

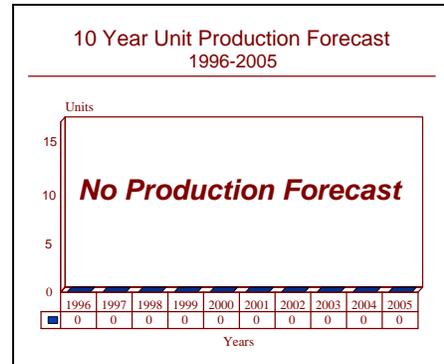
ARCHIVED REPORT

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Salvatore Pelosi Class - Archived 10/97

Outlook

- Further construction canceled
- German Klasse 212 to be built in its place



Orientation

Description. Diesel-electric torpedo attack submarines tasked with ASW, ASuW and patrol operations.

Sponsor

Generale Construction for Naval Construction and Naval Weapons
 Piazzale della Marina
 I-00196 Rome
 Italy

Contractors

Fincantieri
 Cantieri Navali Italiani S.p.A.
 Naval Shipbuilding Division
 Genova
 Italy

Licensee. No production licenses have been granted.

Status. Production and service.

Total Produced. Four submarines have been delivered. Two more were ordered, but subsequently canceled.

Platform

Ship	Builder	Ordered	Commissioned
S522 <i>Salvatore Pelosi</i>	Fincantieri	2/1983	7/1988
S523 <i>Giuliano Prini</i>	Fincantieri	2/1983	5/1989
S524 <i>Primo Longobardo</i>	Fincantieri	3/1988	5/1994
S525 <i>Gazzana Priaroggia</i>	Fincantieri	3/1988	3/1995
S526	Fincantieri	3/1992	Canceled 1994
S527	Fincantieri	3/1992	Canceled 1994

Application. The Salvatore Pelosi class are ocean patrol submarines tasked with ASW, ASuW and surveillance.

Price Range. Based on a comparison of similar submarines it is estimated that the price is approximately US\$250 million.

Technical Data

Characteristics

Speed:	
Surface:	11 kts
Snorting:	12 kts
Submerged:	19 kts
Range:	2,500 nm at 12 kts snorkel 250 nm at 4 kts submerged
Endurance:	45 days
Depth:	1,000 ft operating 1,970 ft maximum
Crew:	7 officers, 43 enlisted

Dimensions

	<u>Metric</u>	<u>US</u>
Length:	64.4 meters	211.2 feet
Beam:	6.8 meters	22.3 feet
Draft:	5.6 meters	18.4 feet
Displacement		
Surface:	1,476 tons	
Submerged:	1,662 tons	

Armament

	<u>Type</u>	<u>Quantity</u>
Torpedo tubes:	21 in	6
Torpedoes:	A-184	12

Electronics

	<u>Type</u>	<u>Quantity</u>
Sonar:		
Active bow:	IPD 70S active/passive	
Passive bow/flank:	MD 100S	1
Radar:	BPS 704	1
	Periscope (range finding)	1
Electronic warfare:		
ESM:	BLD-727	2
Periscope:	Kollmorgen S76 Mod 322 attack	1
	Kollmorgen S76 Mod 323 search	1
Command & Control:	BSN 716 SACTIS	
Navigation:	Litef PL 41	
	Ferranti autopilot	
	Omega	

Propulsion

	<u>Type</u>	<u>Quantity</u>
Main propulsion:		
Surface:	GMT A210 16NM diesels	3x3650 shp
Submerged:	Marelli electric motor	1x4270 shp
Battery:	CGA lead acid	2x148 cells

Design Features. Main propulsion on the surface comes from three GMT A210 16-cylinder diesel engines developing 3,650 hp. Underwater propulsion comes from a double armature Marelli motor using 3,140 kW and developing 4,270 Shaft HP. It runs off of two 148-cell batteries located in separate compartments. The speed is 11 kts on the surface and 12 kts using the snorkel. The maximum underwater speed is 19 kts. The Pelosi class

submarines are constructed of HY 80 steel and have a normal diving depth of 1,000 ft. Their maximum diving depth is 1,970 ft.

Operational Characteristics. There are six 21-inch torpedo tubes located in the bow. These submarines fire the A-184 torpedo. These wire-guided weapons have an active/passive sonar unit and are capable of attacking both submarines and surface ships. In addition, they are

capable of launching mines from the torpedo tubes. The third and subsequent ships carry sub-Harpoon.

The primary underwater detection apparatus aboard the submarine is the USEA/Selenia IPD 70/S sonar with an integrated MD-100/S passive ranging system. The system integrates a series of hydrophones along the hull for passive bearing and ranging, with an active bow-mounted cylindrical array for searching and gaining attack criterion. It can track four targets simultaneously.

The Pelosi class submarine has a Kollmorgen S-76 Mod 322 attack periscope and a Kollmorgen S-76 Mod 323 search periscope. The former uses a laser rangefinder, while the latter has a radar range finder. A Threat Evaluation Tactical Information System (THETIS) unit

attached to each periscope provides electronic support measures (ESM) by providing direction finding and warning of any hostile electronic emissions. The BPS 704 navigation radar also can give targeting information.

The submarine's fire control system is the BSN 716 SACTIS (Submarine Action Information System), which is an improved version of the A184 torpedo fire control system. SACTIS receives inputs from the sonar, radar, ESM equipment, periscopes, and navigation system and performs all of the functions of the SEPA A184 Mk 3, in addition to performing calculations and displaying data for approach or collision courses, attack or evasion courses, screen penetration and target interception. The SACTIS can display 30 targets and select 10 for close examination.

Variants/Upgrades

The second two submarines of this class are slightly different from the first two submarines. They are 6.6 feet longer and have a displacement of 1,653 tons surfaced and 1,862 tons submerged. These modifications were included to provide for the deployment of sub-Harpoon missiles.

These later ships also have provision for a towed array although the equipment has neither been installed nor procured. The final pair of submarines were to be further enlarged.

Program Review

Background. The Nazario Sauro class grew out of the Italian Navy's need for a replacement for their aging Second World War era Guppy class submarines. The initial design studies were conducted during the mid to late 1960s, and an order for two submarines was awarded in 1967. These two submarines were to have been modified versions of the four-ship Enrico Toti class. The order for these two was canceled in 1968, but design studies continued.

In 1972 the first two submarines of the Sauro class were ordered. A total of four ships of the Sauro class was ordered and commissioned. In 1985 the Italian Navy attempted to export the Nazario Sauro design with Australia, South Korea and Saudi Arabia being prime candidates. These attempts were unsuccessful.

The Italian Navy ordered two more submarines in February 1983 to replace two ex-American Tang class boats. Originally, a new design was planned but this was not expected to be ready in time so a modified version of the Sauro class was adopted as an interim measure with the new design being ordered later to replace the Enrico Toti class. This was the beginning of the Pelosi or Improved Sauro class submarines. These differed only in being slightly longer and heavier than the original design and in having an improved sensor suite.

Orders for long-lead items began in late 1983, but the first sections were not assembled until August 1985 and July

1986, respectively, and the formal keel laying ceremonies did not take place until July 1986 and July 1987. The first submarine of the class, *Salvatore Pelosi*, was launched in December 1986 and commissioned on July 14, 1988. The second submarine, *Giuliano Prini*, was launched in December 1987 and commissioned on July 14, 1989.

The Italian Navy continued to evaluate new designs for the next class of submarine, and gave these plans the designation S-90. Some of the designs that were studied called for using a gaseous storage propulsion system, instead of conventional diesel/electric engines. Tests of such a system were carried out aboard midget submarines. By the late 1980s it became apparent that the new concepts were still too immature for service use. In any case, growing budget shortfalls precluded the adoption of a totally new design.

As a result, the Italian Navy decided in early 1988 to order two additional submarines of the Improved Sauro class. This second pair was ordered in March 1988. They are to be slightly longer and heavier than the first pair in order to accommodate sub-Harpoon missiles. Assembly of materials for the second pair of submarines began in mid-1989. The first of these commissioned in July 1993, the second was expected to follow in February 1994. This construction is paralleled by an Italian Navy program to upgrade the original Nazario Sauro class. This will bring

all eight submarines to the same electronics and engineering standards.

By mid-1991, the submarine force level of the Italian was set at ten boats. This required the replacement of the two remaining Enrico Toti class. The Italian Navy was still continuing development of the S-90 design. It hoped to order two of the new class in 1993 or 1994 for service entry during 1998-1999. Once again, a combination of systems immaturity and financial stringencies prevented these plans from being completed. In particular the much-vaunted toroidal AIP design proved to have very severe engineering deficiencies, including a combination of stress and chemical corrosion in the LOX tank. These prevented any immediate prospect of a serviceable system. As a result, the decision was taken to order two further boats of the Improved Sauro class. These were ordered in March 1992.

Early in 1993, the Italian Government carried out major reductions in the force levels of the Italian Navy. These

included the reduction of the submarine fleet from ten hulls to eight. This level could be met either by canceling the two latest submarines of the Improved Sauro class or by decommissioning the two oldest members of the original Sauro class when the new boats are ready for service. At that time, there was no indication as to which of these options would be adopted, but no work was started on the boats ordered in 1992. Construction was first shelved for three years; then, in 1994 the order was canceled.

The motivation behind this cancellation was the fact that the size and cost of the two boats had gone completely out of control. As a result, the Italian Navy made the courageous decision to terminate their own submarine design effort and to buy into the German Klasse 212 program. The Italian Klasse 212 boats will be modified versions of the German design and are now covered in that report.

Funding

This program is funded by The Directorate of Construction for Naval Construction and Naval Weapons.

Recent Contracts

Contractor	Award (\$ millions)	Date/Description
Aeronautical & General Instruments (AGI)	145.0	April 1991 — Engineering design work and manufacture of 21 repeaters.

Timetable

Feb	1983	The first two Pelosi class submarines were ordered
	1985	Assembly of hulls began
Dec	1986	<i>Salvatore Pelosi</i> launched
Dec	1987	<i>Giuliano Prini</i> launched
Mar	1988	Second group of submarines ordered
Jul		<i>Salvatore Pelosi</i> commissioned
		Construction of the second pair began
Apr	1989	<i>Giuliano Prini</i> commissioned
Mar	1992	Last two submarines of the class ordered
Dec	1994	Last pair of submarines canceled
Mar	1995	Final boat in program commissioned
		Italian Navy buys into German Klasse 212 program

Worldwide Distribution

Italy. (4 built)

Forecast Rationale

The fate of the two 1992 boats was finally resolved just after last year's edition of this report went to press. As we projected, both boats were canceled. The reduced force level of the Italian Navy means that the existing force of four Sauro and four Improved Sauro class submarines is adequate. The Sauros are still young boats and their hull life will not be expended until around 2005. The modification program instituted will bring them to the same standard as the Improved Sauro class. In the far term, they will be replaced by Klasse 212 submarines

The history of the S-90 program indicates the hazards of attempting a revolutionary jump forward as opposed to a gradual design evolution. Where revolutionary jumps work, they work very well, but the penalties of failure are high. In this case, each time submarines were ordered, the very advanced S-90 was unavailable and improved Sauro

class boats were ordered in their place. Eventually the financial barriers came down and the design was abandoned. As a result, the Italian submarine fleet is equipped with boats whose design reflects technology of the 1960s and early 1970s.

The following forecast reflects the completion of the building program now that the 1992 boats have been axed. If the original four boats are to be replaced by 2005, the orders will have to be placed around 1999, suggesting that design studies will have to start in 1996/97. As we projected, these will form part of a multinational venture with the Germans, reflecting design technology as expressed in the Klasse 212. The S-90 concept and, with particular emphasis, the toroidal AIP system, is now dead. This report will be dropped next year.

Ten-Year Outlook

No production is forecast.

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