

ARCHIVED REPORT

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DSUV-62

Outlook

- Production has ceased with delivery of the last system of this type
- Replaced in market by active/passive and thin-line solutions
- New towed array being developed for Barracuda class
- Thales has very strong presence in new-technology towed arrays

Orientation

Description. The DSUV-62 is a passive, towed-array sonar for submarines that usually forms part of a fully integrated sonar suite.

Sponsor

Delegation Generale pour l'Armement (DGA)
10-14 Rue Saint Dominique
F-75997 Paris Armees
France

Status. In production and operational service with several navies.

Total Produced. An estimated nine DSUV-61 and 15 DSUV-62 sonars were produced through 2005.

Application. Detection and tracking of hostile submarines and surface ships.

Platforms. Nuclear-powered and diesel-electric submarines.

Price Range. Although no price has been released, the cost of a DSUV-61/62 system is estimated at \$10 million per unit based on the known costs of comparable systems.

Contractors

Prime

Thales Underwater Systems	http://www.thalesgroup.com/naval , 525 Route des Dolines, BP 157, Sophia Antipolis, 06903 France, Tel: + 33 4 92 96 30 00, Fax: + 33 4 92 96 41 24, Email: TUS@thales-underwater.com, Prime
Thales Naval France	http://www.thalesgroup.com/naval , 45, Rue de Villiers, Neuilly-sur-Seine, 92526 France, Consortium Member

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DSUV-62**Technical Data**

	<u>Metric</u>	<u>U.S.</u>
Dimensions		
Cable length	400 m	440 yd
Array length	100 m	110 yd
Array diameter	0.8 m	2.6 ft

Design Features. The DSUV-61 and DSUV-62 have similar processing and analysis systems. They use TSM-320C30, 68020, and 68040 microprocessors for signals processing in MIM-D-type host systems.

Communication is via internal high-speed ring networks and external VME databuses. The system uses structured software developed in C and Ada. The DSUV-62 array is 100 meters long and 50 to 80 millimeters in diameter and is towed on the end of a 400-meter cable. The arrays allow the submarine to identify the contact from the specific noises heard. They also give the submarine the ability to gain a fire control solution entirely by passive means. The DSUV-62 has good capabilities against both narrowband noises, such as those produced by a submarine's machinery, and broadband noise produced by a submarine as it moves through the ocean.

Operational Characteristics. The DSUV-62 passive towed linear array sonar can be either a

component of the TSM-2233 integrated sonar system or a stand-alone configuration with its own processing and operating facilities. The linear array is used to carry out panoramic surveillance in broadband, narrowband, and Demon mode across several fixed or adjustable frequency bands and can automatically initiate the tracking of up to 64 noise sources; up to eight of these may be potential targets for full Lofar and Demon mode analysis. The system also permits direct audio listening by the operators.

The DSUV-62 differs from the DSUV-61 in that the latter is designed to provide warning of hostile submarines and allow the submarine to escape. The DSUV-62, while also passive, is designed to allow the submarine to track the contact and gain a fire control solution if possible. Both have similar hydraulic reel systems that allow the array to be deployed, streamed, and retrieved under water. Alternatively, a clip-on arrangement may be used.

Variants/Upgrades

DSUV-61A. A version of TSM-2933 deployed on French ballistic missile submarines.

DSUV-61B. An advanced version of the DSUV-61A sonar for the Le Triomphant class ballistic missile submarines. The changes from the A version are unclear but probably relate to the signal's processing and display systems.

DSUV-62A. Version of the DSUV-62 deployed on the French Navy Agosta and Rubis class submarines.

DSUV-62C. An upgraded DSUV-62 developed for the Amethyste class submarines of the French Navy.

TSM-2933. This is the designation applied by Thomson-Sintra to versions of the DSUV-62 installed on the new Pakistani Agosta-90B class submarines and other export applications.

Lamproie. Export version of the DSUV-62 sonar differing only in that it is deployed using a shorter, 74-meter cable. Lamproie can track targets both manually and automatically, and can automatically reject narrowband sonar jammers. On submarines, the sonar can be towed up to 32 knots. In surface ship configuration, Lamproie can be streamed either from a VDS fish or from a winch using a critical angle tow.

Program Review

Thomson-CSF began developing the DSUV-61 for the French Navy's ballistic missile submarines early in the 1970s, with the initial trials carried out between 1974 and 1977. The DSUV-62 is a modified version of the DSUV-61. The first prototype models began preproduction tests in 1979. These tests were concluded

by late 1980, and the new sonar was approved for operational service the following year. The first DSUV-62 entered operational service when the submarine FS *Rubis* was commissioned in 1983. Systems have been installed aboard all Rubis class submarines since that time.

DSUV-62***Refitting Rubis***

During the early 1980s, the French Navy began the Amelioration Tactique Hydrodynamique Silence Transmission Ecoute (AMETHYSTE) program to upgrade the sonars aboard the Rubis class and the Amethyste class (improved Rubis) submarines. This program included upgrading the DSUV-62 and installing a new integrated sonar to replace the DSUV-22. The French Navy decided in 1988 to retrofit the DSUV-62 to the Agosta class diesel patrol submarines in the late 1980s. The retrofit program for the Agosta class submarines was completed in 1991. The French Navy ordered the fourth member of the Amethyste class in 1989. The last two ships in this class were due to be laid down in 1992 and 1994, respectively. However, as a result of severe budgetary pressures on French defense expenditure, both of these submarines were canceled, curtailing French nuclear-powered submarine procurement at six boats (four Rubis class and two Amethyste class).

Early in 1995, the French Navy started the process of designing a new class of SSN to replace the Rubis and Amethyste class SSNs. Designated the Barracuda class, the first of these new boats was scheduled to be ordered in 2001 for sea trials in 2008. Plans are to lay down additional submarines every other year until a class total of six is achieved. These submarines will have an entirely new electronics fit, elements of which are currently being tested on the submarine FS *La Praya*. Now, this program is not due to deliver its first hull until 2017.

Exporting Towed Arrays

Following a prolonged series of negotiations, the Pakistani Navy ordered three Agosta-90B class submarines from France. These are equipped with sub-Exocet missiles and will, therefore, require an over-the-horizon targeting system. These submarines are equipped with a TSM-2933 towed array for that purpose.

The government of Chile made official its decision to buy the Scorpène submarines for its Navy on December 17, 1997. In addition to the two submarines DCN built in France, Chile initially planned to build a third submarine on license at its own shipbuilding facility in Talcahuano. This plan was reportedly abandoned. The whole Scorpène program was placed in jeopardy during 1999 by the fallout from the Pinochet affair in the U.K. By mid-2000, the issue appeared to have blown over, and construction of the two submarines continued, one in France, the other in Spain.

The Chilean order led directly to the Spanish Navy's statement in early 1998 that three Scorpène AM-2000s would be procured for the Spanish Navy, with in-service dates extending from 2004. These orders have yet to be placed.

To some extent, these successes were balanced by the Lamproie sonar's failure to win the expected Spanish contracts for upgrades to the four Daphne and four Agosta class submarines in Spanish Navy service. One Daphne class boat, the S-63 *Marsopa*, and one Agosta class boat, the S-63 *Mistral*, were fitted to handle the DSUV-62 for trials that were completed in 1995. Subsequently, the DSUV-62 equipment was removed from both submarines, and there are no plans to modernize the old Daphne class boats. The Agostas are to receive a new towed-array sonar, designated Solarsub, which draws heavily on the technology base offered by the Australian Kariwara/Narama program. This suggests that the new Scorpène class submarines may carry the Solarsub sonar instead of DSUV-62.

The Indian Submarines

In 2001, the Indian government signed a major agreement with DCNI and Thales over the design and production of the Indian Navy's new Project 75 diesel-electric submarine program. At least six Project 75 boats are projected, based on the Scorpène design but built under license in the submarine construction yard at Mazgaon. However, the construction yard at Mazgaon is virtually derelict and needs extensive renovation before construction can start. As a result, Project 75 remains in its early stages, and no solid data on the sensor fits of these submarines are available.

These orders were followed by a Malaysian Navy order for a pair of Scorpène class submarines, with an Agosta class boat being loaned to the Navy for use during trials.

In 2005, additional details of the sonar fits of the Scorpène class submarines became available. These indicated that the sonar system will be, as expected, an advanced version of the TSM-2233 Eledone coupled with a thin-line system where the client specified the provision of a towed array. This was supplemented by Spanish information on their S-80 class submarines. S-80 is essentially an enlarged and improved version of Scorpène. The sonar system will be provided domestically by SAES, including the Solarsub-B towed array and a passive hull-mounted sensor designated SOCILSUB, which is based on an improved TSM-2233.

In September 2010, the last of the four Le Triomphant class SSBNs was delivered to the French Navy. This was the only outstanding platform for the DSUV-61B and its delivery marked the end of system production.

DSUV-62

Le Triomphant, Platform for DSUV-62

Source: DCN

Funding

The DSUV-62 was developed under French Navy contract.

Timetable

<u>Year</u>	<u>Major Development</u>
1975	France issues submarine towed-array requirement
1976	Thomson-CSF receives development contract
1979	DSUV-62 undergoes preproduction tests
1981	DSUV-62 approved for operational service
1983	French Navy prepares Amethyste program/design
1991	DSUV-62 retrofit to Agosta SSK completed
1994	DSUV-62 ordered by Pakistan
1997	Scorpène class submarine ordered by Chile
2001	Indian Navy begins negotiations for six Scorpènes as Project 75
2002	Malaysian Navy orders two Scorpène class submarines
2004	Spain orders S-80 class submarines
2005	Scorpène order by India finally signed
Sep 2010	Last DSUV-61 system delivered

Worldwide Distribution/Inventories

France 6 DSUV-62 on Rubis/Amethyste class SSNs, four DSUV-61B on Le Triomphant SSBNs

Pakistan 2 DSUV-62 on Agosta SSK, 3 on Agosta-90B class SSK

Forecast Rationale

In September 2010, the French SSBN *Le Terrible*, was finally delivered, bringing production of the DSUV-61 thick-line towed array sonar to an end. In fact, this actually happened some time previously when the sonar was delivered to the submarine prior to completion. By the time the submarine was delivered, the production line had already been closed, and with it, any prospect of future sales was terminated.

It is hardly surprising that the DSUV-61/62 should have reached the end of its production life. It is a very dated system and urgently needs replacement. Indeed, it is

more than likely that a replacement sonar on the French SSNs and SSBNs is being developed. Officially at least, this will be for the new Barracuda class SSNs and be a thin-line towed array, probably combined with active emitters to provide full active/passive coverage. However, it will certainly be retrofitted to the SSBNs and is likely to see service on the Rubis class SSNs for 'trials' purposes.

That will be a different item, far more advanced than the existing DSUV-61. The career of the older system is now over and this report will be archived next year.

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