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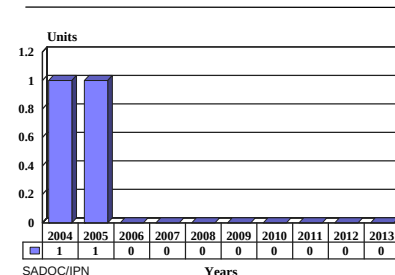
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SADOC/IPN - Archived 11/2005

Outlook

- Forecast International projects the Italian Navy to procure 2 SADOC-2 Command and Control Systems over the next two years
- Forecast International will analyze and report developments concerning the AMS SADOC/IPN family of products as they are made public

10 Year Unit Production Forecast
2004 - 2013



Orientation

Description. SADOC (Systema Dirizione della Operazione di Combattimento) is a sea-based command and control system produced by AMS. IPN is the export version of SADOC. SADOC/IPN systems have been installed on aircraft carriers, patrol craft, and warships.

Sponsor

AMS

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Web site: <http://www.amsjv.com>

Status. In service.

Total Produced. A total of 85 SADOC/IPN systems of assorted types were produced through 2003.

Application. Command and control.

Price Range. Unit costs of the SADOC system vary from US\$2 million for Mini-SADOC to US\$10 million for SADOC-3.

Contractors

Alenia Marconi Systems (AMS), <http://www.amsjv.com>, Eastwood House, Glebe Rd, Chelmsford, Essex, CM1 1QW United Kingdom, Tel: + 44 1245 703588, Prime Defunct

Technical Data

Design Features. SADOC/IPN is a modular federated command system developed for a wide variety of sea-based platforms. It uses a 10 Mbit/sec databus.

There are two types of multifunction consoles: a single operator vertical console with a 16-inch CRT (designated SVC-16) and a three-operator horizontal

console with a 22-inch CRT (designated MHC-22). Each console contains its own imbedded minicomputer. Earlier systems have an NDC-160/E 16-bit system, and later variants use a Mara-286 computer built around an Intel 80286 processor and programmed in Ada. The CDG-3032 central system computer is duplicated.

The SVC-16 terminal has a keyboard and rollerball and can be used as an independent radar repeater. It is also used by AMS as a workstation in its range of civilian air traffic control equipment. The MHC-22 has three flat screens and three keyboards with rollerballs.

The main features of the SADOC/IPN systems are:

- Multifunctional display consoles (MFCs) based on VME architecture and belonging to the Modular Architecture for Graphics and Imaging Console System (MAGICS)
- A powerful computer complex based on VME architecture and using commercial boards
- A high-performance data transfer system based on a standard open architecture

- Very high configurability (from both the HW and SW points of view) in order to conform to the operational requirements of the customer
- Easy upgrade potential due to the extensive use of COTS hardware (VME standard) and software components
- High percentage of hardware commonality with AESN-produced weapon control systems

Operational Characteristics. SADOC-2 systems supplied to export customers have one MHC-22 workstation and four SVC-16s. Systems installed on Italian Navy Lupo and Maestrale frigates have an extra SVC-16. A three-console version was developed for Minerva class corvettes.

Variants/Upgrades

SADOC-1. This was the original naval command system developed by AMS for the Italian Navy. SADOC-1 uses a single centralized computer and effectively runs U.S. Naval Tactical Data System (NTDS) software on Italian-designed hardware.

SADOC-2. Version 2 of the original SADOC system.

SADOC-2+. Large-ship derivative of SADOC-2 originally designed for the aircraft carrier *Giuseppe Garibaldi*. SADOC-2+ has two MHC-22 workstations and nine SVC-16s. It supports Link 1, Link 11, Link 14, and Link 16.

SADOC-3. Fully distributed development of the SADOC-2+ system originally developed for the NATO

Frigate NFR-90 and subsequently specified for the Italian air defense frigates planned for the mid-1990s.

Mini-SADOC. Version of the SADOC system downsized for smaller craft.

IPN-10. Export designation for SADOC-1.

IPN-20. Export designation for SADOC-2.

IPN-S. Newest export version of SADOC.

Vympel. Indian designation sometimes associated with the SADOC and Mini-SADOC systems deployed on ships of the Indian Navy. However, Vympel is also known to be the name of a Russian naval radar (Bass Tilt) built under license in India by Bharat Electronics.

Program Review

Background. SADOC is the acronym for Systema Dirizione della Operazione di Combattimento. The SADOC-1 derivative of SADOC replaced the U.S.-made CP-642 computers and SYA-4 displays with Italian-built hardware (CP-7010 computers and SVC-16 displays).

In the early 1970s, an export derivative of SADOC-1, designated IPN-10, was introduced. The IPN-10 was designed to equip the Lupo class frigates offered on the export market at the time. A downsized version of IPN-10 was also developed. Under the designation Mini-SADOC, this derivative was adopted by the Italian Navy for use on Minerva class corvettes.

The SADOC-2 system was developed for the Italian Navy's next-generation Maestrale class frigates. It entered Italian Navy service in 1982 and was retrofitted to Audace guided missile destroyers during their major refits in the mid-1980s.

A further, enlarged derivative of the SADOC system was designed for the aircraft carrier RIM *Giuseppe Garibaldi*. Designated SADOC-2+, this system used the same technology as SADOC-2, but had a larger number of workstations.

As part of the NATO Frigate program undertaken during the late 1980s, AMS developed a fully distributed command system based on SADOC-2. Designated SADOC-3, this system eliminated the two central computers in favor of greatly enhanced computing power at the individual workstations. This change effectively turned SADOC into a fully distributed system. Following the cancellation of the NATO Frigate, the Italian Navy continued developing SADOC-3 for use in next-generation air defense ships. The export version of SADOC-3 is designated IPNS.

In April 2002, the Royal Malaysian Navy awarded AMS a contract to upgrade the command and control

systems (IPN-10) on board the Laksamana class corvettes. Under the contract, AMS manufactured two IPN-S command and control systems. The contract is part of the Royal Malaysian Navy program to upgrade its Laksamana class corvettes.

Recent Developments. In April 2004, the 10th Division of the Italian Naval Armament Headquarters ordered two SADOC-2 Command and Control Systems from AMS. Each system will be installed on an Italian Navy de La Penne-class guided missile destroyer.

Funding

Funding for the SADOC/IPN family of command and control systems is provided by its customers.

Recent Contracts

<u>Contractor</u>	<u>Award (US\$ millions)</u>	<u>Date/Description</u>
AMS	15.0	April 2002 – Royal Malaysian Navy awards AMS a contract to manufacture two IPN-S systems.
AMS	Unknown	April 2004 – The Italian Naval Armament Headquarters placed an order with AMS for the supply of SADOC-2 Command and Control Systems to upgrade the Italian Navy's two de La Penne-class guided missile destroyers.

Timetable

<u>Year</u>	<u>Major Development</u>
1963	SADOC enters service with Italian Navy
1964	SADOC-1 enters service with Italian Navy
1973	IPN-10 ordered by Peru
1974	IPN-10 ordered by Libya
1975	IPN-10 ordered by Venezuela
1979	IPN-10 ordered by Ecuador
1981	IPN-10 ordered by Iraq
1982	SADOC-2 enters Italian service
1987	Mini-SADOC enters Italian service
1987	SADOC-2+ enters Italian service
1995	SADOC-3 testing begun
2002	Royal Malaysian Navy awards AMS a contract to manufacture two IPN-S systems
2004	The Italian Naval Armament Headquarters orders two SADOC-2 Command and Control Systems

Worldwide Distribution

The countries of **Ecuador, India, Iraq, Italy, Malaysia, Peru, Spain, Taiwan, and Venezuela** are reported to have installed some IPN or SADOC variants on one or more ships.

Forecast Rationale

SADOC (Systema Dirizione della Operazione di Combattimento) is a sea-based command and control system produced by AMS. IPN is the export version of SADOC. AMS has installed SADOC/IPN systems on aircraft carriers, patrol craft, and warships.

As indicated in the outlook chart, Forecast International projects the Italian Navy to procure 2 SADOC-2 Command and Control Systems over the next two years.

The Italian Navy's need to upgrade the current command and control systems on two of its de La Penne-class guided missile destroyers is driving these SADOC-2 purchases.

Forecast International will continue to analyze and report developments concerning AMS's SADOC/IPN family of products as they are disclosed.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Designation	System	<u>High Confidence</u> <u>Level</u>					<u>Good Confidence</u> <u>Level</u>				<u>Speculative</u>		Total 04-13
		Thru 03	04	05	06	07	08	09	10	11	12	13	
SADOC/IPN	WARSHIP C3I (ITALY)	35	1	1	0	0	0	0	0	0	0	0	2
SADOC/IPN	Prior Prod'n:	50	0	0	0	0	0	0	0	0	0	0	0
Total Production		85	1	1	0	0	0	0	0	0	0	0	2