/Upgrades

SPS-67(V)1. The basic radar.

SPS-67(V)2. This variant replaced the SPS-10(V) antenna with a nuclear-survivable linear array. Bearing accuracy and performance in extreme roll and pitch conditions were improved. Scan rate can be 15 or 30 rpm, and an integrated IFF antenna was added. Elevation coverage is increased.

SPS-67(V)3. This model added the DMTI, track-while-scan, and automatic target detection for surface targets. It has improved command/weapons interfaces. The (V)3 variant was developed to support the naval gunfire support mission capability of the DDG-51 destroyer class. The system is able to integrate its data into the SYS-1(V) IADTS and has a 2/4-second data rate.

SPS-67(V)

SPS-67(V)5. This upgraded version features better frequency stability, signal processing, and tracking, including increased track capacity and clutter-suppression Doppler processing. It is also able to provide gun weapon system target designation via the AEGIS command and decision interface.

Program Review

In FY77, Norden Systems (now Northrop Grumman) was awarded a contract to produce two engineering development models of the SPS-XX, now designated the SPS-67(V). The first production contract was awarded in 1982. During FY82, development of the SPS-67(V) automation module to link the radar to the SYS-1(V) IADTS continued. This module takes the outputs from several radars and combines them into a single display.

First Units Delivered

During FY83, the first of an initial 22 units was delivered to the Ingalls Shipyard in Mississippi. Australia ordered three SPS-67(V) radars for installation aboard its three U.S.-built, modified DDGs (HMAS *Perth*, *Hobart*, and *Brisbane*). During FY84, full-scale development of an anti-ship missile defense capability for the SPS-67(V) was initiated.

DRS Chosen to Produce SPS-67s

In 1997, DRS Technologies was awarded a contract to provide SPS-67(V)3 radar systems (minus the OE-374/SPS-67(V) Antenna Group), engineering support, and associated installation kits for DDG-51 class AEGIS ships.

In 1998, Norway selected the SPS-67(V) radar for its three Nordkapp class offshore patrol vessels. The contract was valued at $4.1 million.

Deliveries of SPS-67(V)3 Begin

In February 2000, DRS Technologies announced that it had delivered the first SPS-67(V)3 for installation on the DDG-83, the USS *Howard*. The company also announced the receipt of a $1.9 million contract to produce additional SPS-67(V)3 systems. This award resulted from a contract option that fell under the 1997 contract, having a total value of approximately $14.2 million. DRS has produced more than 20 systems for several U.S. Navy ships and the Spanish Navy's F-100 class frigates.

Backfit Kits and Maintenance Work

In April 2005, the U.S. Navy began upgrading its SPS-67(V)3 to the SPS-67(V)5 standard. Under the plan, the Navy purchased backfit kits from DRS Technologies to upgrade the in-service radars. The kits increased system reliability and improved capabilities, utilizing established commercial off-the-shelf (COTS) technology. A contract was awarded in April 2005 for 17 backfit kits, and a second contract was awarded in April 2006 for an additional 11 kits.

In 2007, a number of SPS-67-related Federal Business Opportunities were posted. One called for 44 wave-guide filters, and others called for the maintenance, repair, rebuilding, and refurbishment of SPS-67s and related equipment. These requirements were eventually contracted and completed.

Testing the SPS-67 Wave Guides

The U.S. Navy reported in October 2008 that the USS *Carl Vinson* (CVN-70) crew was conducting its first wave-guide tests in more than three years as the ship prepared to enter the final phases of its Refueling Complex Overhaul (RCOH) at Northrop Grumman Shipbuilding. The SPS-43 and SPS-67 wave guides, last operational in early 2005, allow the safe, mission-essential transmission of radio frequency (RF) signals throughout the ship. The RCOH is an extensive refresh that all Nimitz class aircraft carriers go through near the midpoint of their 50-year life-cycle.

The Navy reports that radar equipment transmits RF signals that, without wave guides, could potentially be harmful to the crew. The Nimitz class aircraft carrier utilizes RF signals for numerous radar functions on board, including air search, fire control, navigation, and communications, as well as for air traffic control applications at sea.

New Hope for Arleigh Burke and the SPS-67

The SPS-67(V)5-equipped U.S. Navy DDG-51 Arleigh Burke destroyer has a new lease on life. The Navy originally planned to cease DDG-51 production in favor of building the new DDG-1000 Zumwalt class warship. However, the Navy sharply downscaled the DDG-1000 program in 2008 and has capped the class at three vessels.

The U.S. Navy's FY12 budget documentation included funding for four SPS-67 radars to support new DDG-51 vessels. *Defense Daily* reported in January 2012 that the Navy was seeking congressional approval for a multiyear contract to begin construction of Arleigh Burke class (DDG-51) Flight IIA destroyers during the next five fiscal years. According to the Naval Sea Systems Command's manager for the

restart program, the multiyear deal would run from FY13-FY17.

The DDG-113 is the first ship of this group; the DDG-121 would be the last ship of this restarted batch. Delivery of the first destroyer was scheduled for 2016.

In September 2011, Huntington Ingalls Industries was awarded a $698 million contract for DDG-114 construction. At the same time, the Navy awarded Bath Iron Works, a General Dynamics company, a $680 million contract for DDG-115 construction. BIW was also awarded an option for the DDG-116.

In February 2012, Lockheed Martin was awarded a $148.5 million contract for production and integration of the AEGIS Weapon System in support of the DDG-116.

Funding

U.S. FUNDING

	PRIOR QTY	PRIOR AMT	FY17 QTY	FY17 AMT	FY18 QTY	FY18 AMT	FY19 QTY	FY19 AMT
Procurement (U.S. Navy)								
LI# 2980 – Items less than $5 million								
DC019 – Radar Restoration SPS-67 Antenna	5	4.181	0	0.000	0	0.000	0	0.000
DC021 – SPS-67(V)5 MRP	-	2.922	0	0.000	0	0.000	0	0.000

	FY20 QTY	FY20 AMT	FY21 QTY	FY21 AMT	FY22 QTY	FY22 AMT	FY23 QTY	FY23 AMT
LI# 2980 – Items less than $5 million								
DC019 – Radar Restoration SPS-67 Antenna	0	0.000	0	0.000	0	0.000	0	0.000
DC021 – SPS-67(V)5 MRP	0	0.000	0	0.000	0	0.000	0	0.000

All $ are in millions.

Source: U.S. Department of the Navy, FY17 Budget Estimates, Other Procurement, Navy, BA2, February 2016

Contracts/Orders & Options

Contractor	Award ($ millions)	Date/Description
DRS	5.2	Apr 2004 – Contract for SPS-67(V)3 radars for DDG-51 AEGIS class combatants. Includes developing SPS-67(V)5 configuration for DDG-103.
DRS	9.9	Jan 2005 – Repair parts for, alterations of, and field changes to the SPS-67(V). (N00024-05-G-4300)
DRS	9.2	Apr 2005 – Not-to-exceed firm-fixed-price (FFP) modification to a previously awarded contract for 17 (V)5 backfit kits for the SPS-67(V) radar. Work was completed in Dec 2008. (N00024-03-C-4003)
DRS	6.5	Apr 2006 – Fixed-price modification under previously awarded contract (N00024-03-C-4003) to exercise an option for production of 11 SPS-67(V)5 backfit kits. Work was completed in Jun 2008.
DRS	10.2	Sep 2008 – Cost-plus-fixed-fee (CPFF), indefinite delivery/indefinite quantity (IDIQ) contract for engineering and technical services associated with the SPS-67(V) program, including program management, system engineering, technical analysis, and logistics support. The services improved radar performance, mitigated obsolescence issues, and provided configuration management and logistics support. The contract was expected to be completed in Sep 2013.

SPS-67(V)

Contractor	Award ($ millions)	Date/Description
DRS Technologies	0.6	Jun 2011 – Contract for commercial repair, modification, and servicing as appropriate for SPS-67 radar. (N00104-07-G-A303)
Vantage Associates	0.5	Jul 2011 – Contract for manufacture of SPS-67(V)3 radomes. (N00164-11-C-GR18)
EDO Corporation	2.4	Jun 2012 – IDIQ contract for the casting, machining, stacking, and wrapping of an unknown number of sets of up to 64 antenna horns for the SPS-67(V)3 radar. (N00164-13-D-GR26)
EDO Corporation	3.3	Sep 2012 – Modification to existing IDIQ contract for the casting, machining, stacking, and wrapping of up to 64 antenna horns for the SPS-67(V)3 radar. Increases total award to $3.3 million, the maximum. Contract is to be completed in FY18. (N00164-13-D-GR26)
DRS C3 and Aviation	8.2	Oct 2012 – FFP contract for SPS-67(V)5 below-deck radar sets and an installation checkout kit for the DDG-114, DDG-115, and DDG-116. Work was expected to be completed by Nov 2014. (N00164-13-C-GR02)

Timetable

Month	Year	Major Development
	FY77	Norden receives an award to produce two SPS-XX engineering models
May	1981	Norden awarded a production contract from U.S. Navy
	1983	First production systems delivered
	FY84	Start of development of an anti-ship missile defense capability for the SPS-67
	1984	Sea trials of first production SPS-67 installed aboard the battleship *Iowa*
Late	1988	100th SPS-67(V) delivered
	1991	First production deliveries of SPS-67(V)3 upgrade kits
Feb	1996	USCG award to develop new search radar, the SPS-73(V)
Dec	1996	LPD-17 contract awarded; SPS-67(V) to be installed on all ships
Feb	1997	Procurement of OE-374/SPS-67 Antenna Group Field Change kit announced
Feb	2000	Delivery of first SPS-67(V)3 by DRS
	2008	Completion of upgrade of SPS-67(V)3 to SPS-67(V)5 standard
	2014	U.S. Navy cancels the SPS-67 Maritime Radar Processor upgrade procurement due to performance shortfalls
	2027	Funding support continues

Worldwide Distribution/Inventories

The following ship classes are known to carry the SPS-67(V):

Australia. Perth class DDGs

Germany. Lutjens class Type 103B destroyers

Norway. Nordkapp class offshore patrol vessels and Fridtjof Nansen class (F85) frigates

Spain. F-100 class frigates

United States. The SPS-67 is installed on U.S. Navy AEGIS destroyers, carriers, and amphibious ships. In addition, the following classes and individual ships are known to have been retrofitted or are eligible for retrofitting with the SPS-67:

Aircraft carriers:	CVN-68 Nimitz class, CVN-65 Enterprise class, CV-63 Kitty Hawk class, CV-59 *Forrestal*, BB-61 *Iowa*
Cruisers:	CG-36 California class
Destroyers:	DDG-51 Arleigh Burke class through Flight IIA; Flight III will use the SPQ-9B
Amphibious assault ships:	LHD-1 Wasp class, LHA-1 Tarawa class
Combat support ships:	AOE-6 Supply class
Amphibious transport docks:	LPD-4 Austin class, LPD-1 Raleigh class
Landing ships:	LSD-41 *Whidbey Island*, LSD-36 Anchorage class

Forecast Rationale

Over a 30-plus-year history, the SPS-67 navigation and short-range surface surveillance radar has been associated with production of ships operated by NATO members and by countries closely aligned with NATO. The SPS-67 has been utilized most prevalently on the U.S. naval fleet, where it is fitted to ships ranging in size from aircraft carriers to landing ships. However, over the past decade, the number of classes that continue to operate the SPS-67 has dwindled.

The only ship still in production that specified the SPS-67 is the U.S. Navy's DDG-51 Arleigh Burke class, but even this ship switched to the SPS-73 years ago.

The SPS-67 continues to receive a small amount of funding that sustains the radar's operability on the ships still carrying it.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR O&M FUNDING(in millions US$)

Designation or Program	High Confidence				Good Confidence			Speculative			
	Thru 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total
MFR Varies												
SPS-67 <> United States <> Navy												
	6.62	1.00	.98	.80	1.09	1.04	.99	1.86	2.01	1.96	.99	12.74
Total	6.62	1.00	.98	.80	1.09	1.04	.99	1.86	2.01	1.96	.99	12.74