



Scorpene *O'Higgins* launching

SUMMARY

KEY TO INTERNATIONAL SALES	2
---	----------

THE CHILEAN CONTRACT FOR SCORPENE	4
--	----------

Presentation
Contract conditions
Stages of construction
Scorpene consortium
ITO (Inspeccion Tecnica de Obras)

THE SUBMARINE <i>O'HIGGINS</i>	7
---	----------

Technical specifications
Key dates
Subtics tactical integrated combat system

THE ORGANIZATIONS IN THE PROGRAMME	11
---	-----------

DCN
Izar
UDS International

THE PEOPLE IN THE PROGRAMME	16
--	-----------

Captain Ulf Baader, Chilean Navy Delegate
André Portalis, Director of the Scorpene line of products
Pierre Pauliac, Project Director

Key to international sales

O'Higgins, the submarine that was launched is the "first of class" of a new type of conventional submarine the "Scorpene".

This submarine is based on a design issued from the new generation of French nuclear submarines that benefit from the best technologies developed. It is designed from a modular concept in order to be adapted to its missions profiles and to various requirements. It corresponds to the latest technologies and performances available on today's classic submarine market.

DCN as the prime contractor of this range of submarines has launched this programme to boost its international activity and to take parts of the market to its main rival the German shipyard HDW. While in the last 20 years HDW has occupied two thirds of the market open to conventional submarines. The ambition of DCN for the next 15 years is to equal its rival with the Scorpene family.

To gain these parts of the market, **DCN has chosen an association with a Spanish shipyard**, Izar (before known as Bazan) with which it already had former bonds. Agreements between DCN and Izar have thus been signed for the commercialisation and common realisation of these submarines.

The Chilean Navy was first to place its confidence in DCN and Izar in 1997 by ordering two Scorpene submarines. On this occasion DCN and Izar were organised as a Consortium. Realised partly in France and in Spain, the *O'Higgins* submarine is today alongside in Cherbourg and is the result of this mutually shared confidence.

The launching of the submarine that took place in the last few days is a **key milestone** in the realisation process of this type of ship. By its symbolic character it corresponds to the former "launching ceremonies" but remains very different marking the end of the outfitting and the first setting to work. In a few weeks the *O'Higgins* will be ready to start its harbour trials followed by sea trials before being delivered to the Chilean Navy.

This first submarine of the Scorpene range is a new testimony of the **recognised know-how** of DCN as prime contractor for highly complex ships such as "*O'Higgins*". It also testifies the success of the co-operation between DCN and Izar and the implication of DCN in international programmes.

It is of course **only the first of a series** that DCN hopes to be ever increasing. Thus the Royal Navy of Malaysia signed a contract for the acquisition of two Scorpenes in 2002 which is already under way and other potential orders are under preparation: a contract with India for a transfer of technology is currently under negotiation as well as discussions with other clients.

To face their concomitant execution and profit from the return on experience from the first of series, DCN has set up an integrated organisation, **the Scorpene product line**. Its mission is to prepare and conduct these projects, to guarantee their industrial consistency and correct integration in the industrial activity of DCN, to co-ordinate its relationship with Izar and make significant time/labour savings and then to support the promotion of this range of products. DCN is reinforcing its alliances and know-how on the Scorpene programmes in progress by building winning partnerships with components manufacturers and industrials already involved and by maintaining a permanent improvement programme of its competitiveness and optimising its partnership with Izar.

In mean terms DCN is resolutely turning its gaze by focussing on Far East and South American contracts in 2010.

On the same basis as *O'Higgins*, DCN is preparing technological evolutions that will offer these countries sea proven and performing submarines. With the range of Scorpene submarines whose commercialisation has been entrusted to Armaris, DCN is able to respond to the operational needs of various Navies and to offer them the best technology at the most competitive prices.

Armaris offers Scorpene submarines to international Navies:

In August 2002, DCN and Thales Naval France founded Armaris, a joint company set up to win new international business in naval prime contracting, shipbuilding, combat systems and related systems and services. Armaris can act as overall prime contractor for naval programmes undertaken for international customers or involving international co-operation. The French government may also entrust to Armaris national programmes likely to attract international sales.

Armaris has taken over the interests previously held by DCN and Thales in:

- UDS International (Underwater Defence Systems International), a joint subsidiary set up to promote the partners' expertise and win prime contracting for submarine combat systems.
- SFCS (Saudi Frigates Combat System), the joint subsidiary responsible for combat systems for Saudi Arabian Sawari II frigates.

Armaris has also taken over the French interests in:

- Horizon SAS, the prime contractor for the Franco-Italian Horizon anti-air frigate programme (50% Armaris, 50% Fincantieri/Finmeccanica joint venture).
- EuroSysnav SAS, the Franco-Italian joint venture acting as prime contractor for the Horizon combat system (50% Armaris, 50% Finmeccanica).

The chilean contract for scorpene

PRESENTATION

Designed by DCN, the Scorpene submarine has been developed jointly by DCN and the Spanish shipbuilder Bazan (since become Izar).

The Scorpene is a conventional propulsion submarine (diesel-electric or hybrid [diesel-electric+AIP]) destined to surface and anti submarine warfare, special operations and training.

The Scorpene incorporates the most recent developments in submarine construction, especially in terms of the progress made for the latest classes of submarines for the French Navy.

The advanced hydrodynamic characteristics of the Scorpene hull profile enable it to sail at high speed when submerged while generating minimum noise, thereby improving the listening capabilities of its sonar and protecting it from enemy detection.

To limit the adverse detection capabilities, all the Scorpene equipment are isolated from the hull according to the double suspension principles of vibrating equipment adapted for the last generations of French submarines.

Its pressure hull of weldable, high-yield-point steel gives it a submerged depth of more than 300 metres, making it even more difficult to detect.

Its carrying capacity of 18 weapons (torpedoes or missiles) make it the most armed of its category.

The power of the diesel engines allow the recharge of the batteries by reducing the exposure of the schnorkel.

CONTRACT CONDITIONS

On the 17th of December 1997, a contract for the supply of two Scorpene class submarines was signed with the Chilean Navy jointly by DCN for France and Bazan (since become Izar) for Spain.

	Name	Dimensions	Crew
N° 1	Q 279 <i>O'HIGGINS</i>	66.4 m x 6.2 m Displacement: 1,700 tons	31 men
N° 2	Q 280 <i>CARRERA</i>	"	"

These Scorpene class submarines are intended to replace two Oberon class boats in service with the Chilean Navy since 1976 (English designed and built submarines).

The contract relates to the procurement and manufacturing of two Scorpene class submarines, with no technology transfer.
In addition, there is the associated crew training, maintenance training and sets of spare parts.

The technical co-ordination of detailed studies is realised by DCN. The general arrangement is also realised by DCN. The detailed studies (drawings) are shared between Izar for the aft part and DCN for the fore part.

The pressure hull of the two submarines is produced in four sections by DCN at the Cherbourg yard, thereby making modular construction possible.

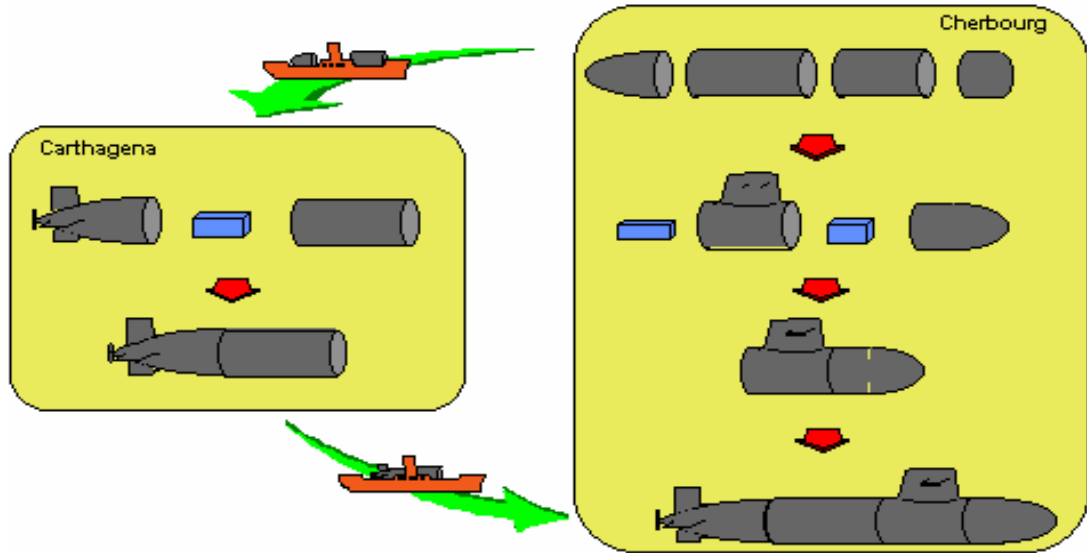
This design has enabled Izar to undertake assembly and fitting of both aft sections for each of the two submarines after receiving the hull components manufactured by DCN.
DCN performs the equivalent tasks on the two fore sections of each submarine.

The aft part of the first submarine is then transferred to Cherbourg for operations, final completion, commissioning and trials by DCN.

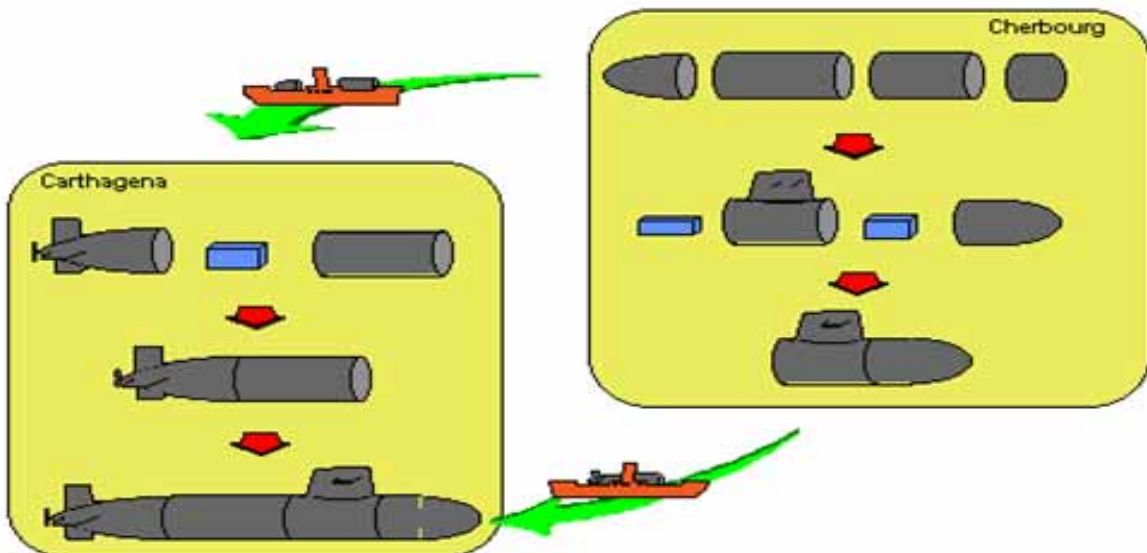
The fore part of the second submarine is then transferred to Cartagena for operation, final completion and commissioning of this submarine by Izar.

STAGES OF CONSTRUCTION

Submarine n°1



Submarine n°2



SCORPENE CONSORTIUM

This contract is the outcome of the creation of a Franco-Spanish consortium, the "Scorpene Consortium" which is located in Paris. The official language of the consortium is English. A Frenchman directed the consortium for the first half of the contract. Luis Tallon, who is Spanish, is the Director at the present time.

Beyond the general arrangement realised by the consortium and in order to guarantee the success of the project, DCN and Izar have set up performing interfaces – particularly at the level of engineering and provisioning – as well as for the integrated management means of interfaces.

ITO – INSPECCION TECNICA DE OBRAS

In order to control the execution of the contract, the Chilean navy has appointed a team of officers, petty officers and engineers, led by the Director of the Chilean Navy and called the Inspeccion Technica de Obras – ITO.

This team of 25 is based in France at Cherbourg, and in Spain at Carthagena.

The delegation arrived in Cherbourg in July 1998 with Captain Herrmann as its leader.

In November 2000, Captain Davanzo took over until March 2003, when the present director, Captain Baader, arrived.

The Submarine *O'Higgins*

The first Scorpene submarine for Chile will bear the name *O'Higgins* in tribute to the Chilean general, Bernardo O'Higgins, who proclaimed complete independence for his country in 1818.

TECHNICAL SPECIFICATIONS

- Length 66.4 m
- Diameter 6.2 m
- Height 12.3 m
- Surface displacement 1,550 tons
- Submerged displacement 1,700 tons
- Diving Depth over 300 m
- Submerged speed Over 20 kts
- Type of propulsion Diesel electric
- Endurance 50 days
- Complement 31
- Sensors Integrated SUBTICS® combat system and other equipment
- Weapons
 - 6 torpedo launch tubes
 - 18 heavy weapons: SUT266 torpedoes, BlackShark torpedoes, SM 39 missiles

KEY DATES

- 18 December 1997 Contract signed
- 31 March 1998 Entry into force
- 22 July 1998 Cutting first sheet metal
- 18 November 1999 Laying on keel blocks
Opening of Narval yard
- 3 July 2000 Departure of aft resisting hull sections to Izar
- 18 November 2002 Aft sections return
- 31 December 2002 Fore/aft parts joined
- 6 June 2003 Hydroplanes fitted
- 18 October 2003 Departure from Narval yard and transfer to completion dock
- 23 October 2003 Launching
- Beginning of 2004 Start of sea trials in Lorient
- 2nd quarter of 2004 Delivery of *O'Higgins* to the Chilean Navy

SUBMARINE TACTICAL INTEGRATED COMBAT SYSTEM

UDS International was contracted in 1999 from DCN to design, develop, manufacture, integrate and test at sea a second generation of SUBTICS® combat system selected by the Chilean Navy to be installed aboard the two Scorpene submarines ordered from DCN and Izar.

Long Range Performance and Quality

SUBTICS® brings the high operational performance of long range capacity; both in detection and in weapon launching. The benefits from the French Navy's and other Major Navies' worldwide expertise in long range sensors combined with anti-surface-ship missile capability guarantee industry-leading defence power.

Integration and Optimum Mastery of Information

Based on more than 20 years of experience, SUBTICS® offers the optimum balance between advanced automated processing and sophisticated interactive tools. This well-balanced data integration ensures that the command team is in constant control of the information starting from surveillance and threat assessment through to weapon launching. It also facilitates the co-operation between the submarine with its own "on-board sensors" and other naval units with "off-board sensors" through the data link system. Finally, the command team has a constant, global and integrated vision of the tactical situation, facilitating its capacity to make critical and timely decisions.

State of the Art Technology made user-friendly and flexible

Leveraging modern and proven techniques derived from the familiar world of the multimedia, the user interface really gives the operators fingertip control of the system. The man-machine interface concept of roles and tasks drastically increases the operational efficiency of each operator. It also provides a real operational flexibility which optimises the global efficiency of the combat team, since the manning configuration can exactly match the actual situation, the mission phase, and be tuned and adapted to the particular combat team organisation of each customer navy.

Open Architecture based on COTS

Integration of common hardware and software resources based on carefully selected modern world-wide standards (COTS) ensures high availability, easy maintenance, intrinsic growth potential, and make it easier to cooperate in customers' countries with local companies, which can provide hardware or software components and take over part of the activities involved in long term support.

Strong Adaptability

Open architecture, modular and flexible, guarantees that the system is adaptable, can be configured for all operational requirements, and can evolve as needs change. Any particular sonar suite configuration may be selected in the product line, without impact on the system core architecture. The same applies to the combination of non-acoustic sensors that are interfaced to SUBTICS®, and to their level of integration. Finally, SUBTICS® product line is designed to interface all modern weapons and countermeasures, either in single or in multiple-weapons configuration.

The organisations in the contract



DCN

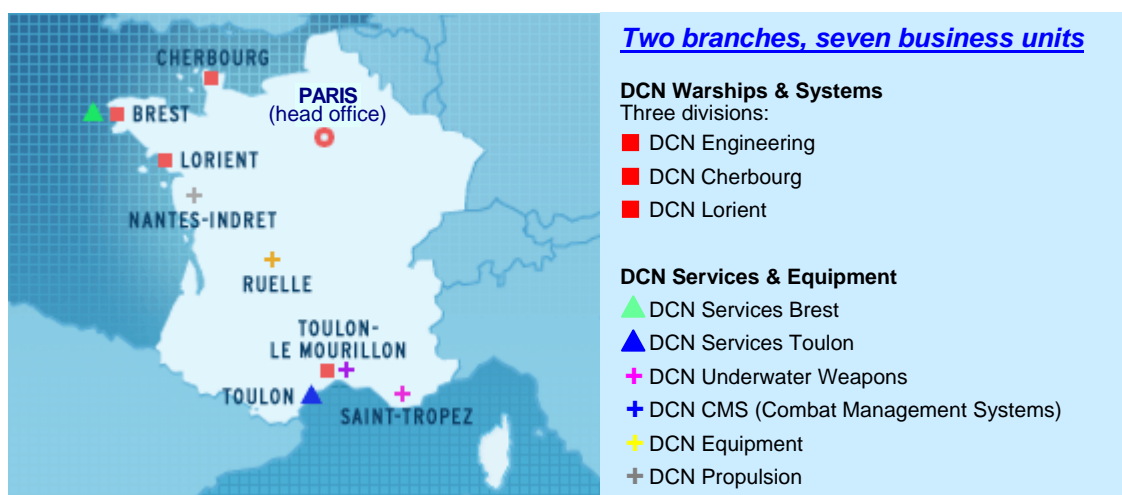
As one of Europe's leading naval shipbuilders, prime contractors and system integrators, DCN has competencies and infrastructure spanning the entire naval defence chain, from design concept to decommissioning.

As a prime contractor for integrated warships, DCN takes an integrated approach to vessel, combat system and associated services combining sophisticated design techniques and advanced technologies. DCN offers its prime customers (the French Navy and defence procurement agency DGA) and international client navies a full range of warships, combat systems and equipment plus a variety of services, including assistance with the definition of needs, technology transfers, through-life support, and training.

At a glance

- President and Chief Executive Officer: Jean-Marie Poimboeuf
- Head office: 2 rue Sextius-Michel, 75732 Paris Cedex, France
- 2002 revenues: €2.2 billion
- Orders booked in 2002: €1.9 billion
- Orderbook, as at 31 December 2002: €5.9 billion (not including recurrent through-life support, representing around one-third of annual revenues)
- R&D budget for 2002: €32.5 million
- Major programmes: *Charles-de-Gaulle* aircraft carrier, La Fayette stealth frigates, Le Triomphant-class SSBNs.
- Projects under development: FREMM European multirole frigates, Horizon anti-air frigates, Sawari II frigates, BPC force projection & command vessels, Le Triomphant-class SSBNs *Le Vigilant* and *Le Terrible*, Barracuda nuclear attack submarine, Scorpene attack submarines, BlackShark/IF21 heavyweight torpedo.

As of mid-2003, DCN employed 13,300 people at seven shipyards and engineering centres and at its head office in Paris.



DCN and the Chile Scorpene contract

For the Chile Scorpene contract, the Cherbourg site of the business unit « Warships and Systems » is particularly concerned with the construction of the two submarines but this ambitious programme also implies other DCN branches or business units.

- DCN Lorient (Wharships & Systems business unit): engineering, manufacturing of the forward part and composite material elements.
- DCN Propulsion (Nantes-Indret): architecture of propulsion, fabrication of equipment such as propellers and refrigerants.
- DCN Equipment (Ruelle): torpedo handling systems, integrated platform control/command systems, SUBTICS[®] equipment, masts.
- DCN CMS (Toulon - Le Mourillon): architecture and integration of the combat, procurement of the combat system equipment (UDS International, SAGEM, ...) and realisation of TITLAT part as an integrated team with en UDS International.
- DCN Underwater Weapons (Saint-Tropez): BlackShark torpedoes, participation in the trials, technical expertise to the combat system prime contractor.



Izar is the leading company in Spain for warship and commercial shipbuilding.

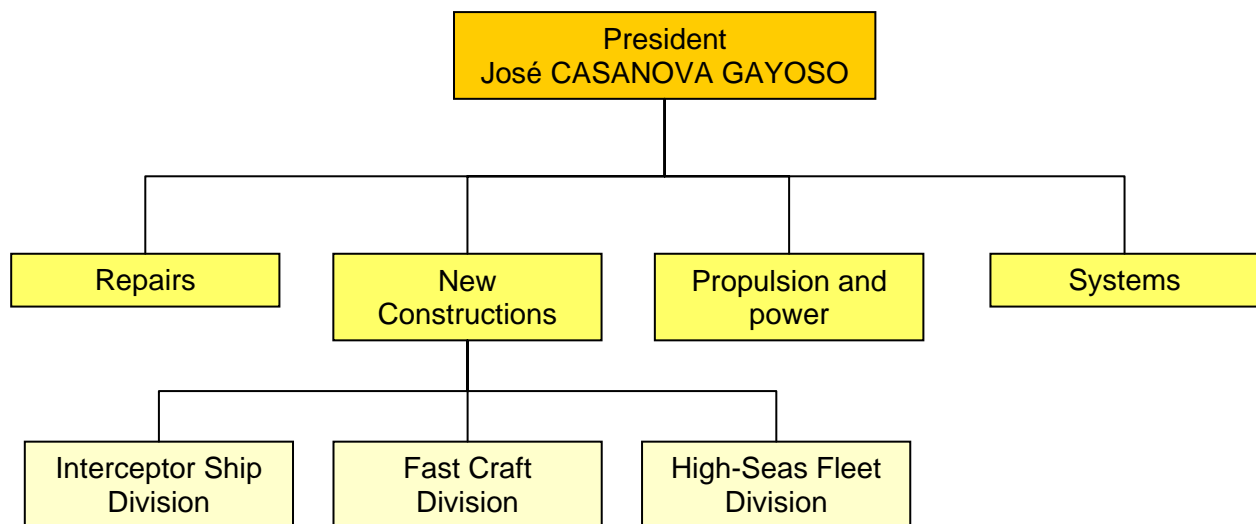
It is the second largest naval group in Europe in terms of turnover and ranks ninth in the world.

Izar was formed by the merger of two groups:

- Empresa Nacional Bazan with more than 250 years of history in construction and repair of warships and commercial ships,
- Astilleros Espanoles (AESAs), construction and repair of commercial ships.

Izar is a group whose sole proprietor is the Spanish state under the control of SEPI (Sociedad Espanola de Participaciones Industriales).

Izar is composed of four branches, as shown below:



A multi-establishment company

Izar has several construction, production and repair sites located in the following cities:

- Sestao
- Gijon
- Ferrol
- Fene
- Seville
- Puerto Real
- Cadiz
- San Fernando
- Cartagena
- Manises

The Izar site at Cartagena is involved in new construction, refits, propulsion and power, and systems.

The Izar group has around 11,037 employees grouped into:

- 7,038 workers
- 2,562 supervisors
- 1,437 engineers and managers

The Izar yard at Carthagea for new constructions employs 900 people.

The Izar yard at Carthagea is situated in the Southeast of Spain (province of Murcia) and occupies a surface area of 187,000 m².

Address:

Carreterra de la Algameca, S/N. 30205 Cartagena (Murcia)

Tel: +34 968 32 75 00

*Gérard VILLEMIN, Chairman
Michel AGOSTINI, Sales and Technical Operations Director
Daniel PLOUZENNEC, Programs and Industry Operations Director
Serge BERTOLINO, Sales Director
Alain CURSAT, Program Manager
Carine GUILLOU, Communication Manager*

UDS International (Underwater Defence Systems International) is a subsidiary of Armaris, a joint company set up by French naval shipbuilder DCN and leading defence systems company Thales.

UDS International develops and manufactures combat systems for submarines through a competitive range of products named SUBTICS[®] (Submarine Tactical Integrated Combat System).

Based on advanced sensors and weapons, SUBTICS[®] is adaptable to any type of submarine design, either for new construction or modernisation programs, and meets present and future operational requirements.

UDS International has supplied the combat system for the three Agosta 90B submarines ordered by the Pakistan Navy in 1995. This system is now fully commissioned and operational at sea, including the SM39 Exocet subsurface-to-surface missile launching capability, which has been successfully test-fired in 2001 by the Pakistan Navy, from maximum range and optimum depth, with SUBTICS[®] combat system installed on board their first Agosta 90B (PNS Khalid).

In close partnership with a local company, SISDEF Ltda, UDS International has also supplied the two SUBTICS[®] which equip the Scorpene class submarines purchased by the Chilean Navy from DCN International and IZAR.

More recently, UDS International has been contracted to provide the SUBTICS[®] systems for the two Scorpene submarines purchased by Malaysia in June 2002.

Developed by UDS International, with two major industrial partners : Thales Underwater Systems and DCN CMS, and based on the most modern technologies in this field, the SUBTICS[®] product line provides high operational performance of long range capacity, both in detection and in weapon launching.

Address:
Underwater Defense Systems International
525, route des Dolines - B.P. N° 157 - 06903 Sophia Antipolis Cedex - France
Intl Tel.: +33 4 92 96 34 86 - Fax: +33 4 92 96 37 69 - E-mail: sophia@udsinternational.com
Website: www.udsinternational.com

The people in the programme

CAPTAIN ULF BAADER, CHILEAN NAVY DELEGATE

Captain Baader was born in Osorno in Chile on the 27th of April 1956. He joins the Chile Naval academy as a cadet in 1977.

After his first instruction cruise aboard the school ship *Esmeralda*, he is assigned to several rapid patrol boats and submarines.

He has been the Executive Officer of the *Simpson* and has specialised in submarines after following courses in Chile and in Great Britain and was commander of the Chilean fleet units: *Maipo*, *Thomson* and *Simpson*.

He is promoted Captain the 1st of January 2000.

In the course of his career he has sailed during 14 years aboard Chilean Navy ships.

Among his multiple functions, he has given lectures on several submarines and followed the Superior Naval Academy courses in Great Britain and also followed submarine commander training and preparation courses related to the Scorpene programme.

Captain Ulf Baader arrived in Cherbourg in March 2003 where he replaces Captain Davanzo at the head of the Chilean delegation.

He is married and the father of three children.

ANDRE PORTALIS, DIRECTOR OF THE SCORPENE LINE OF PRODUCTS

Since June 2003 André Portalis is the Director of the Scorpene line of products: organisation in charge of the preparation of these projects to guarantee their industrial consistency, to optimise the relationship with Izar and to support the promotion of this range of submarines. He is a member of the Scorpene Board and of the Ships & Systems Directorate Committee.

Between 1999 and 2003 he assumed increasing responsibilities in the first Scorpene contract with Chile: first as the project manager in Cherbourg followed by project director for DCN and finally French Director of the Scorpene Consortium.

Before, André Portalis fulfilled several responsibilities for DCN in the field of fleet ballistic missile nuclear submarines (SSBNs): between 1985 and 1991 in Toulon as chief design engineer, then as the head of project *Le Triomphant* SSBN weapon system, and between 1996 and 1998 in Cherbourg, as the project director for the construction of the 3rd SSBN *Le Vigilant*.

Between 1992 and 1995 André Portalis gained experience in the French Procurement Agency DGA/Paris as Director to adapt the *Le Triomphant* SSBN to the MSBS M5 in its feasibility phase and as counsellor near the General Delegate for Armament in charge of the prospective and strategic analysis; a parenthesis in his predominantly industrial profile.

He was trained as an engineer at "Ecole Centrale de Lyon" and became an armament engineer in 1993. André Portalis is married and father of 6 children. He is a member of the EDC (Entrepreneurs et Dirigeants Chrétiens).

PIERRE PAULIAC SCORPENE CHILE PROJECT DIRECTOR

Born the 18th of December 1973 in Carcassonne, Pierre Pauliac followed the “Ecole Polytechnique” courses and the “Ecole Nationale des Statistiques et de l’Administration Economique ENSAE”. In 1999 he obtained a DEA (post graduate diploma) in International Economy

He began his career with the Scorpene programme in September 1999 at the Paris head office and was appointed to Cherbourg in January 2000.

He is the Project Director since June 2003 and is responsible for the results of the programme.

He co-ordinates and manages the DCN teams in the following fields:

- Production
- Procurement
- Combat system
- Engineering
- Logistics
- Propulsion
- Client support
- Izar partnership
- Components manufacturers DCN (Ruelle in particular).