

# Year book

POWER AT SEA

# 2020

**NAVAL**  
GROUP

# Year book

POWER AT SEA

# 2020

P.04  
▼  
P.09

**GROUP PROFILE**

Logbook from the Chairman and Chief Executive Officer

Naval Group: an international group at the forefront of innovation

A major leader in naval defence, with a unique model



P.28  
▼  
P.35

**STEP 03: TRAINING AND SUPPORT**

Building sovereignty with technology transfer



P.10  
▼  
P.17

**STEP 01: DESIGN AND PREPARATION**

Designing is necessary innovation

P.44  
▼  
P.49

**STEP 05: DECOMMISSIONING AND DISASSEMBLY**

Delicate yet controlled operations

P.36  
▼  
P.43

**STEP 04: MAINTENANCE, UPKEEP AND MODERNISATION**

FREMM *Auvergne* : an exceptional technical shutdown

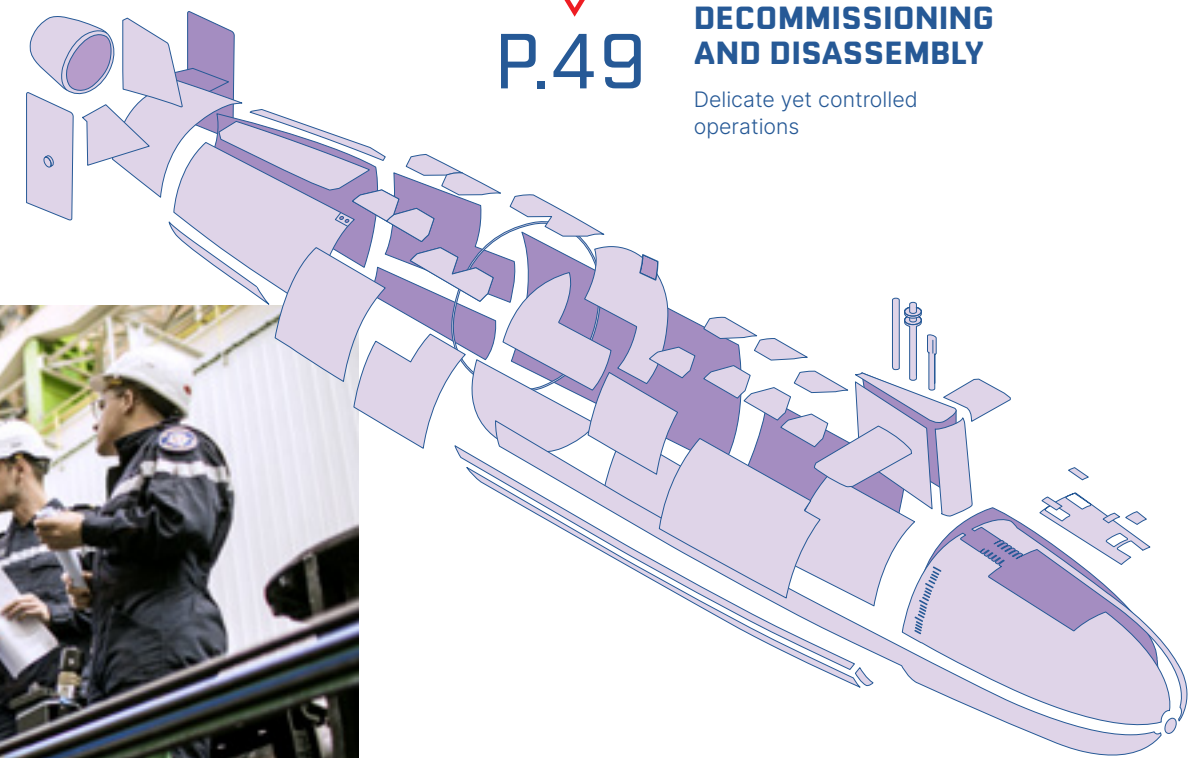


02

**STEP 02: PRODUCTION AND BUILDING**

2020: the year of the "unprecedented", including for the *Suffren* !

P.18  
▼  
P.27



P.50  
▼  
P.61

The key events of the year

Governance in the service of excellence

Surface vessels: products and solutions of excellence

Submarines: in the service of our clients' strategic missions

Stakeholders

# LOGBOOK

2020. What can we take away from this extraordinary year?

At Naval Group, we will remember that, at the height of the crisis, we successfully carried out essential tasks on behalf of our clients. We owe our achievements to both the individual and collective commitment of all our employees. During 2020, each surpassed expectations to contribute to the progress of their site, subsidiary, and more broadly, to the future of our group. To be part of Naval Group is to grow and learn among enthusiasts, innovators and experts, all committed excellence. If there is one memory to cherish from 2020, it would be our ability to serve united as one for the French Navy and our international clients. If there is one memory to cherish from 2020, it will be that one.

NAME	ROLE	DATE TOOK OFFICE
PIERRE ÉRIC POMMELLET	CHAIRMAN AND CEO	2 APRIL 2020

LOGBOOK

*Pierre Éric  
Pommellet*

*24 / March*

## Taking office in the midst of a health crisis

When I joined Naval Group, France had been in lockdown for a week, following in the footsteps of other countries. We have all been fully mobilised by crisis management. Nevertheless, I had a lot of contact with the management teams of each site and function. And I paid our French sites a visit as soon as it was possible to do so while adhering to the health regulations. From these meetings, I remember a tremendous sense of group effort, in all of the professions. The managers had a difficult and essential part to play in fostering dialogue, clarifying strategies and giving things meaning. All of our teams have gone the extra mile to meet our commitments, and we have been able to continue delivering on essential tasks on behalf of our clients, even during the height of the crisis. Thanks to them, we have retained all clients and programs, and for that we feel extremely grateful. It is true that having states as clients provides a certain level of stability, which few business sectors can claim. We have to make good on this fortunate position. Our clients are counting on us, we cannot let them down.



*It is an honour and a source of great pride to be able to serve Naval Group, a resolutely international and forward-looking company with a 400-year history of serving the sovereignty of France.*

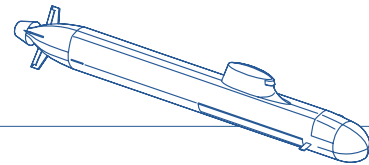
*Naval Group is proud to be present once again alongside Chantiers de l'Atlantique in this European program. This cooperation, which brings together the best expertise from the civilian and military sectors, is beneficial both economically and operationally for our clients.*

18 / May

### Launch of the Logistics Fleet program (FLOTLOG)

The ceremony to cut the first metal sheet for the first of the four replenishment vessels destined for the French Navy officially marked the start of the Logistics Fleet program (FLOTLOG). The phased delivery of these vessels will take place from late 2022 until 2029. Replenishment vessels are tasked with providing logistical support for the French Navy's ocean-going ships, and in particular for the carrier battle group formed around the aircraft carrier.

12 / June



### Fire on the nuclear attack submarine (SSN) Perle

On Friday 12 June, a fire broke out on the nuclear attack submarine (SSN) *Perle*, which had been on a routine stop for repair and maintenance at the Toulon site for several months. The aim of this maintenance work, carried out by Naval Group under the responsibility of the Fleet Support Service (FSS), was to check the structures and installations of the SSN, to regenerate her potential and to modernise her capabilities. The fire was brought under control thanks to the extraordinary action and courage of around one hundred members of the Naval Fire Battalion and fire-fighters from the Var Department of France, supported by more than 150 people who came to lend them a hand. Thanks to them, the crews on board were evacuated and there were no injuries. We thank them deeply. The fire on board the *Perle* had a major impact on us all, painfully reminding us just how central site safety is to our priorities. A coincidence of timing: that same morning, the ballistic missile submarine (SSBN) *Le Téméraire* was successfully completing her launch test, marking for Naval Group the end of the program to adapt French ballistic missile submarines to M51 missiles. This was the result of the work by more than 1,100 employees who contributed to this program at all of our sites, in conjunction with the crew and partner companies.

*I spent several days at the Toulon site, with our teams and partners, all of whom were very much affected by the fire. All of Naval Group shared this emotion with the submarine community, with the French Navy in particular having been very greatly affected.*

03 / September

### Innovating with regions, for regions

On 3 September, we signed a strategic partnership with the Pays de la Loire Region to promote collective projects that will help to establish and inject life into the local naval industrial base. We look forward to being the driving force behind a pivotal partnership for many years to come. The Region is a key partner when it comes to developing forward-looking projects in the area of the factory of the future: additive manufacturing, augmented reality, artificial intelligence, etc.

*Despite the crisis, our ambition to hire young people and experienced individuals remains and we will continue to create training programs and forge local partnerships.*

05 / October

### The FREMM *Alsace* makes her maiden voyage

The multi-mission air defence frigate (FREMM DA) *Alsace* leaves the Lorient site for her maiden voyage. On board: testers, installation operators, teams in charge of health and safety, security, logistics, operations, works, prevention and life on board, i.e. nearly one hundred employees from Lorient, Nantes-Indret, Ollioules and Bagneux who will be working in shifts, day and night. On the client side, representatives of the French government also came on board, along with 62 crew members from the French Navy who have been training for almost a year to sail this



new multi-mission frigate. This maiden voyage – successful completion of which will pave the way for further phased trials up until delivery in April 2021 – is principally intended to test the performance of the propulsion and safety units and the navigation system.

*Thanks to the unwavering commitment of our employees, we have achieved our milestone. Well done to them!*

16 / October

*In ten years, Naval Group will be a Franco-Australian company. There will be nearly 2,000 employees in Australia and Naval Group will contribute to Australian sovereignty.*

**The Australian Future Submarine program continues to build momentum**



our teams in France for training.

Naval Group Australia inaugurates its new premises in Adelaide and welcomes its 250th employee, continuing its growth. At the same time, new Australian engineers have joined

20 / October

**Naval Group welcomes its 400th apprentice to its Lorient site**

As a major player in the naval industry sector, we must focus on preparing the skills of the future. At the start of the 2020 academic year, more than 400 students on work-based learning programs joined our group! Demonstrating commitment to young people is not only about recruiting talent, it is also about promoting their inclusion in the company and integrating them into the group's important decisions. While it is vital to enrich our environment with the dynamism and ideas of these young generations, it is also important to make work-based learning programs a vehicle for developing diversity within the company. We also need to make progress on recruiting and creating opportunities for those with a disability to work on based learning programs and strive towards their full integration. What is more, we must move forward in terms of diversity and the recruitment of female students on work-based learning programs, because careers in the naval defence industry are open to everyone, women and men, in the professions of engineering and design as well as in production!

*The future is getting ready today, with young people!*

19 / October

**Launch of the Naval 2025 transformation program**

On 19 October, after visiting the sites to talk to the teams and organising meetings with the Group's managers and senior executives, I announced the launch of the Naval 2025 transformation program. This program is the synthesis of these discussions in the field. It sets out our five-year aim to achieve the standards expected by our clients: to be the benchmark for naval applications and defence systems throughout all the areas in which we are active, especially in terms of health, occupational safety and environment, quality of delivery and client satisfaction. Naval 2025 is based on four pillars: growth, performance, innovation and talent. These will form the backbone of our roadmaps and action plans, both at company level and within each site or entity.



*Making talent a pillar of Naval Group's transformation reflects the fact that an industrial adventure is above all a human adventure.*

20 / October

**Euronaval in digital form**

This year, for the first time since its creation, the Euronaval exhibition was cancelled due to the health situation. So as to keep up this special meeting with our clients, we digitised the event and reconstructed our stand in our showroom in Ollioules. Over three days, we showcased our products, services and latest innovations from there, and visitors were able to discover various workshops led by our experts.



*Congratulations to the marketing teams who went above and beyond to reinvent and keep up this key event for our sector.*

*The decision to repair the Perle is a sign of confidence in Naval Group. I am confident that our teams will be able to demonstrate our know-how, skills and the excellence of our industrial facilities to meet the needs of the French Navy.*

22 / October

### Announcement of the repair of the SSN *Perle*

The Minister of the Armed Forces, Florence Parly, announces her decision to start the repair work on the nuclear attack submarine *Perle*. Our teams will repair the *Perle* by replacing the front section of the damaged submarine with that of the SSN *Saphir*, which left active duty in 2019. Repair operations began in January 2021 when the *Perle* arrived in Cherbourg, and will continue until delivery, scheduled for early 2023.

06 / November

### The *Suffren* is delivered to the French Defence Procurement Agency

At the Toulon naval base, Naval Group delivers the *Suffren* to its client, the French Defence Procurement Agency (DGA), so that the French Navy can take possession of her following the completion of her sea trials. The delivery of this first nuclear attack submarine (SSN) from the Barracuda program comes at the end of a sea trials phase that took just six months. This is a great achievement in the history of the group, despite the crisis situation caused by the pandemic.



*I salute the commitment of the design and production teams at Naval Group and Technicltome, as well as those at the French Defence Procurement Agency, the French Alternative Energies and Atomic Energy Commission (CEA) and the French Navy. Hundreds of French companies, both large and small, including Naval Group, have rallied around for this program.*

13 / November

### Launch of the FREMM *Lorraine*

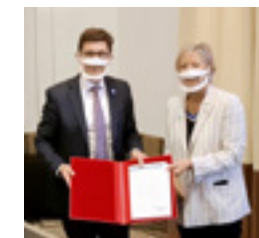
The *Lorraine*, a multi-mission air defence frigate (FREMM DA), is launched in Lorient. Passing this milestone paves the way to the vessel's maiden voyage, which is scheduled for February 2022, and to her delivery as planned on the contractual date, the following November. It bears witness to the industrial and technological expertise of our group and to the resilience of our employees, partners and sub-contractors, who were able to reorganise production and rally round in spite of the challenging health requirements. The *Lorraine* is the tenth multi-mission frigate produced by Naval Group, and the eighth and final one to be built for the French Navy.

*What tremendous pride shared with all the employees to launch the last FREMM of the French program!*

19 / November

### Naval Group signs the Manifesto for the inclusion of people with disabilities in economic life

I am very pleased to have signed, on behalf of Naval Group, the Manifesto for the inclusion of people with disabilities in economic life, at the invitation of Sophie Cluzel, Secretary of State for People with Disabilities at the French Ministry of Social Affairs and Health. Since the creation of our Disability Mission in 2010, Naval Group has been committed to a proactive approach to inclusion. By joining the signatories to the manifesto, Naval Group undertakes to recruit more employees with disabilities, to give pupils and students access to the world of business, to strengthen our economic commitments with adapted companies and to continue to conduct awareness-raising measures with managers, influencers and all employees. Differences make our teams strong. With the signing of this manifesto, our commitment takes a further step towards inclusion for all.



*We will continue to strive resolutely for a fairer company and society.*

08 / December

**The President of the French Republic announces the commencement of studies into the future nuclear-powered aircraft carrier**

We welcome the announcement by the President of the Republic, which will enable France to maintain its position within the very small circle of major powers capable of designing and implementing a nuclear aircraft carrier.



This project will contribute to the development of jobs in the technological and industrial defence base and will ensure the sustainability of our skills during the current health and economic crisis. Naval Group, its partners and the entire associated ecosystem will enable the French Navy to benefit from the best naval systems for

this flagship project. As the overall architect, we are committed to meeting the needs expressed by the French Defence Procurement Agency and the French Alternative Energies and Atomic Energy Commission (CEA), together with our partners Chantiers de l'Atlantique and TechnicAtome, as well as Dassault Aviation. This project will enable the development of innovation in the fields of propulsion and high value-added military systems, thus preserving France's technological lead and its rank as a major power.

*Naval Group is very proud to be building the largest warship that France has ever built.*

11 / December

**Launch of the Humaitá, the second Brazilian Scorpène built in Brazil**

In the course of this event, two major milestones were also celebrated for the other submarines in the series: the final integration of the Tonelero and the ongoing sea trials of the Riachuelo, respectively number 3 and number 1 in the series. A success shared by all the teams in Brazil and France who have worked together on this program, demonstrating – for more than ten years now – the ability of Naval Group and ICN to support their Brazilian clients with the design and construction of their future submarines.

*This milestone reflects the importance of technology transfer: Brazil is now able to design and produce its submarines and maintain them in operational condition.*



# Naval Group: an international group at the forefront of innovation

**15 bn euros**  
French and international  
booked orders

**3.4 bn euros**  
Order intake recorded  
during the 2020 financial year



Naval Group continues to internationalise its business, including in the area of innovation.

## 18 COUNTRIES

- ▼ AUSTRALIA • BELGIUM
- ▼ BRAZIL • CANADA • CHILE
- ▼ COLOMBIA • EGYPT • FRANCE
- ▼ GREECE • INDIA • INDONESIA
- ▼ ITALY • MALAYSIA • NETHERLANDS
- ▼ PHILIPPINES • SAUDI ARABIA
- ▼ SINGAPORE • UNITED ARAB EMIRATES

## 10 SITES IN FRANCE

- ▼ ANGOULÊME-RUELLE  
Equipment, simulators  
and training
- ▼ BAGNEUX  
Systems
- ▼ BREST  
Services
- ▼ CHERBOURG  
Submarines
- ▼ LORIENT  
Surface vessels
- ▼ NANTES (Indret,  
Technocampus Ocean)  
Energy-propulsion, R&D
- ▼ OLLIIOULES  
Systems
- ▼ PARIS  
Headquarters
- ▼ SAINT-TROPEZ  
Submarine weapons
- ▼ TOULON  
Services

**3.323 bn euros**  
2020 turnover  
(in millions of euros, IFRS standards)

**30%**

Percentage of  
turnover generated  
internationally



### A strong recruitment drive

As at 31 December 2020, Naval Group employed 17,000 members around the world. Our target is to recruit 10,000 to 12,000 new talents between 2018 and 2028, both in France and internationally, to respond to the strategic challenges facing the group and to meet our clients' expectations.

### The linchpin of European alliances

Naviris is a joint venture between its two parent companies, Naval Group and Fincantieri. It became fully operational on 13 January 2020. The aim of this alliance is to strengthen Europe's position on the world naval defence market and to jointly combat global competition, in the service of navies.

# A major leader in naval defence, with a unique model

As an international high-tech company, Naval Group uses the extraordinary know-how of its employees and its unique industrial resources and capacity to arrange innovative strategic partnerships to meet its clients' requirements. The company is a partner in the sovereignty of its clients, both in France and internationally. The group designs, produces, supports, upgrades, decommissions and disassembles submarines and surface ships. As an industrial contractor, designer and builder of warships and combat systems, it also provides services for naval shipyards and bases. Aware of its corporate social responsibilities, Naval Group is a member of the United Nations Global Compact.

08

## Design and preparation

# 01

Naval Group's engineers, researchers and experts respond to the technological maritime challenges of tomorrow.

## Training and support

# 03

Naval Group offers its clients a comprehensive range of training and consulting services in all areas of naval defence.

## Maintenance, upkeep and modernisation

Naval Group ensures the operational readiness of surface ships, submarines and equipment.

## 02 Production and building

The industrial sites produce, assemble or build high-tech naval solutions.

## Decommissioning and disassembly

Naval Group performs the disassembly of vessels and the decommissioning of French Navy nuclear submarines.

# 05

# STEP 01

Our naval architects imagine our future vessels years before the first metal sheet is cut.



SITE  
**LORIENT**  
COORDINATES  
**47°45'00" N 3°22'00" W**

SITE  
**TOULON**  
COORDINATES  
**43°07'00" N 5°55'59" E**

SITE  
**PARIS**  
COORDINATES  
**48°51'12" N 2°20'55" E**

# Design and preparation

## \_INTERVIEWS

01  
R&D Architect and Innovation Project Manager in the Architecture, Offers and Preliminary Projects department  
**ALEXIS BLASSELLE, LORIENT**

02  
Head of Submarines Marketing  
**STEPHAN MEUNIER, PARIS**

03  
Head of Eco-design  
**GAËLLE ROUSSEAU, LORIENT**

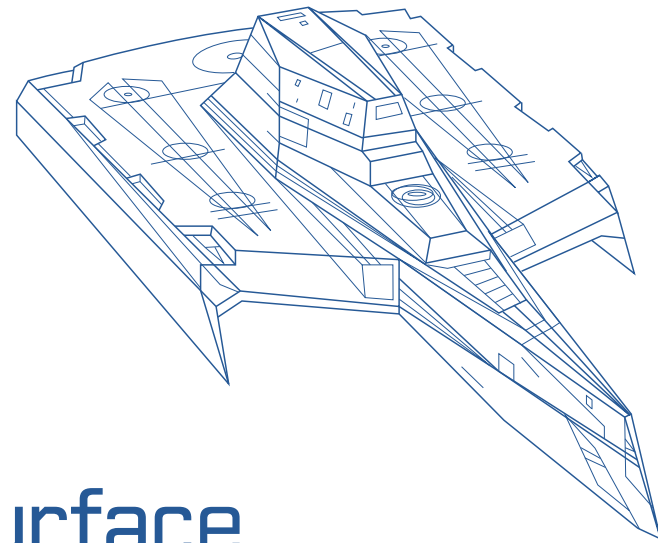
04  
Head of Information Systems Security (ISS)  
**EMMA LOMBARD, TOULON**

MORE THAN **40**  
international partners in the field of innovation

# Designing is necessary innovation



To innovate in design, we bring together operational performance, threats and scientific and technological developments. We draw on decades of knowledge in naval defence and a leading international innovation ecosystem. Intelligent, communicative and digital, our ships are designed to meet three operational objectives: information superiority, superiority of action, and the ability to continue operating with reduced crews.



## Surface vessels

- ▶ **The Concept Lab illustrates Naval Group's avant-garde approach to innovation: open, multifaceted and bold. Not to mention always relevant. Neither a laboratory nor a boat, the Concept Lab is a discourse on method. Immersion with Alexis Blasselle**

The story starts in 2019 with a concept for a military vessel. A boat devised by Alexis Blasselle and her team, performing at a remarkable level: the Sea Striker. At the end, the team shared their conclusion: "The process is at least as interesting as the result." The Concept Lab was born. Today, it legitimises technological choices by establishing the link between performance and innovation... or innovation and performance. "To demonstrate our ability to measure the impact of our technological choices on performance, we have developed four operational scenarios in the Lab: anti-air warfare, anti-submarine warfare,



◀ The Concept Lab, demonstrating our innovation.



◀ Alexis Blasselle giving a presentation during the Euronaval digital 2020 exhibition, held at the Naval Group showroom in Ollioules.



**Alexis Blasselle**, architecte R&D et chef de projet Innovation au département Architecture, offres et avant-projets de Naval Group à Lorient

evacuation of nationals and protection of oil platforms in the exclusive economic zone (EEZ). For each, we compare two models: one referred to as "distributed", made up of several small units, and the other called "centralised", a classic model of high-capacity multi-mission vessels."

### LEGITIMISING OUR INNOVATION CHOICES

In 2020, the Concept Lab was one of the pillars of Euronaval's Innovation space. What was the objective? To showcase innovation in its most meaningful light, demonstrating, with mathematical support, how it contributes to the desired performance objectives. Alexis Blasselle emphasises the need to make the link between innovation and performance. "If you cannot prove the relevance of the innovation, it is meaningless and not legitimate in the eyes of our clients. Technological solutions must be useful, and navies expect a leading industrial player like Naval Group to put innovation at the service of their needs, their requirements and their contextual challenges." ▶



◀ Examples of concept ships presented at Euronaval.



### 3 QUESTIONS PUT TO...

Gaëlle Rousseau,  
Head of Eco-design

Gaëlle Rousseau integrates environmental responsibility from the earliest stages of thought when it comes to designing the products of tomorrow.

**Ship eco-design is not new for Naval Group...** Since 2008, eco-design has been gaining momentum. Initiated on the vessels, it is gradually being rolled out to our entire offer, including services. In 2019, 50% of our vessels had a proactive environmental approach. And by 2020, 100% of them are part of the eco-design process.

**What is your mission and your method?** I help design products with the lowest possible environmental impact, without compromising performance, taking into account client requirements and regulatory constraints. It is at the convergence of this and the responsible approach of Naval Group that I propose solutions. Naval Group is certified in accordance with ISO 14001, a standard that now applies to the entire product life cycle\*. From that starting point, our approach is logical: mapping of environmental risks by product range (impacts vary from one type of vessel to another), and the variation of requirements for programs to achieve solutions that reduce the overall environmental impact.

**For the defence and intervention frigate (FDI), what did you propose?** In particular, our proposals aim to meet the requirements of the International Maritime Organization (IMO) and specific client requests (for example, Cleanship classification from Bureau Veritas). We have also put forward proactive measures such as management of energy efficiency and diesel consumption, and the integrated management of organic waste.

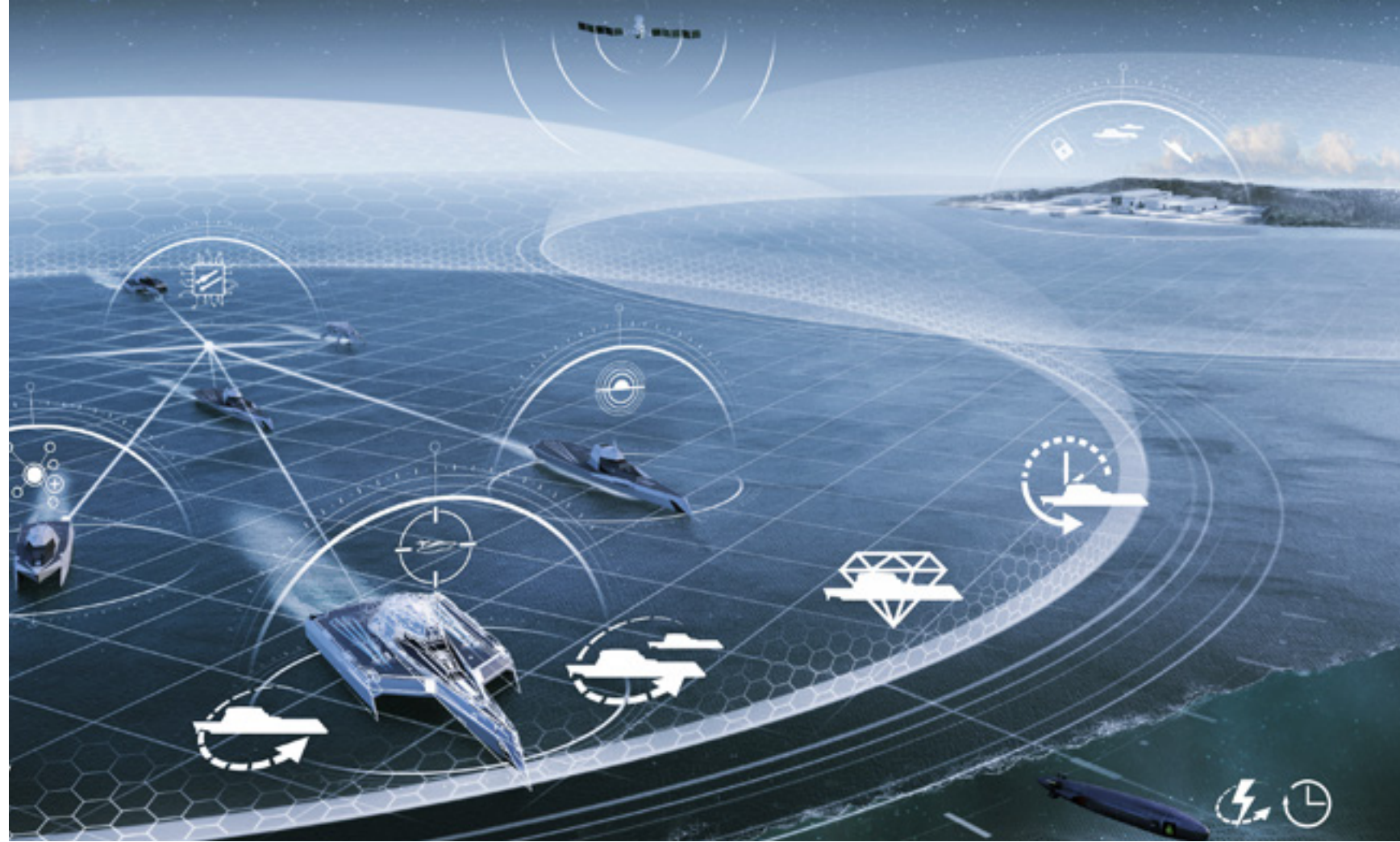
\* ISO 14001 evolved in 2015 to cover products in addition to industrial sites

Facing up to the evolution of threats requires ever faster and more efficient methods. Among them, developing "collaborative combat" capabilities across an entire air-sea force is a serious advantage.

## “ How to stay ahead of the cybersecurity threats?

Cybersecurity is a strategic issue for all the players in naval defence. Our integrated approach covers ships and services, design, production and maintenance facilities, and our supply chain. What is the objective? To ensure the cyber resilience of our systems and vessels. This global approach allows us to anticipate, analyse and manage cyber attacks from multiple sources, such as mafia organisations, hackers or espionage, with the help of our Computer Emergency Response Team (CERT). All our employees are made aware of the cyber threat via a campaign and dedicated training measures. ”

Emma Lombard, Head of Information Systems Security (ISS)



### ► THINK DIFFERENTLY IN ORDER TO INNOVATE

However, simply meeting expectations is not enough. You also have to come up with things that no one else has thought of. In order to put forward completely new concepts, we have to wipe the slate clean, reverse the paradigms, and think differently. “This is the only way to achieve a breakthrough. In my job, I am lucky to have the freedom to do so. It is with this mindset that we are designing the surface ships of tomorrow.”

### IMAGINING THE FUTURE WITH A NEW LOOK

Alexis Blasselle is far from a novice when it comes to innovation. “Since 2015, innovation and looking forward have been at the heart of my work. I consider how to integrate incremental innovations or ground-breaking ones into surface vessels. My research is based on the main global geostrategic trends, with themes ranging from artificial intelligence to the contributions of quantum computing, from cybersecurity to new modes of propulsion in naval architecture.” In her day-to-day work, she looks forward around fifteen years. How will war be fought in the future? What operational capabilities will navies need in the face of shifting and poorly understood

threats, and even those that are totally overlooked at present? How can resource allocation be optimised to ensure that vessels are as robust and reliable as possible? So many questions, and many more, which do not have to be answered but for which we must now “imagine possible answers”, thanks in particular to the Concept Lab. The task is stimulating. It requires a holistic vision and “a mix of candour and pragmatism”, but also, and this is essential, a strong capacity to listen and exchange, because the starting point is to integrate operational requirements at microscopic level. Nothing less than all this to imagine the surface ship of tomorrow that is “adaptable, resilient and evolving, capable of facing new threats and working cooperatively as part of a naval force in increasingly uncertain and complex environments”. ►

Examples of concept ships presented at Euronaval.



### ISSUE BRIEF

#### Cyber by design mine hunters

As part of the Mine Counter Measures (MCM) mine hunters program, Belgium and the Netherlands have set very ambitious targets for cyber security. To ensure the highest level of cyber security for the Belgian and Dutch navies, Naval Group has focused on training the system architects. Of course, cyber is integrated into all of the design phases in a cyber by design approach. However, for MCM, Naval Group has gone further by asking cyber and combat systems management experts to undergo in-depth training. This has resulted in the training of around twenty systems engineers involved in the program, in two parts. The first part of the training dealt with cyberlanguage and general practices to be followed. The second, more in-depth and practical, focused on the specific requirements of MCM and the points to watch out for. The trainers capitalised on the feedback from a similar training course conducted as part of the multi-mission frigates (FREMM) program. Beyond the programs, Naval Group wants systems engineers to appropriate cyber-culture and integrate it “natively” into the day-to-day practice of their profession.



▲ The SMX® 31 E can monitor areas ten times larger than presently possible.

# Submarines

► **Stephan Meunier invites us to take a journey into the future with the SMX® 31 E, a concentrated blend of intelligence, stealth and autonomy. The two most notable elements of Naval Group's 2020 concept ship are her powerful propulsion system and energy storage capacity.**

While autonomy is becoming an asset for all vessels, the submarines of the future will also have to be resilient. Naval Group's concept ship allows the crew to be submerged for months thanks to her efficient energy management system.

## SEEING FAR AND WIDE

Our naval architects are continuously designing solutions for tomorrow's naval defence. "In the decades to come, while the oceans are subject to ever-increasing surveillance thanks to powerful and more numerous submarine forces, navies, for their part, will be confronted with an increasingly complex and threatening environment", says Stephan Meunier.

**“ Artificial intelligence is at the service of humans, not the other way around! ”**

**Stephan Meunier**, former sailor and submarine expert for Naval Group

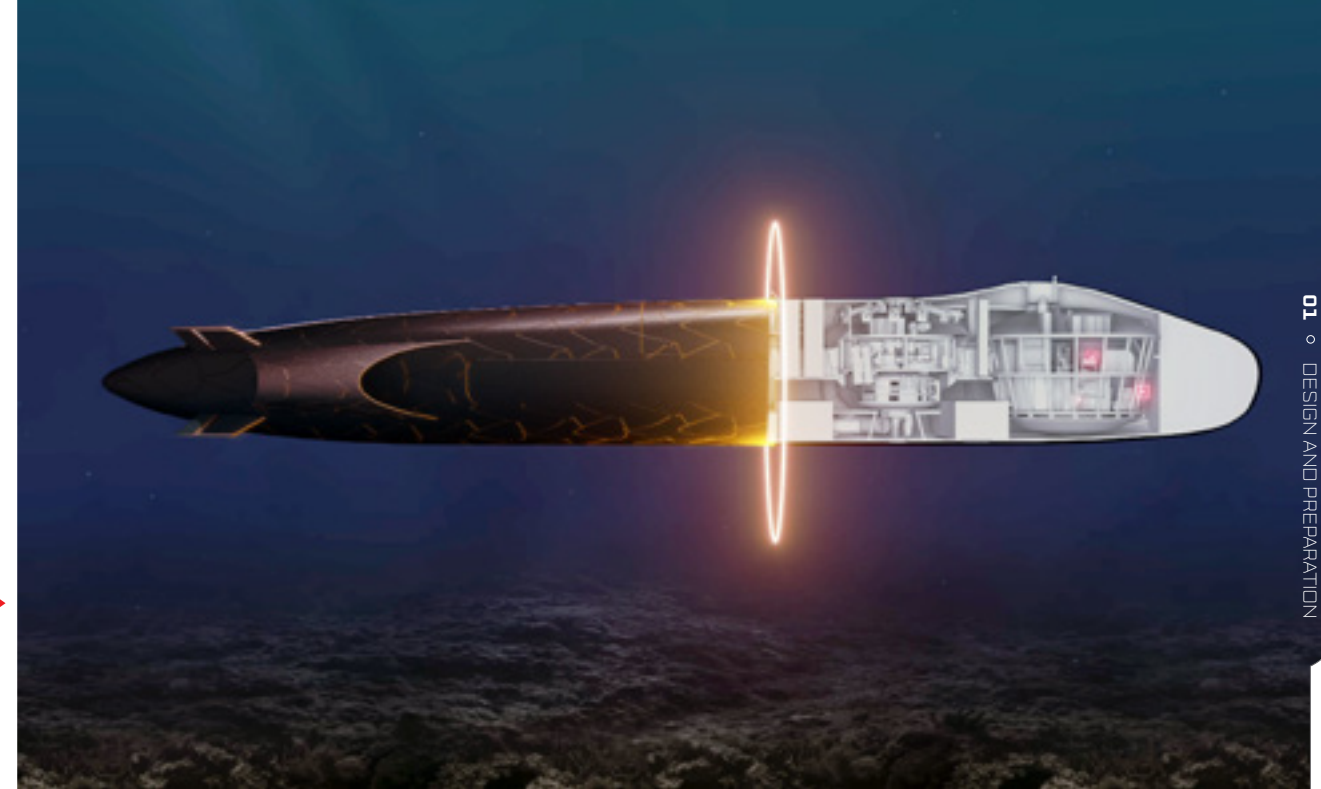


## ISSUE BRIEF

### Naval Innovation Hub: a catalyst for breakthrough innovation

Created in 2018, the Naval Innovation Hub aims to initiate and support Naval Group's breakthrough innovation approach, with an open and customer-centric mindset. Its activities range from researching innovative technologies directly linked to the world of start-ups, laboratories and intrapreneurship to training in new working methods, and also encompass the development of business plans including for commercial partnerships and equity investments. A model that favours diversity and complementarity of profiles, moving away from a strictly technocentric framework.

► Multi-mission and benefiting from increased efficiency, the SMX® 31 E is more stealthy thanks to her biomimetic coating.

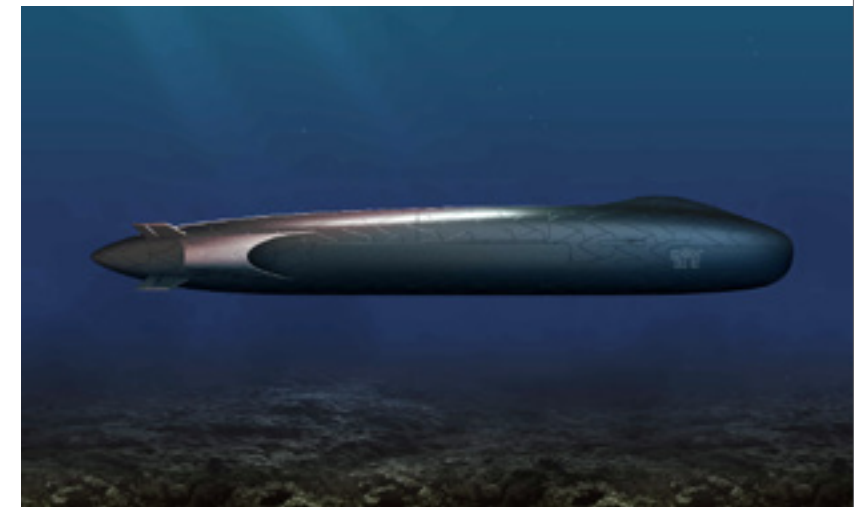


that can integrate sensors. The result? An acoustic signature reduced to a minimum. The stealth of a submarine is her strength. Resilience is the other advantage of the SMX® 31 E, which can be submerged for months thanks to her innovative and efficient energy management system.

## IMPROVED CAPABILITIES

For Stephan Meunier, the SMX® 31 E is the idea behind the conventional submarine of the future. "She is a highly intelligent submarine, capable of processing huge quantities of data from all her sensors (including remote ones, such as underwater drones, buoys or gliders) and data generated by the AI, in order to present the command with vital information for rapid and reliable decision-making." The SMX® 31 E is certainly intelligent, but it is also collaborative. Using advanced AI technology, it can interact effectively with the rest of the fleet. The result? The SMX® 31 E can monitor areas ten to twelve times larger than the current Scorpene® vessels. A capability that is strengthened by her numerous networked drones. Finally, with regard to weaponry, the SMX® 31 E can carry some twenty weapons, including cruise missiles, anti-surface ship missiles and torpedoes fired from lateral torpedo tubes firing forward... but also from the stern,

with tubes firing aft! So where do humans fit into all of this? For Stephan Meunier, "The human element remains absolutely essential for interpreting, deciding and implementing the right decisions at the right time". No technology or AI will ever replace the leadership and expertise of an experienced command. "AI is at the service of humans, not the other way around!" ◀



▲ This submarine of the future has an unequalled electrical energy storage capacity and a new propulsion system.

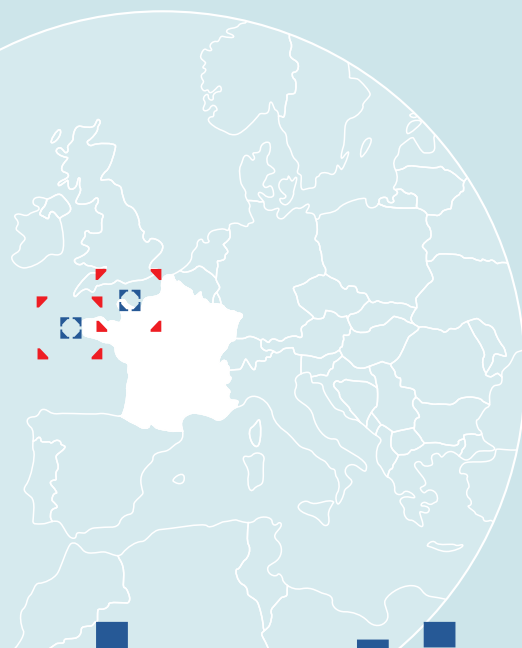


SITE  
**CHERBOURG**

COORDINATES  
**49°38'23" N  
1°36'58" W**

SITE  
**BREST**

COORDINATES  
**48°23'59" N  
4°28'59" W**



# STEP 02

In order to complete our new construction programs, our industrial sites produce, assemble or build high-tech naval solutions.

# Production and building

## \_INTERVIEWS

01

Microsoft HoloLens advisor at the Barracuda cradle site  
**PIERRE JARNET, BREST**

02

Head of the Barracuda Series Move-In Operation  
**THIBAUT CHANEL, CHERBOURG**

03

Head of Works on the Barracuda Cradles  
**GILDAS PENSEC, BREST**

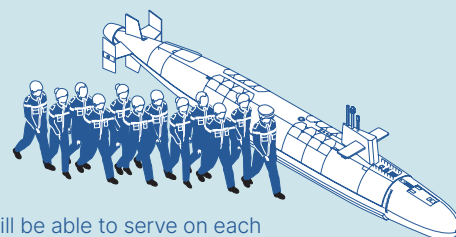
04

Suffren Post-Acceptance Project Manager  
**LAURENCE CHANU, CHERBOURG**

05

Welder  
**FARID MOUSSAOUI, CHERBOURG**

# 63



women and men will be able to serve on each Suffren-class nuclear attack submarine (SSN).

# 2020, the year of the "unprecedented", including for the Suffren!



- Suffren ▶ 2020
- Duguay-Trouin ▶ 2022
- Tourville ▶ 2024
- De Grosse ▶ 2026
- Rubis ▶ 2027
- Casabianco ▶ 2029

Suffren  
a catalyst  
of expertise

Tests validating the technical performance of a latest-generation nuclear attack submarine (SSN) in just six months, a qualification announced with that of two new weapons systems, and a delivery to the French Navy, on time and in the midst of a health crisis. 2020 will remain the year in which a long-term project was completed, bearing the seal of the determination and passion of exceptional men and women.



▲ 28 July 2020. The *Suffren* arrives in Toulon for further trials before delivery.

► **Thirteen years after her first metal sheet was cut in Cherbourg and eighteen months after being launched by the President of the French Republic, Emmanuel Macron, the *Suffren*, the first of six nuclear attack submarines (SSN) of the eponymous class, was delivered by Naval Group to the French Defence Procurement Agency (DGA) on 6 November 2020.**

During this event, which took place at the Toulon naval base in the presence of the Minister of the Armed Forces, the Chief of Staff of the French Navy, the Delegate General for Defence Procurement and the Chairman and CEO of Naval Group, the submarine was transferred to the French Navy.

**Hervé Glandais,**  
Barracuda  
Program Director



Her entry into active service in 2021, twenty-three years after the launch of this ambitious program, will provide further proof of France's maritime supremacy and military sovereignty. More versatile, more manoeuvrable and also more discreet than the six first-generation SSNs (Rubis class), the *Suffren* and her five sisterships will each carry 63 men and women for up to 90 days. Yes, for the first time, a submarine has been designed from the outset to accommodate a mixed crew. But let's get back to the *Suffren's* 2020 news. At the turn of the year, this first of the series underwent a major industrial step, namely the start-up of her nuclear boiler system by the TechnicAtome and Naval Group teams. The operation, known as divergence, consists of initiating a controlled nuclear reaction of her core for the first time. A success!

#### SIX MONTHS OF TESTING

Following this, Naval Group, its clients and partners prepared for the sea trials. The group had not carried out such a campaign for a French submarine prototype for ten years. The last time, it was *Le Terrible*, the fourth Triomphant-class ballistic missile submarine (SSBN). The background of the pandemic that led to the first lockdown throughout France obviously weighed on the meticulous preparation of these tests. "It had to be coupled with radical sanitary measures," stresses Hervé Glandais, Director of the Barracuda program. "We developed a health protocol to safeguard the health of the crew and our employees, with a preventive fourteen-day quarantine, mask wearing and pre-departure testing. The working methods therefore had to be adapted to limit the impact on the schedule. When the *Suffren* left Cherbourg harbour on the morning of 28 April for her maiden voyage, some people held their breath while others finally breathed! Both on board and on the quayside, all the teams remained on permanent duty to carry out an extensive and in-depth program of tests. ►

“ A day of great pride for our nation.”

“ Yes, you did it. Together, you have designed and built an exceptional submarine that will guarantee our independence and will be the symbol of our sovereignty and the linchpin of our freedom of action. Together, you have played an active role in the renewal of the French Navy's strategic capabilities, supported by the Military Planning Act, which has enabled the French Navy to acquire a weapons system that only the world's greatest powers have. And I am sure that the admiration of our submariners for the performance of this new SSN, their eyes shining at the sight of the *Suffren*, is the best tribute that can be paid to your work. ”

**Florence Parly,** Minister of the Armed Forces,  
Toulon, 6 November 2020



▼ 6 November 2020. The Minister of the Armed Forces, Florence Parly, presides over the ceremony to receive the nuclear attack submarine (SSN) at the Toulon naval base.



▲ The arrival of the *Suffren* in Toulon.



**Feedback on the trials**

Laurence Chanu from Cherbourg, *Suffren* Project Manager post-reception, took part in the trials over the course of several days in autumn 2020, off Toulon. An unprecedented experience that she describes as “an exceptional adventure”. Once the nervousness surrounding the departure had passed, the perfectly orchestrated ballet of the submariners on board quickly reassured her, and fascinated her as well. “At night, at the central navigation operations station, everything is muffled and peaceful: the voices of the sailors, the luminosity due to the red lighting. The atmosphere takes a unique, almost fantastic turn.” Aware of the “enormous luck” and “privilege” of having been able to travel on the vessel while “there are many of us who are building this submarine and dreaming of going on board”, Laurence Chanu admits to having felt a sense of separation when the *Suffren* left Cherbourg in the spring. “Seeing the boat again was a real moment of happiness!” When she started working on *Barracuda* in 2005, the contract had not yet been signed. “We were in the pre-project phase. I was young, just out of school: everything was new. I was involved in the design of installations, then in manufacturing and now in testing. As part of the integrated team, we’ve given a lot to get this submarine out on time. That was our common goal. Seeing it come to life underwater is a wonderful conclusion.”



▲ July 2020. The *Suffren* nuclear attack submarine (SSN) carrying out sea trials off Brest.

▼ The *Suffren* is 99.50 metres long.



▼ The arrival of the *Suffren* in Toulon.



- ▶ The *Suffren* firstly carried out an initial static dive off Cherbourg to check her perfect watertightness and her weight before continuing with a series of surface tests on the availability of her steering system, testing her propulsion system and calibrating her navigation system. Before the summer, she made her first dynamic dives in the Atlantic, at increasingly greater depths and speeds.” Then the *Suffren* headed for the Mediterranean, where another series of trials (of her combat system, in particular) awaited her in Toulon. Between 1 September and 20 October, several synthetic firings of different weapons were successfully carried out, sealing years of combined efforts for Naval Group’s Submarine Weapons Business Unit, for MBDA and the teams of the Toulon, Ollioules, Angoulême-Ruelle and Cherbourg sites.

These firings involved the F21 heavyweight torpedo (the replacement for the F17), the SM39 missile and the long-range naval cruise missile. While the *Suffren* is a nuclear submarine because of her on-board boiler room, the tactical weapons system (TWS) gives her the status of a nuclear attack submarine. Why “attack”? In addition to the conventional missions of protecting ballistic missile submarines (SSBNs) or escorting valuable vessels, such as the *Charles de Gaulle* aircraft carrier, the *Suffren*-type SSN will add new actions: strikes on land, discreet implementation of special forces, notably thanks to a swimmer lock-in/lock-out compartment and the optional carriage of a dry deck shelter capable of deploying commando underwater vehicles, etc. The demonstration of the perfect operation at sea of this eminently complex tactical weapons

system is also the fruit of a mere decade of work for its team. Finally, on 1 November, 100% of the sea trials were completed after just 180 days – 100 of which were at sea – of a campaign that was conducted with great enthusiasm. Six months of testing compared to fifteen for the previous *Triomphant* submarines: this feat speaks volumes about the perseverance of the teams involved. It was thanks to this collective commitment that “the *Suffren*’s good performance was confirmed, demonstrating that this submarine had been remarkably designed and built”, says Hervé Glandais. ▶



Started in 1998 for the renewal of the Rubis nuclear attack submarines (SSN), the Barracuda program has benefited from ten years of studies, with the first metal sheet cut in 2007 and delivery of the first in the series in 2020.

## The Suffren: a catalyst of expertise supporting French sovereignty



50 million hours of work and more than 10,000 people will be involved over the duration of the program to complete this industrial challenge successfully.



In total, the Barracuda series consists of six SSNs that will be built and assembled at Naval Group sites.



Through her technical prowess and international influence, the Barracuda will ensure France's status as a great power in the world.



12 July 2019. The President of the French Republic, Emmanuel Macron, is in Cherbourg to celebrate the transfer of the Suffren to the launch platform (LP).



Due to her performance and cutting-edge technology, the Barracuda inspired the Australian order for 12 conventionally-powered submarines.



Rare and specific expertise, skills cultivated over decades: throughout the program, Barracuda has made it possible to combine innovative capacity and centuries-old know-how.



## COMMENT

### Axel Roche, first pasha of the *Suffren*

On Friday 8 January 2021, Commander Axel Roche, commanding officer of the *Suffren* spoke to the managers of the Angoulême-Ruelle site to share his experience after 110 days at sea aboard the first Barracuda nuclear attack submarine (SSN). He also gave a review of the facilities in Ruelle.

"I want to share with you my attachment to and enthusiasm for this new attack submarine: ultra-modern, more manoeuvrable, better armed, more discreet, more efficient, resilient, fully automated and truly safer in operation. Together with my crew, we experienced this exceptional testing adventure with all the more passion because the results were so good. This passion was shared with the industrial teams. We all had determination in common! The descents to maximum immersion allowed us to observe the remarkable watertightness of the submarine. Not a single drop! And that is true performance and the result of remarkable work. Redundancies in the different steering modes with two joysticks, the option of switching to automatic mode on the steering or diving with the different steering units make it possible to be more resilient in the event of damage. This has therefore improved the safety of the submarine's steering".

Acoustic superiority, increased operational capabilities, latest-generation systems: the *Suffren* is an instrument of power at the service of the nation.



### FIRST STOP FOR MAINTENANCE

Shortly after her delivery, in December, the *Suffren* was entrusted to the care of Naval Group's Services department teams for her first stop for maintenance. Maintenance tasks and final works were carried out in the brand new MY01 dock in Toulon. In the meantime, two new Barracuda cradles were transferred from Brest, the second assembly centre for the series engine frames, to Cherbourg. Under the leadership of Gildas Pensec, Head of Works on the Barracuda cradles, Pierre Jarnet supervises the installation of these multiple supports fixed to the cradles, which are themselves suspended inside the hull sections to ensure the stealth of the vessel. In this key phase for minimising risk during the welding operations, as in Cherbourg during the hull outfitting stage, the use of augmented reality goggles has enabled considerable gains to achieve the desired compliance. In Cherbourg, the first feedback from the *Suffren* has been gradually analysed and taken into account. Anomalies and new requests had to be resolved and studied before being integrated into the rest of the series. A constant race for Thibault Chanel and his colleague Julien Falaize, both responsible for the move-in operation for the Barracuda series, who have to reconcile the ordinary and the extraordinary within an extremely constrained timeframe. "All our teams are rallying around so that the transfer of the *Duguay-Trouin*, the second in the series, to the launch platform will take place on time in September 2021, without neglecting the other submarines – the *Tourville*, the *De Grasse*, the *Rubis* and the *Casabianca* – which must also benefit from these improvements." Moving from this "pilot boat", the *Suffren* being a pure prototype, to series production models that can be delivered at a rapid rate (one unit every two years until 2029), requires a rigorous and controlled industrial organisation that must be adapted to the economic challenges of the program. Watch this space! ◀

## IN THE MEANTIME...

# The Barracuda program progresses at a brisk pace

Spread over eight sites, more than 2,500 employees are helping to ensure several industrial milestones are successfully met on the next five vessels, whilst always maintaining their focus on the safety, quality, cost and deadline criteria. An update on the schedule.

In the pipeline, the second in the series: the *Duguay-Trouin*. In November 2020, the front and aft sections of the *Duguay-Trouin* hull were joined together. "Quite a symbol" for Farid Moussaoui, hull welder in Cherbourg, and the teams of carpenters, grinders, preheaters, welders and inspectors.

Ten days before, each move of this complex operation had been meticulously rehearsed, in positions that were often acrobatic due to the cramped space and crowding with the other employees. "Keeping a cool head in an overheated atmosphere that is difficult to bear: on the big day, we are not entitled to make mistakes." *Duguay-Trouin* will be delivered in 2022. The third vessel, the *Tourville*, is being built alongside the *Duguay-Trouin* at the Cherbourg site. At the Naval Group site in Nantes-Indret, the assembly of the propulsion system and the nuclear boiler module of the fourth vessel, the *De Grasse*, is under way. The sections and parts of the nuclear boilers for the *Rubis*, the fifth, and the *Casabianca*, the sixth, are currently being machined at Naval Group's Cherbourg and Nantes-Indret sites respectively.



### CALENDAR OF DELIVERIES

	Delivery
<i>Suffren</i>	2020
<i>Duguay-Trouin</i>	2022
<i>Tourville</i>	2024
<i>De Grasse</i>	2026
<i>Rubis</i>	2027
<i>Casabianca</i>	2029

\_INTERVIEWS

<p>01</p> <p>Head of the Customised Training department, Naval Group University <b>HERVÉ GILLOTEAU, BREST</b></p>	<p>02</p> <p>Naval Architect specialising in service and instruments <b>GEORGIA MCLINDEN, CHERBOURG</b></p>
<p>03</p> <p>Officers Manager <b>ALEXANDRE BERTHELOT, BREST</b></p>	<p>04</p> <p>Specialist in technical training, Naval Group University <b>JASON MAMMINO, CHERBOURG</b></p>

STEP **03**

Naval Group also contributes to the sovereignty of States through technology transfer and training.

# Training and support



SITE  
**CHERBOURG**  
COORDINATES  
**49°38'23" N  
1°36'58" W**

SITE  
**BREST**

COORDINATES  
**48°23'59" N  
4°28'59" W**

SITE  
**ADÉLAIDE (AUSTRALIA)**

COORDINATES  
**34°55'43" S  
138°35'55" E**

**2,000**



internal trainers are made available by Naval Group for the transfer of expertise and know-how.

## Building sovereignty with technology transfer



Their names are Katelin, Georgia, Adam and Maurizio: Australian engineers who have come to France to complete their training as part of a technology transfer. A cornerstone of Australian sovereignty, technology transfers support the progress of the Australian Future Submarine (AFS) program. AFS is successfully fulfilling each of its milestones in the face of the challenges posed by the health crisis. The latest is the systems functional review (SFR), the objective of which is to validate the functional specifications of the vessel with the client.

► **At the heart of the Australian Future Submarine (AFS) program is probably the most successful form of technology transfer, a capability that makes Naval Group proud and unique. Very few manufacturers can claim this. From India to Brazil, via Egypt, Naval Group has a proven track record in this field. Thanks to these successful transfers, carried out over many years, Naval Group has made its mark by its ability to train and support navies and their industrial partners.**

#### TECHNOLOGY TRANSFER, A SOVEREIGNTY ASSET

The acquisition of knowledge and know-how by means of technology transfer enables navies to get the most out of their fleets and to intervene directly at certain key stages in the lifecycle of their vessels. When the naval bases are as far away from Naval Group's industrial sites in France as Itaguaí in Brazil or Kota Kinabalu in Malaysia, the technology transfer makes sense. Yet it is also the best way for States to exercise their strategic, industrial and economic sovereignty by gradually absorbing key skills. In 2016, when the Commonwealth of Australia selected Naval Group to design and build 12 Barracuda-derived submarines (since named Attack class), it naturally placed the technology transfer at the heart of the program. While the pre-studies are underway, training and technology transfers are the focus of attention from the outset. The AFS technology transfer will take place over many years, firstly in France where the engineers who will make up the program's design authority for sustainment are trained, then in Australia in all the trades related to the design and construction of submarines, from naval architecture to industry, as milestones are reached. Thanks to a mix of lectures, e-learning and on-the-job training, i.e. in real or simulated situations, delivered in a flow aligned with the arrival in France of groups of engineers who will then acquire experience by working for a significant period of time in an integrated manner in French teams, Australia is gradually acquiring the resources essential to the full exercise of its sovereignty. This will require greater autonomy in terms of skills, which will enable the 12 submarines to be built on site, and then for numerous industrial and maintenance operations to be carried out.

This means, by extension, a strong local economic dynamic, since AFS will rely on Australian industry with the aim of maximising local content and employment in Australia.

#### CHERBOURG AND NANTES ON AUSTRALIAN TIME

January 2021: a small group of Australian engineers moves to Nantes to work on the Platform Land Based Test Facility (PLBTF) at Nantes-Indret, Naval Group's propulsion site. In Cherbourg, where the vast majority of the submarine's design activities are concentrated, the very first batch of Australian engineers arrived in the autumn of 2017 and there are now around thirty of them working in the engineering teams. Most of them came for three years, as a couple or with their family. Beyond the professional challenge, they see it as an opportunity to live the Cherbourg experience (most of them want to live in the city centre) and, who knows, when the time comes, the French experience. Vincent-Daniel Moreau, a Franco-Australian

► 12 Attack class submarines will be delivered to the Royal Australian Navy.



◀ Despite the health crisis, the program passed the Systems Functional Review (SFR) milestone on time in January 2021. This crucial stage establishes the architectural choices for the definition of the Attack class submarines.

who heads the team in charge of preparing for the Australians' arrival and supporting them throughout their move, says that "joining AFS means working on a very high-tech product that contributes to Australian sovereignty while creating a strong link with France and the French way of life". While the design phases of the program will take place mainly in France until 2023, they will eventually be carried out in Australia, where Naval Group Australia will set up its own design office. Also in the pipeline is the creation of a Technical Educational Centre run by Australian employees. It will maintain the initial trained profiles so as to ensure the capacity to produce locally, as desired by the Commonwealth of Australia. In the meantime, the engineers are following a well-trodden path. Recruited in Australia, they spend a few months in the subsidiary before a long immersion period in the design offices in Cherbourg or Nantes. They then qualify as design authorities for sustainment after one to three years of extensive, diversified and specialised training, followed by a period of actual work allowing them to acquire experience. Back home in Australia, these "black belts" will in turn be able to address design and industrialisation issues and train other teams. ►



### 3 QUESTIONS PUT TO...

#### Nola Wakeford, Director of Human Resources (HR) for the AFS program

Nola Wakeford supervises the French and Australian HR teams involved in this strategic phase of the program. The growth of resources in Australia and France will make it possible to support the development of Australia's submarine capacity, without which the sovereign deployment and upkeep of its future fleet of submarines could not be guaranteed.

#### Does the AFS program face any particular challenges as far as training is concerned?

The AFS program is truly unique in terms of training. It calls for long-term planning to ensure that the necessary resources will be available at the right time in all the trades involved within the submarine sector, from the design stages through to the construction process.

#### How are you placed now, as of early 2021?

More than one hundred employees are set to join us in engineering during the first fifteen months of the second phase of the contract, and the program's management team will welcome around forty employees. This number is in addition to the Australians who are mainly on assignments lasting three to five years in France and who are pursuing tailored career paths as part of the technology transfer program. These experienced engineers will be authorities in design matters on their return to Australia and, in turn, will be able to pass on the expertise they have acquired in France.

#### The AFS program will be entering the industrialisation phase in 2023. What do you have planned?

We have been focusing on workforce planning for the past year and we are aware of the sheer scale of the task! Our recruitment and training forecasts are extremely detailed and make provision for many control points and emergency plans. We are already planning the training for the industry trades that will be implemented in late 2023. Over and above our training programs in France, we are working to establish our own training and education centre in Australia. The aim is to ensure that we have the necessary resources to develop the skills of NavalGroup Australia in all trades, and especially engineers, technicians and maritime workers. This approach will go hand in hand with numerous job opportunities, both locally and in France, with more than 400 additional contributors required between 2021 and 2023. Some of these people will work solely on the AFS program, while others will contribute to different programs. The job vacancies will be published on our website. The Australian market is highly competitive. It is vital to attract and retain a lot of talented employees so that they join us as part of this exciting program and stay with Naval Group to pursue their careers and ensure the supply of Australian submarines.



▲ A group of Australian engineers in training at the Cherbourg site.

“ I am part of the 3rd cohort of design authority that arrived in summer 2020. As such, I’m dedicated to safety, an essential aspect of seaworthiness.

My training aims to understand Naval Group engineering process and design principles so I can pass on that knowledge to other engineers back in Australia. Designing and building a submarine is one of the most complex undertakings there is. I’m proud to contribute to a program that is of the utmost importance to Australia. ”

**Adam McLeod**, mechanical engineer, acting as a safety engineer



“ In October 2020, I moved to France with my family and joined Naval Group University.

The challenge is: how do you transfer 100 years of submarine knowledge to Australia? Without knowledge, there’s no sovereignty. A major part of my role is to adapt the existing training material to the Australian context. Our educational and training systems are different, so it’s essential and nothing like a cut-and-paste exercise. From a personal perspective, my family and I love it here.”

**Jason Mammino**, technical training specialist, Naval Group University



“ After I arrived, I spent three months studying all aspects of submarine design.

After I arrived, I spent three months studying all aspects of submarine design. It was very much like an engineering classroom. It was both amazing and a steep learning curve, with multiple acronyms getting in the way. I had studied French in Australia, which eased my understanding and integration. The thing that struck me is that people over here have been in naval defence for generations. It’s a family thing. ”

**Georgia McLinden**, naval architect, works in the Method and Tools department



◀ October 2020. Visit of Jean-Pierre Thébault, French Ambassador to Australia, to the Cherbourg shipyard.



“ All training within the AFS program is delivered by Naval Group University.

We are designing bespoke courses for the Australian technology transfer, with the aim of building all 12 Attack class submarines locally. To this end, we are adapting existing design processes and providing training in all design professions, including in our own schools such as the Cherbourg School of Move-In Operations, the first to be inaugurated. ”

**Hervé Gilloteau**, Head of the Customised Training department, Naval Group University



**Hughes House, an Australian enclave in Cherbourg**



Named after Rear Admiral Oscar Hughes, who played a key role in the history of Australian submarines, the Resident Project Office Hughes House accommodates the AFS program activities in Cherbourg. Eighteen months after its inauguration in July 2017, the Australian enclave has expanded its footprint to support the program's ramp-up. The additional 195 m<sup>2</sup> have revitalised the teams by providing them with new collaborative work spaces and meeting rooms. Physically integrated into the original building, the extension houses Naval Group's customer service, project management office (PMO), data management, whole warship and shipyard teams, as well as the Commonwealth of Australia and Lockheed Martin Australia teams. The extension also welcomes visitors, primarily suppliers and partners of the program.



► **HUMAN RESOURCES: STRATEGIC SUPPORT**

Since the first batch arrived in Cherbourg in late 2017, two more have followed. The ramp-up is dynamic, with the program progressing according to schedule, despite the continuing unprecedented health requirements. The action plans implemented by the program's human resources are precisely in line with this progress. Strategic and involved, based in both countries, they work closely together to anticipate and manage the flow of engineers and technicians to France. Their action plans are implemented by Naval Group University, a real strike force for employee and client training. Finally, the integration of Australian colleagues is made possible thanks to the involvement of managers who welcome them into their teams and the mentors who support their development. In addition to the technical technology transfer and understanding of AFS issues, the Australian engineers acquire language skills in France, so as to maximise the sharing of knowledge by the French "wise ones". They also take part in intercultural workshops to improve communication with their counterparts. ◀



**An all-round training offer**

In addition to training its employees, Naval Group University implements training programs for the group's clients as part of technology transfers and naval training. Alexandre Berthelot, Offers Manager, explains: "More broadly, Naval Group's offer includes simulators (including on the largest scale), maintenance, combat systems, platforms, cybersecurity and on-board computing. It covers the entire range of industrial processes: building, verification, qualification, purchasing, integrated logistics, planning and logistics for naval bases. In order to deploy it, Naval Group sets up industrial training schools and dedicated crew training centres on behalf of its clients. What is more, digital training, from e-learning to simulators, continues to grow in importance within the group." Finally, to disseminate knowledge, Naval Group can count on a pool of 2,000 in-house trainers or "wise ones". They use proven and adapted approaches, in line with the standards and practices of training organisations.

**Alexandre Berthelot,**  
Offers Manager



**IN THE MEANTIME...**



**France-Brazil:  
a long-term  
mutual  
commitment**



ners are qualified on simulators before setting sail. It is therefore crucial that they can be trained under conditions similar to those on board. Simulators are also used to keep skills up to date between naval expeditions.

As part of the Prosub technology transfer, the support provided by the Naval Group back office is really valuable: its employees have helped us to resolve minor issues that have arisen so far and provided us with tailored documentation. Over the next six years, they will remain in direct contact with us to ensure that the simulators are running smoothly and that they are kept up to date."

**In 2008, France and Brazil signed a military cooperation agreement embodied, as far as naval defence is concerned, in Prosub (Programma Submarino). The transfer of technology is an integral part of this. In charge of simulator maintenance for the Brazil Navy, Thiago Costa explains.**

"Boosted by an ambitious technology transfer program, Naval Group began helping us increase the power of our submarine forces 12 years ago. As a reminder, the first phase of Prosub consists of building 4 conventional submarines in Itaguaí, a new workshop and operational naval base. The program then involves designing and building a new class of nuclear attack submarine, still in Brazil. While awaiting delivery of the first Brazilian Scorpène®, its crew rotates between lessons and training on simulators provided by Naval Group in 2018. In Brazil, submari-

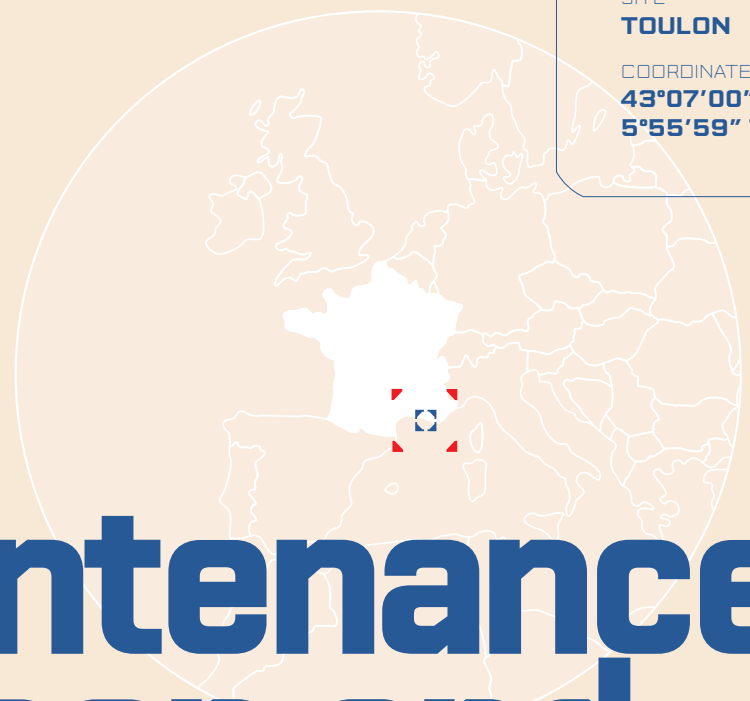
» **Brazilian teams have been trained in Cherbourg for a number of months so that the Scorpène® can be manufactured and assembled in Itaguaí. "**

**Thiago Costa,** Head of Simulator Maintenance for the Brazilian Navy



# STEP 04

Restoring the ship's potential, dealing with technical facts and adapting the vessel to the needs of the crews: these are the objectives of in service support (ISS).



SITE  
**TOULON**

COORDINATES  
**43°07'00" N**  
**5°55'59" W**

# Maintenance, upkeep and modernisation

36

## \_INTERVIEWS

01  
Head of the Vauban Dedicated Site department  
**JÉRÔME CHARRIER, TOULON**

02  
Prevention Consultant to the Health and Safety in the Workplace and Environment (HSE) department  
**ADRIEN COULOMB, TOULON**

03  
Director of the I-maintenance Program for the K-Team  
**SYLVAIN DUGARET, TOULON**

04  
Work Packages Manager for the Combat System  
**MARGOT FRACCHIA, TOULON**

05  
Lead Production Engineer (LPE)  
**MAXIME STEFANUTO, TOULON**

100%

In 2020, the end of availability dates were met for the technical shutdowns planned for the FREMM multi-mission frigates.

# FREMM *Auvergne*: an exceptional technical shutdown



On 23 March 2020, with France having been in lockdown for a week, the Fleet Support Service (FSS) decides to continue the technical shutdown (TS) of the multi-mission frigate (FREMM) *Auvergne*. The country is at a standstill, the lack of visibility is total, but the end date of the work, scheduled for 10 July, remains unchanged. It is up to the Services Department teams to meet the challenge...



In February 2020, the FREMM *Aquitaine* underwent her technical shutdown at the Brest site.



### 3 QUESTIONS PUT TO...

Guillaume de Garidel,  
Central Director of the Fleet  
Support Service (FSS)

#### How was the sequence of technical shutdowns (TS) of the multi-mission frigates (FREMM) prepared?

The scheduling of the technical shutdowns is based on a five-year cycle for all of the vessels in the fleet, taking into account the operational constraints and infrastructures. For FREMM maintenance, the contractual schedule updated every six months is the basis on which Naval Group prepares for technical shutdowns. Each FREMM has at least one technical shutdown per year, and the exchange of documents with the FSS to prepare for it starts between six and nine months before the technical shutdown begins.

#### What is the FSS's assessment of this cycle of TS?

The availability of the FREMMs has considerably improved since 2018 and was good in 2020. The deadlines imposed and the technical scope of the TSs were generally respected, despite the dense scope of the work. The FREMMs are highly capable ships that form the backbone of our fleet. It is therefore desirable that the bulk of the maintenance tasks be concentrated during technical shutdowns and essential that the end of availability dates (EADs) be met.

#### Are you satisfied with the investment of the Naval Group teams during the health crisis?

It was brought under control thanks to everyone's commitment, in compliance with prevention measures. These measures were applied effectively and without major impact on the works: the fact that the date of exit from the dry dock was maintained and the absence of cases of COVID-19 demonstrate this. Certainly, some sizeable but non-essential tasks were deferred in the short term. The *Auvergne* entered the dry dock a fortnight late, but left on time! This required, and demonstrated, an excellent sense of mission and cooperation between the crew, Naval Group and the subcontractors. Success was achieved through a high level of trust and constant dialogue, sometimes lively but always constructive.

#### AN OUTCOME BEYOND EXPECTATIONS

In the last week of March, in the midst of the COVID-19 pandemic, the core of the Services department returned to its offices to organise the return of the teams and to make trade-offs with the Fleet Support Service (FSS), the project owner for the works. In concrete terms, 345 of the 467 tasks planned were retained and 20 changes were made to the 65 initially planned. "Although the scope of the work had to be scaled down, given the circumstances, it was possible to carry out almost all of the preventive maintenance tasks initially scheduled," stresses Maxime Stefanuto, Lead Production Engineer (LPE) on the multi-mission frigate (FREMM) in service support (ISS) program. Lockdown prevented some of them. However, by the end of July, all tasks were completed." At the end of the project, 457 tasks and 35 changes were completed. In addition, the teams focused on demonstrating the compliance of the work by providing nearly 100% of the reports by the vessel's end of availability date (EOA). The sea trials then went ahead without any problems, which reflects a good control of the quality of the services.

The FREMM *Auvergne* is the sixth ship in the series, which comprises 10 vessels, including 2 FREMMs with reinforced air defence capabilities (FREMM DA).



#### MAJOR WORK

Some work – on the shaft system, steering gear, hull valves and sleeves, and hull paintwork – can only be carried out in the dry dock. For this first technical shutdown of the *Auvergne* with passage to the dry dock, the site teams were therefore eager to fulfil their commitments. "The entire combat system has benefited from a software upgrade," continues Margot Fracchia, Work Packages Manager (WPM) for the Combat System. The sonar suite was successfully overhauled after it was removed, thanks to the deployment of significant resources by the Logistics and Combat Navigation departments." In addition, the client wanted to increase the capacity for crew. "Although we were informed of this request at a late stage, we created 15 additional berths, adapted and changed the life rafts and added a water heater and ventilation," says Maxime Stefanuto. "This development involved major work, requiring the participation of numerous trades and logistical resources. The *Auvergne*

was the first FREMM of the series to benefit from this and the working documents we had were still at the draft stage. However, thanks to the fact that the Engineering, Supply Chain, Purchasing and Site employees rallied around strongly, we were able to meet the high expectations of the FSS and the crew. This is one of the technical shutdown (TS) success stories!"

#### GOOD RISK MANAGEMENT

"In order to ensure that the new health regulations are applied, all the site's resources were involved: Lead Production Engineers (LPE), Work Package Managers (WPM), preparers and Health and Safety in the Workplace and Environment (HSE) employees, department managers and social partners," recalls Jérôme Charrier, Head of the Vauban Dedicated Site department. Each work line was subject to a health risk assessment to define the number of participants and the preventive measures (masks, direction of traffic, etc.) to be deployed. ▶

At present, the FREMMs *Aquitaine*, *Bretagne* and *Normandie* are based in Brest. The FREMMs *Provence*, *Languedoc* and *Auvergne* are based in Toulon.



“As far as safety is concerned, the technical shutdown involving the *Auvergne* brought with it a significant amount of work in terms of total risk prevention: in addition to the complexity associated with the vertical simultaneous activity in the dry dock and with the heavy workload, we had to very quickly rethink the way we were working to limit interaction on board and in the offices.”

**Adrien Coulomb**, Prevention Consultant to the Health and Safety in the Workplace and Environment (HSE) department



▶ The prevention and safety office, through which all workers on the site pass, was modified. We organised the flow of traffic, including inside the FREMM, to avoid contact as much as possible, and adapted the intervention times to limit concurrent work.”

“The challenge was to complete as much of the work as possible in a shorter time, since the TS started a fortnight later than originally planned, and with a reduced workforce,” explains Margot Fracchia. “The time slots for interventions were therefore extended.”

“This preparation presented a real challenge because we did it in a very short time,” adds Jérôme Charrier. “However, the measures that we implemented to limit health risks as much as possible have proved effective: this painstaking work enabled our production facilities to grow in strength rapidly and in a controlled manner. This performance was coupled with good compliance with safety rules, as no accidents with work stoppages occurred during the TS.”

#### COMMITMENT AND TEAM SPIRIT

“At the beginning, I feared that it would be difficult to have the teams available: not only did the employees come back as soon as necessary, but their commitment has been remarkable. Instead of driving us apart, the health crisis brought us closer together and everyone gave their best to enable the ship to set off on its mission again”, says Margot Fracchia. In addition, the collaboration of the Naval Group teams with the crew of the *Auvergne*, who took charge of some of the maintenance tasks, was particularly strong during this TS. “We worked in symbiosis with the crew and shared the same desire to move forward”, confirms Maxime Stefanuto. “This was a factor in our success!” “Despite the challenges, everyone involved rallied around a common objective: returning the vessel to availability. The production teams seized their mission with both hands. Although this TS was a succession of sprints, it encouraged mutual support and team spirit and was ultimately a success”, summarises Jérôme Charrier. ▶



◀ The construction of a FREMM represents approximately 3 million working hours, a significant part of which benefits the subcontracting chain.



#### The FREMM program

15 years of know-how and expertise in the service of the program and our clients

- 2005**  
Launch of Europe's largest naval defence program
- 2012**  
Delivery of the *Aquitaine*, the first of eight FREMM anti-submarine vessels
- 2014**  
Delivery of the FREMM *Mahammed VI* to the Royal Moroccan Navy
- 2015**  
May: successful firing of a naval cruise missile from the *Aquitaine*, a first in Europe June: delivery of the *Provence*, delivery of the *ahya Mistr* to the Egyptian Navy, final qualification of the SETIS® combat system developed by Naval Group
- 2016**  
March: delivery of the *Languedoc*
- 2017**  
April: delivery of the *Auvergne*
- 2018**  
July: delivery of the *Bretagne*
- 2019**  
July: delivery of the *Normandie*
- 2020**  
October: first sea trial of the *Alsace*, the first of the two FREMM air defence vessels  
November: launch of the *Lorraine*, the tenth and last unit, marking the end of the FREMM program
- 2021**  
Delivery of the *Alsace*
- 2022**  
Delivery of the *Lorraine*

## IN THE MEANTIME...



Since the launch by Florence Parly, Minister of the Armed Forces, of the repair of the nuclear attack submarine (SSN) *Perle*, the Naval Group teams have been hard at work performing this unusual work, which will take six months to complete. This project is a major challenge for our client and will allow the French Navy to ensure it possesses the SSN fleet it requires to carry out its missions.



- ◻ 2nd half of 2020  
Confirmation of the feasibility of repairing the SSN *Perle* by creating a hybrid with the SSN *Saphir*. Launch of detailed studies in parallel with the work, with more than 100,000 hours of engineering studies: design of the added mesh, completion of the related plans, identification and qualification of joining technologies, drawing up the safety and performance files that will be necessary in order to obtain authorisation to dive.

# SSN *Perle*: an exceptional repair

- ◻ End of 2020  
Preparatory work completed on the SSN *Saphir* with cutting and dismantling of the bow section equipment in order to carry out the out-of-service maintenance and repair (IPER) work which will restore the *Saphir*'s hull to its full capacity. The SSN *Perle* leaves Toulon for Cherbourg.
- ◻ Q1 2021  
End of the work dismantling the bow section of the SSN *Saphir*, preparation for exit from Le Homet and positioning on the launch platform (LP). Positioning on the launch platform (LP) for the SSN *Perle*.
- ◻ End of Q1 2021  
Cutting of the two thick hulls of the SSN *Saphir* and SSN *Perle*.
- ◻ Q2 2021  
Once the four sections have been obtained in this manner, the stern of the *Perle* and the bow of the *Saphir* will be positioned face-to-face and then welded together. Once the two sections have been welded together, commencement of the work to join the 120 electrical cables and 80 manifolds that run through the submarine from bow to stern.
- ◻ End of Q2 2021  
Removal from the launch platform (LP) for the SSN *Perle*.

“We will live up to the trust placed in us by our authorities, clients and partners. The Naval Group teams have a mastery of the techniques and expertise needed to complete each stage of the repair work.”

**Franck Ferrer**, Director of the Services department programs and Head of Operations on the *Perle*.





The FREMM *Languedoc* was delivered on 16 March 2016. This is the fifth ship in the FREMM series.

## Focus on the other technical shutdowns in 2020

► “In 2020, the FREMM maintenance workload was very heavy”, observes Laurent Michel, FREMM Program Director in the Services department. “The volume of work was high, both in terms of the number of technical shutdowns (TS) and in terms of content, since the work included a large proportion of evolution orders, i.e. adding capacity. The health crisis that occurred in the spring was an additional difficulty, which we overcame thanks to the effective measures put in place on our sites and the strong commitment of our teams. All technical shutdown end of availability (EOA) dates have been met: we are proud to have succeeded in keeping our commitments to allow the sailors to return to their missions!” The installation of the SAMAHÉ® (helicopter docking and handling system) and the addition of 15 berths to increase the capacity of the FREMMs are among the main changes made to the ships in service. In addition, the transition of the FREMMs to a double crew means that they have to sail even more. “Naval Group, which was awarded an availability contract

by the Fleet Support Service (FSS), has started to rethink its model”, adds Laurent Michel. “Its employees now intervene as soon as a system is damaged, including when the vessel is at sea or in a port other than her base port. In this respect, the pandemic, with its border closures and cancellations of stopovers, accelerated the process. We are developing new remote support methods and tools that rely more on the crews, as illustrated by the remote support operation of the FREMM *Languedoc* tested from September to November 2020, while the ship was deployed in the Indian Ocean. We are continuing to consider how to improve remote support for Navy units and make them more independent, in conjunction with the rear bases formed by the dedicated shipyards. In 2020, we also accelerated the experiments that were under way on the analysis of ship operating data, with a view to issuing recommendations for implementing predictive maintenance. This is one of the major challenges for 2021.”



**Autumn 2019**

**February 2020**

TS of the *Aquitaine* (Brest) and *Languedoc* (Toulon)

**April 2020**

**July 2020**

TS of the *Auvergne* (Toulon)

**June 2020**

**July 2020**

TS of the *Bretagne* (Brest)

**August 2020**

**January 2021**

TS of the Moroccan FREMM *Mahammed VI* (Lorient)

**September 2020**

**November 2020**

TS of the *Provence* (Toulon) and *Normandie* (Brest)

**December 2020**

**February 2021**

New cycle of technical shutdowns for the *Aquitaine* and *Languedoc*

### I-MAINTENANCE IS BEING DEVELOPED ON FREMMs

“Created in 2017, the Intelligence Maintenance System (IMS) offers three services based on a data recording and analysis function: system monitoring, damage anticipation and problem-solving assistance”, states Sylvain Dugaret, Director of the I-Maintenance Program at K-Team, the team responsible for initiating and developing new services for the French Navy and foreign navies. Since then, the development of algorithms by the Integrated Digital Support Operational Centre (COSIN) has moved on to a concrete utilisation phase. The first applications have been installed on the FREMM *Auvergne* to monitor one of its four diesel generators. The crew can now continuously monitor the operating status of the injectors, coolants and various filters, and crew members are alerted if these are not normal. In addition, based on the analysis of the data transmitted, the COSINs of Brest and Toulon can issue recommendations and the visits can be postponed. “The point of i-maintenance is to move away from a systematic maintenance plan towards carrying out maintenance as needed and at the right time”, says Sylvain Dugaret. “Thanks to the algorithms that we have embedded, the service life of certain components can be extended by 25%. During technical shutdowns of the vessel, preventive maintenance can be adjusted and corrective maintenance anticipated, which ultimately increases vessel availability. As said vessels are increasingly complex, the objective is also to meet the demand from our clients, both in France and internationally, to improve the autonomy of crews by providing them with on-board assistance in resolving damage.”



### 3 QUESTIONS PUT TO...

Yves Le Goff,  
Commanding Officer of  
the FREMM *Languedoc*

**What are the advantages of remote support for sailors?** When a ship is deployed far and wide, as the *Languedoc* was between April and November 2020, remote support is definitely of interest. The solution is based on simple, easily controlled tools: a tablet, a camera and an endoscope. Thanks to real-time photo and video sharing, these tools allow the crew to carry out certain maintenance operations, interacting with a Naval Group expert who guides them from the mainland. This expert's specialist knowledge brings something to the procedure because he or she is at the heart of the diagnosis and intervention. This saves a considerable amount of time and the availability of the vessel improves.

**When do you make use of this?** Naval Group's expertise is required when the approach to a problem needs to be well documented, even if the subsequent intervention is not complicated. We have used remote support for diagnostic and repair assistance, in particular to set up and adapt a new gas turbine human-machine interface (HMI) and repair the degaussing circuit.

**What focuses for improvement can you suggest?** Remote support could be extended to all operations that are technically manageable for a sailor accompanied by an industrial expert. We have the right tools at our disposal. The limitation is the area of responsibility of each party, which is defined contractually. The challenge is to develop the remote in service support (ISS) model by assessing the added value provided by Naval Group's expertise in a different way Maintenance, upkeep and modernisation.

The Lorient site plays the largest role in the production of a FREMM frigate, with the support of the Ollioules site for the combat system, Nantes-Indret for propulsion and Angoulême-Ruelle for equipment.



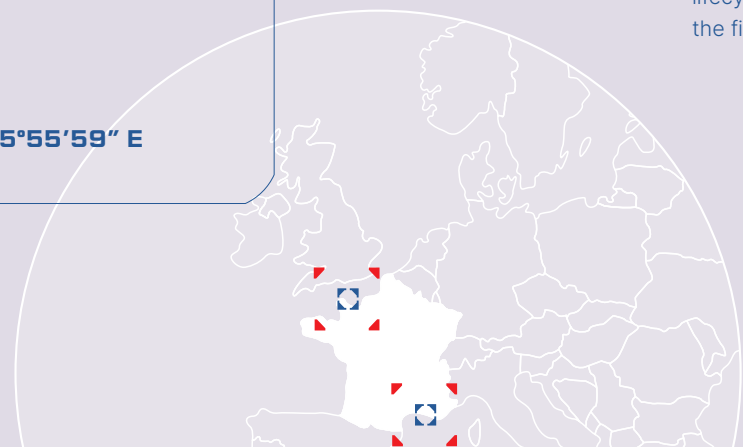


SITE  
**CHERBOURG**

COORDINATES  
**49°38'23" N 1°36'58" W**

SITE  
**TOULON**

COORDINATES  
**43°07'00" N 5°55'59" E**



# STEP 05

Our expertise covers the entire lifecycle of the vessel, including the final stages.

# Decommissioning and disassembly

18 MONTHS

This is the average period of time required for the step of disassembling a submarine

## \_INTERVIEWS

<p>01</p> <p>Operator <b>ÉRIC MARTIN, TOULON</b></p>	<p>02</p> <p>Director of the Submarine Disassembly and Decommissioning Programs <b>OLIVIER LEZIN, CHERBOURG</b></p>	<p>03</p> <p>Head of Health and Safety in the Workplace and Environment (HSE) <b>AURORE DESFOUGÈRES, CHERBOURG</b></p>
--	---	--

## Delicate yet controlled operations



At the Cherbourg site, Naval Group is continuing to execute two contracts awarded by the French Defence Procurement Agency (DGA): the level 1 disassembly of the first of five Rubis-class nuclear attack submarines (SSN) and the decommissioning of five first-generation nuclear-powered ballistic missile submarines (SSBN) (the sixth is kept at the Cité de la mer, a science and entertainment park dedicated to undersea exploration, located in Cherbourg), which began in September 2018 and is scheduled for completion in 2027.

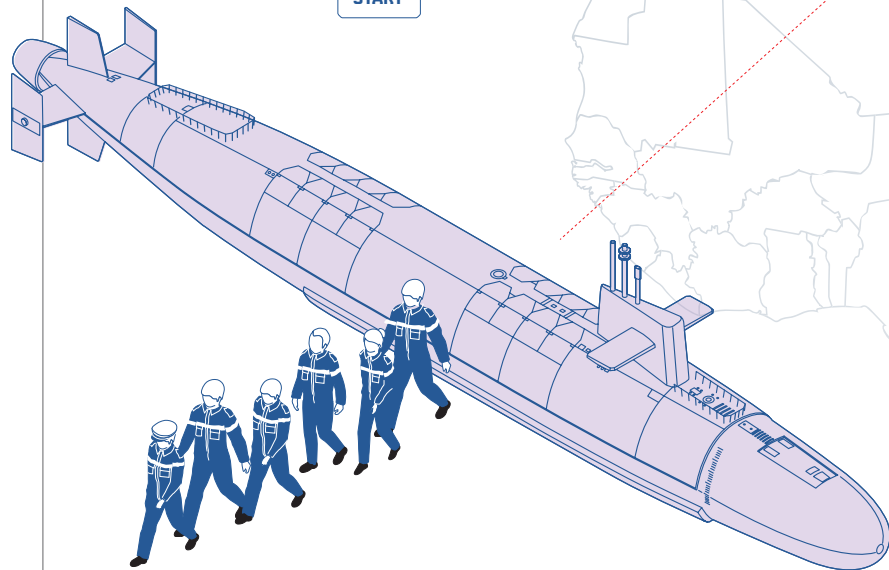
Having entered the dry dock in July 2019, the nuclear attack submarine (SSN) *Saphir* was withdrawn from active duty the following month. Her level 1 disassembly took place between August 2019 and June 2020. Following the fire on the SSN *Perle* in June 2020 and the proposed solution for her repair, the *Saphir* nonetheless remained in the dry dock in anticipation of cutting out her bow section and splicing the bow section of the *Perle* in its place. After this operation, the work to secure the hull thus created will be finalised and the submarine will remain at the quay for at least two more years, before her level 2 disassembly. At the same time, the *Indomptable* entered the dry dock for decommissioning on 9 March 2020. This was the second ballistic missile submarine (SSBN) to be decommissioned by Naval Group. Focus on the fifth stage of the vessel lifecycle: decommissioning and disassembly.

PHASE  
**1**

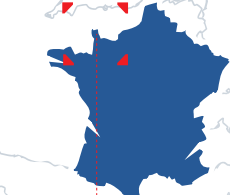
**WITHDRAWAL FROM ACTIVE SERVICE**

A milestone officially marking the end of a ship's operational use, a precursor to final decommissioning operations.

START



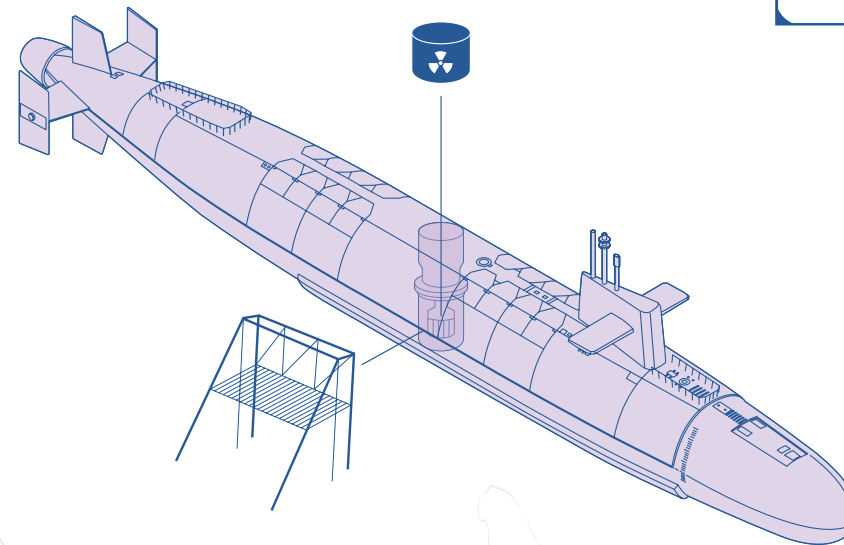
CHERBOURG



PHASE  
**2**

**DECOMMISSIONING**

The objective of decommissioning is to evacuate all radioactive materials and waste from the French Navy's former submarines (SSN and SSBN) to the various sites of the French National Agency for Radioactive Waste Management (ANDRA). The activity is focused on the reactor unit of the vessels but also deals with penetrating circuits. It is divided into three levels.



PHASE  
**2.1**

**LEVEL 1**

- Removal of the fuel from the core of the nuclear boiler system.
- Securing the hull: the hull penetrations are welded to ensure its long-term watertightness; sacrificial anodes are installed to prevent corrosion. The aim is for the ex-submarine to be able to remain safely at the quay for years to come, both in terms of the vessel herself and the environment.

12 MONTHS

PHASE  
**2.2**

**WAITING AT THE QUAY PHASE**

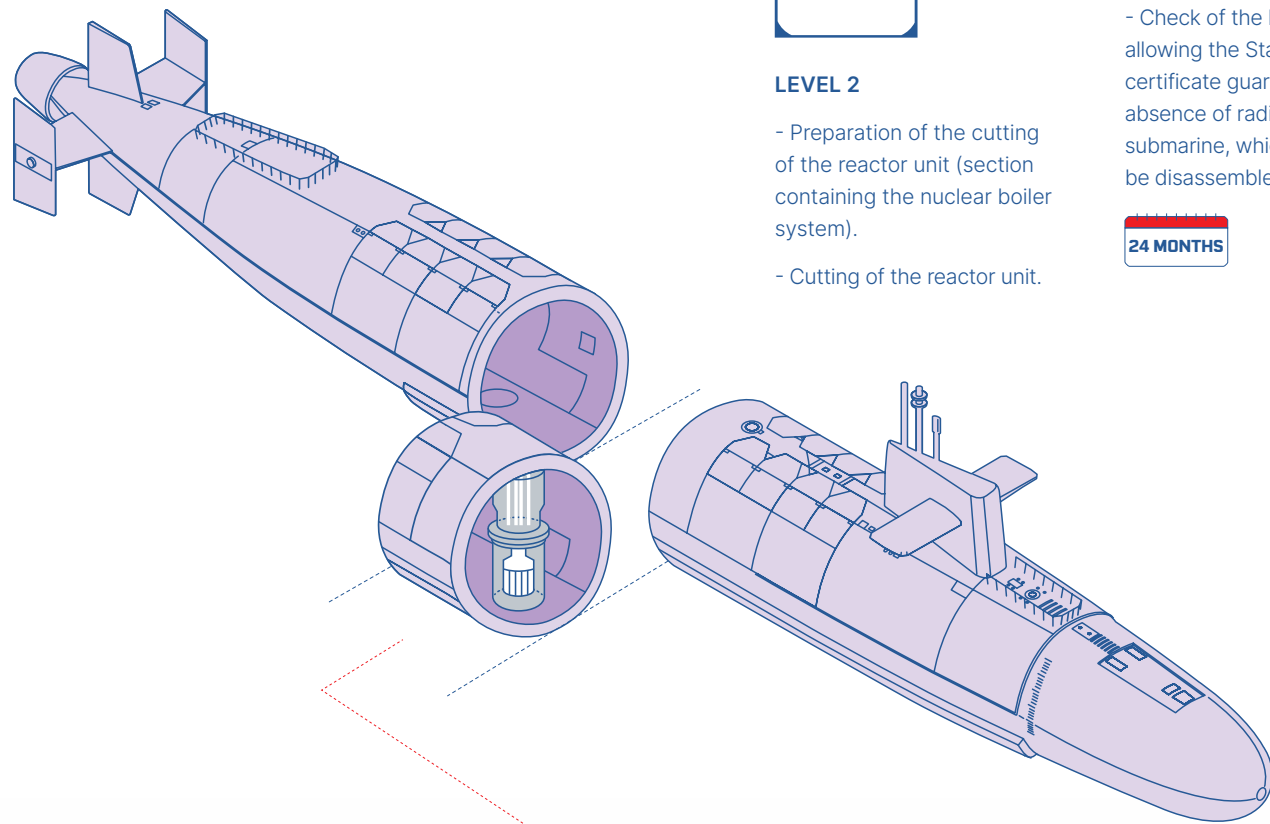
A minimum of three years is required for the radioactivity to decrease sufficiently to allow the subsequent operations to be carried out safely.

3 YEARS

“ The start of disassembly work on the former SSBNs, which involved some 60 employees and subcontractors, was preceded by ten years of studies, including a risk analysis. Safety and environmental issues are taken into account right from the planning stage. They are an integral part of every phase of the project, right up to the feedback phase. This has made it possible to improve the processing of the second hull (formerly the *Indomptable*), which will run until September 2021. This new activity includes decontamination operations, large-scale oxycutting work with a naked flame, and numerous outdoor handling operations with various types of construction equipment (tower crane, mobile crane, forklift trucks, etc.). To prevent risks and make the work of operators as easy as possible, a common reference system has been created, combining the cultures of the construction industry and Naval Group. In 2020, thanks to the involvement of all the teams, the results in terms of health, safety at work and the environment (HSE) were satisfactory and confirmed by the AFNOR audit conducted in early 2021. ”

**Aurore Desfougères**  
Head of Health and Safety in the Workplace and Environment (HSE) at the Cherbourg site





PHASE  
**2.3**

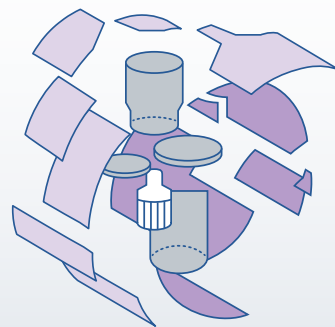
**LEVEL 2**

- Preparation of the cutting of the reactor unit (section containing the nuclear boiler system).
- Cutting of the reactor unit.

- Removal of the reactor unit and storage on a platform at the secret basic nuclear facility (INBS) at Le Homet.

- Check of the hull's respicing allowing the State to issue a certificate guaranteeing the absence of radioactivity on the submarine, which is then ready to be disassembled.

24 MONTHS



PHASE  
**2.4**

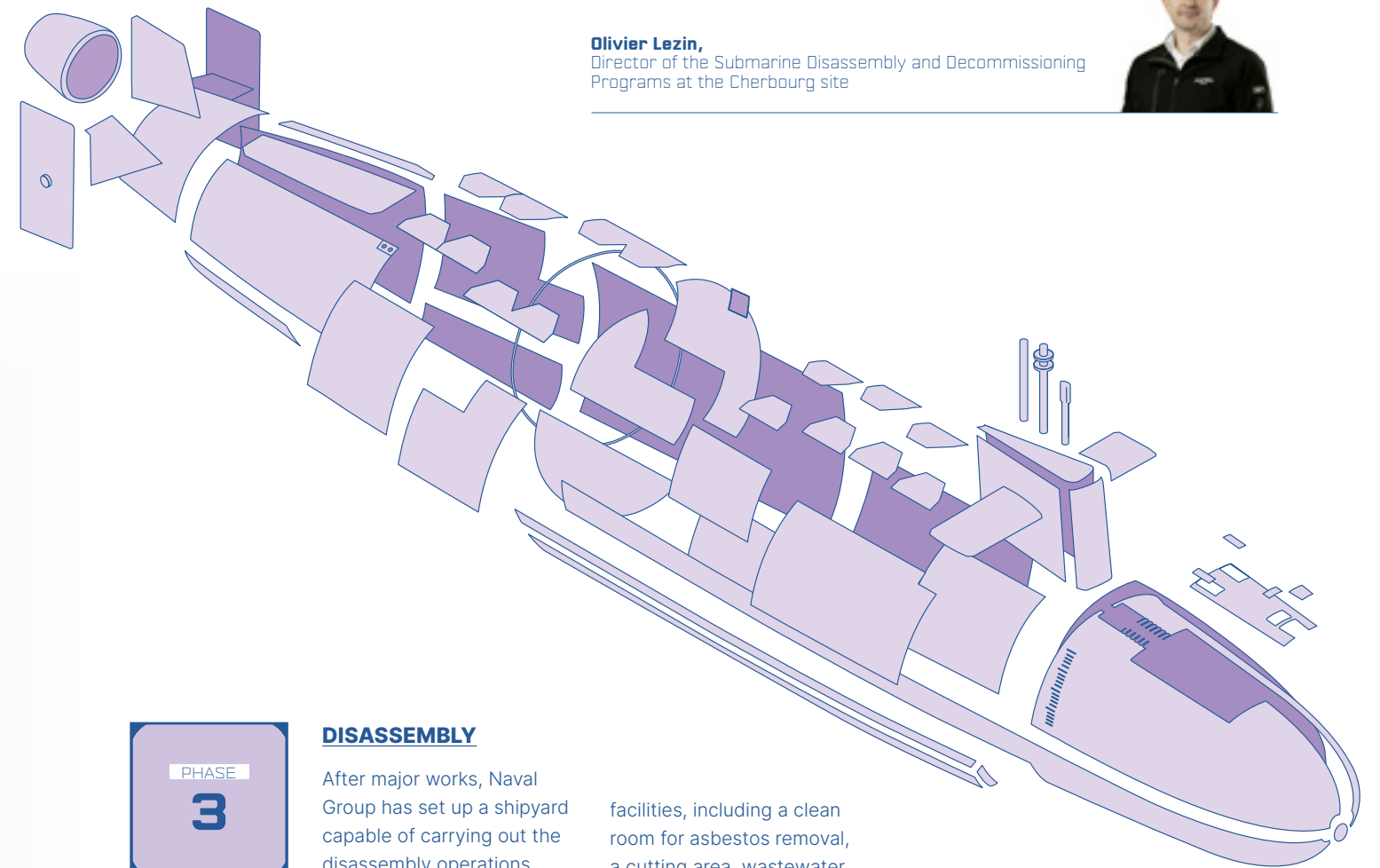
**NIVEAU 3**

Complete decommissioning of the reactor unit, at the end of which all its components are taken over by the appropriate ANDRA channels.

This stage is not expected to take place for several decades: the reactor units of the first-generation SSBNs and SSNs will therefore be kept at the secret basic nuclear facility (INBS) while awaiting processing.

“ The teams at the Toulon site are used to removing nuclear fuel from SSN boiler systems, since this is our task during all periods of out-of-service maintenance and repair (IPER). There is just one difference: in the case of decommissioning, the removal of fuel is definitive! This type of intervention is always highly regulated. For the *Saphir*, the operation took place between August and December 2019. Many employees from Toulon took part, with the support of operators from Cherbourg and Brest: radiation protection and decontamination services, fitters, mechanics, controllers, procedure readers, etc. Since then, some of us have returned to Cherbourg to help with the work needed to repair the *Perle*. ”

**Éric Martin,**  
Operator at the Toulon site



PHASE  
**3**

**DISASSEMBLY**

After major works, Naval Group has set up a shipyard capable of carrying out the disassembly operations. A classified facility for environmental protection (ICPE), it guarantees excellent control of discharges (atmospheric and aqueous) and the processing of the various materials making up the former submarine, thanks to specialised

facilities, including a clean room for asbestos removal, a cutting area, wastewater treatment facilities, etc.

The shared objective for all disassembled submarines is to recover over 87.5% of their solid mass.

18 MONTHS

“ Despite the difficulties during the spring 2020 lockdown, Naval Group has met its deadline commitments for these two programs. Compliance with the decommissioning schedule was essential in order to send back to Toulon the unique tools necessary to carry out the unloading operations for the SSN *Perle* within the framework of her routine stop for repair and maintenance, without disrupting the schedule. The disassembly of the former SSBNs is a first and a real success for Naval Group in two respects. The disassembly was completed one month ahead of the contractual schedule, and the recovery objective for the first disassembled SSBN was exceeded, reaching almost 92% out of a total mass of 6,000 tonnes, all this with very stringent requirements on site in terms of tidiness and cleanliness: this reflects how well we have controlled operations! ”

**Olivier Lezin,**  
Director of the Submarine Disassembly and Decommissioning Programs at the Cherbourg site



# The key events of the year

2020

## JAN.

**13** Naviris, the joint venture (JV) owned in equal parts by Naval Group and Fincantieri, becomes fully operational.



## FEB.

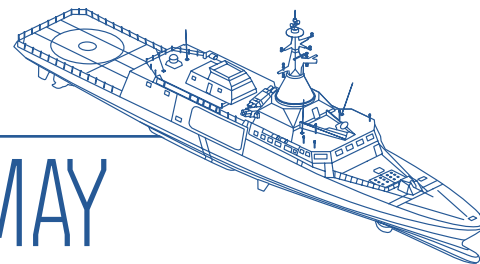
**05** The ARA *Bouchard* arrives in Argentina after 22 days of a crossing that began on 15 January 2020, from the Toulon naval base.



## MARCH

**24** Pierre Éric Pommellet becomes Chairman and Chief Executive Officer of Naval Group.

**27** The amphibious helicopter carrier (PHA) *Dixmude* docks in Toulon after a 17-day mission in the Mediterranean, as part of Operation Resilience announced by French President Emmanuel Macron.



## MAY

**14** The *Louxor*, the fourth Gowind® corvette in the Egyptian fleet, is launched in Alexandria.

**18** The ceremony to cut the first metal sheet for the first of the four replenishment vessels destined for the French Navy marks the start of the Logistics Fleet program (FLOTLOG).

**23** Exactly one year after the contract was notified in 2019, the *Mine Countermeasures Vessels* (MCV) program, which involves the supply of 12 mine hunters equipped with drone systems (*Toolbox*) to the Belgian and Dutch navies, passes another major milestone: the System Functional Review (SFR).



## JUNE

**04** Naviris signs its first research and technology (R&T) contract with the Organisation for Joint Armament Co-operation (OCCAR).

**12** The ballistic missile submarine (SSBN), the *Téméraire*, successfully completes her acceptance test.

## JULY

**22** Naviris signs its second contract with the Organisation for Joint Armament Co-operation (OCCAR) for a feasibility study for the mid-life refit of the Horizon frigates.

## AUG.

**12** The Brazilian submarine *Riachuelo* undertakes her maiden independent surface voyage for a series of tests in the waters off the base in Itaguaí.

## SEPT.

**03** The Pays de la Loire Region and Naval Group signs a strategic partnership to promote collective projects that will help to establish and inject life into the region's naval industrial base.

**11** Naval Group and École Centrale de Nantes renew their partnership.

**14** The results of phase 2 of the Natick project, a joint project between Naval Group and Microsoft, are conclusive: after two years of underwater operation, the data centre has surfaced in excellent overall condition.



## OCT.

**01** The ARA *Piedrabuena*, the second Argentinean offshore patrol vessel (OPV), is launched at the Concarneau shipyard in Brittany.



**05** The multi-mission air defence frigate (FREMM DA) *Alsace* leaves the Lorient site for her maiden voyage.

That same day, the *Courbet* renovation and modernisation project is launched. The work on this La Fayette type frigate (FLF) will principally involve three areas: the hull, platform operation and the combat system.



## OCT.

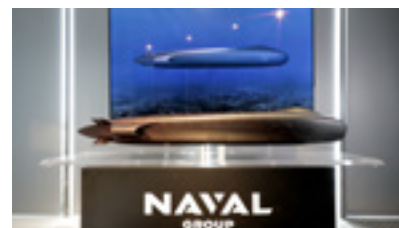
**06** The big day arrives for the *Terrible's* routine stop for repair and maintenance. This major maintenance is a first for the nuclear-powered ballistic missile submarine (SSBN), which was launched from Cherbourg in 2009.

**16** Naval Group Australia inaugurates its new premises in Adelaide and welcomes its 250th employee.

**20** Naval Group welcomes its 400th apprentice to its Lorient site: Laëtitia Guégan, who joins the Composites Production department.



**20** Cancelled due to the health situation, the Euronaval exhibition goes digital and is housed at the Naval Group showroom in Ollioules. Over three days, we showcased our products, services and latest innovations from there.



**22** The Minister of the Armed Forces, Florence Parly, announces her decision to start the repair of the nuclear attack submarine (SSN) *Perle*.

## NOV.

**02** Naval Group takes a further step in the development of its service offering, launching an e-commerce portal, Navygate, that specialises in the sale of spare parts to international clients.

**06** At the Toulon naval base, Naval Group delivers the nuclear attack submarine (SSN) *Suffren* to its client, the French Defence Procurement Agency (DGA), so that the French Navy can take possession of her following the completion of her sea trials.



**12** The *Vagir*, the fifth Scorpene® P75 submarine, is successfully launched. She was built entirely by the Indian shipyard Mazagon Dock Shipbuilders Limited (MDL), thanks to years of technology transfer and partnership with Naval Group.



**13** The *Lorraine*, a multi-mission air defence frigate (FREMM DA), is launched in Lorient.

## DEC.

**03** Naval Group announces the opening of a new representative office in Manila, Philippines, marking the first step towards a long-term partnership to develop the country's naval capabilities.

**08** The President of the French Republic, Emmanuel Macron, announces the commencement of studies into the future nuclear-powered aircraft carrier. This decision is a major boon to the French defence industrial and technological base and to the nuclear industry, and in particular to Naval Group.



**11** The Brazilian navy launches the *Humaitá*, the second Brazilian Scorpene® built in Brazil. In the course of this event, two major milestones were also celebrated for the other submarines in the series: the final integration of the *Toneleiro* and the ongoing sea trials of the *Riachuelo*, respectively number 3 and number 1 in the series.

**15** Naval Group and five other French and Australian partners sign an agreement to create the International Research Laboratory (IRL), which will focus on artificial intelligence, the human factor, autonomous systems and their interactions.

**22** The *Perle* nuclear attack submarine (SSN) arrives at Cherbourg, where the repair work is set to start.





# Governance to achieve excellence



## ▶ THE MANAGEMENT TEAM

\*as at 1 January 2021

The governance of Naval Group is based on an Executive Committee. Presided over by the Chairman and Chief Executive Officer, the Executive Committee sets the group's objectives and rules on all matters that have a major impact on the group's strategy, its functioning and its commercial and operational activities:

- 1 **Caroline Chanavas**, Executive Vice President for Human Resources;
- 2 **Éric Papin**, Executive Vice President for Technology and Innovation;
- 3 **David Quancard**, Executive Vice President for Operations and Performance;

- 4 **Alain Guillou**, Senior Executive Vice President, Development;
- 5 **Guillaume Rochard**, Executive Vice President for Strategy, Partnerships and Mergers & Acquisitions;
- 6 **Frank Le Rebeller**, Senior Executive Vice President, Finance;
- 7 **Laurent Espinasse**, Executive Vice President, Industry;
- 8 **Pierre Éric Pommellet**, Chairman and CEO;
- 9 **Claire Allanche**, Executive Vice President, Communications;
- 10 **Olivier de la Bourdonnaye**, Executive Vice President, Programs;
- 11 **Jean-Yves Battesti**, Special Advisor to the Chairman and CEO;
- 12 **Vincent Martinot-Lagarde**, Executive Vice President, Services;
- 13 **Géraldine Le Maire**, General Secretary.

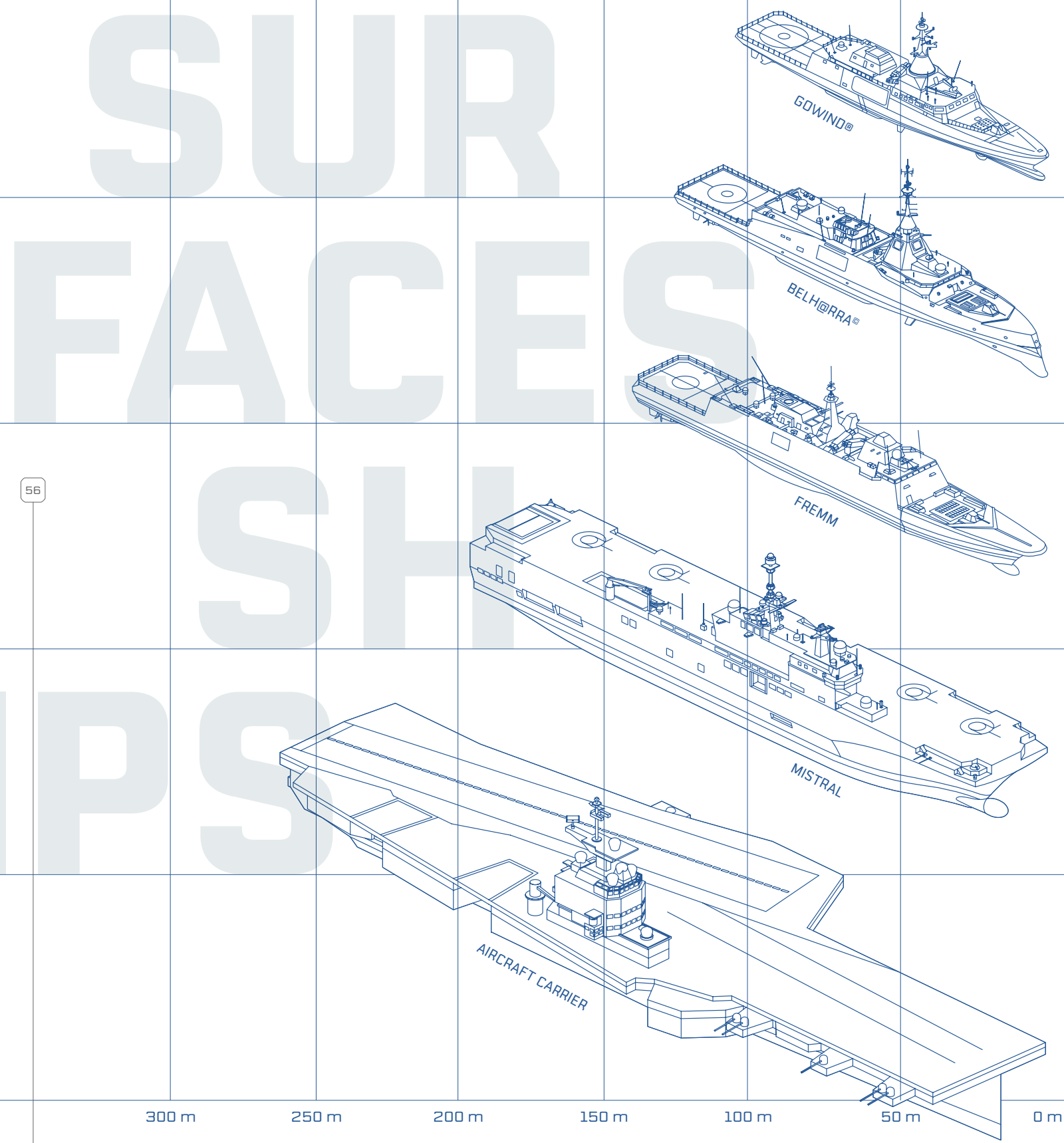
## ▶ THE GENERAL MANAGEMENT COMMITTEE

The General Management Committee considers all the major strategic, economic, financial or technological policies relating to the company's activity.

As at 1 January 2021, Naval Group's General Management Committee is composed of:

- Chairman: Pierre Éric Pommellet.
- Administrator appointed by decree as a representative of the State: Vincent Le Biez.
- Administrators appointed by the Shareholders' General Meeting: Pierre Éric Pommellet, Patrice Caine, Nathalie Ravilly, Pascal Bouchiat, Bernard Réat, Jacques Hardelay, Valérie Champagne, François Geleznikoff, Guenaelle Penin de la Raudière, Geneviève Mouillerat, Eveline Spina.
- Administrators appointed as staff representatives: Laurent Chagnas, Didier Chavrier, Tony Lecorps, Olivier Ménard, Béatrice Unia et Yvon Velly.
- Censor: Gabriel Cumenge.

# Products and solutions of excellence



## Gowind®

The benchmark multi-role combat ship.

**MISSIONS:** coastal and high seas operations, surveillance, protection and escorting, anti-trafficking and anti-piracy operations, either alone or in cooperation with a naval force.

## Belh@rra®

The latest generation digital frigate.

**MISSIONS:** all high-intensity naval operations, high detection capability, strong anti-aircraft firepower and command of sea warfare domains.

## FREMM

The expedition-capable multi-mission frigate.

**MISSIONS:** all high-intensity naval operations, benchmark in anti-submarine warfare, long-range onshore strikes and naval force command at sea.

## Mistral

The amphibious helicopter carrier with proven efficiency.

**MISSIONS:** force projection, humanitarian support, aero-naval and amphibious operations command and hospital ship.

## Aircraft carrier

The flagship of an ocean-going fleet.

**MISSIONS:** force projection and independent aerial support for all types of operations.



### ON-BOARD MISSION AND COMBAT SYSTEMS

**SETIS®**  
The combat system for warships in high-intensity naval operations.

**POLARIS®**  
The on-board maritime security and surveillance system.

**SUBTICS®**  
An integrated combat system for submarines that is powerful, highly automated and scalable.

**I4®DRONES**  
The management system for unmanned operations.



### PLATFORM SYSTEMS AND EQUIPMENT

A complete range of systems designed to ensure the security and control of surface ships and submarines in combat.

**SHIPMASTER®**  
The automated control system for surface ships.

**SYLVER®**  
Vertical missile launch systems.

**SAMAHÉ®**  
An efficient system for handling heavy on-board helicopters in rough seas.

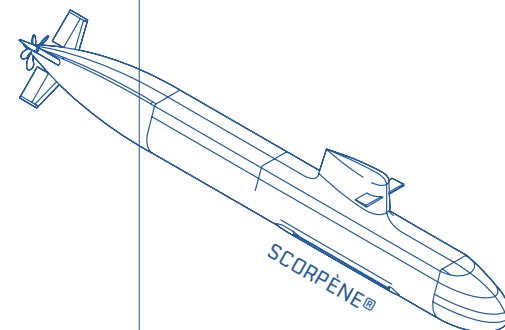
**INTEGRATED PLATFORM MANAGEMENT AND CONTROL SYSTEMS FOR SUBMARINES**  
Integrated control systems ensuring centralised and particularly safe operation of submarines.

**TORPEDO LAUNCHER INSTALLATIONS**  
For submarine and combat ships.

# In the service of our clients' strategic missions

SUB-  
MA-  
RINES

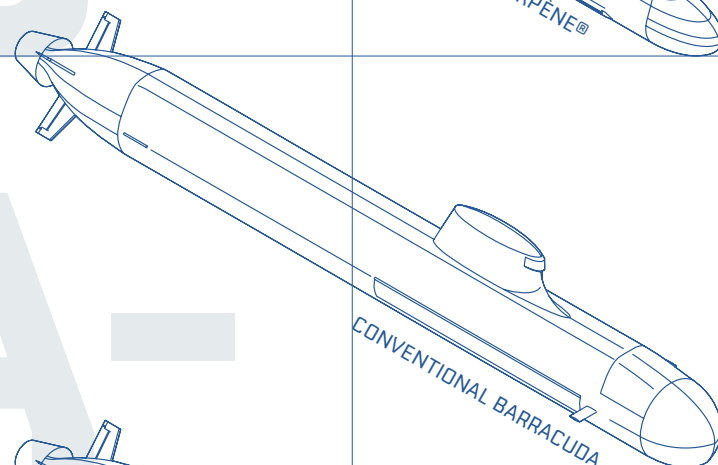
58



## Scorpène®

The international benchmark for conventional submarines.

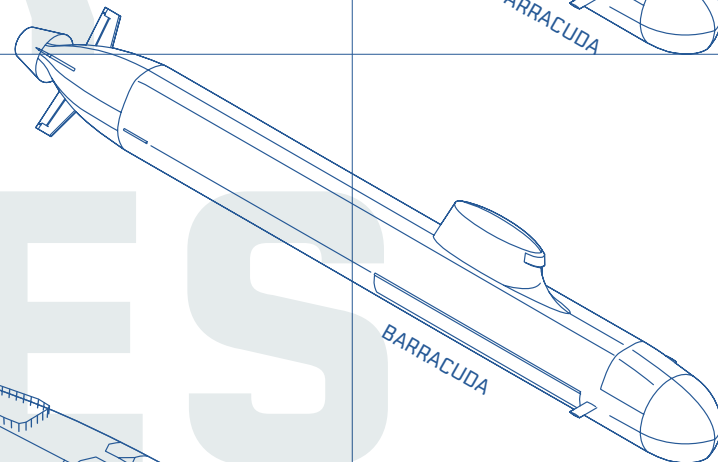
**MISSIONS:** warfare against surface ships and submarines, information gathering and special operations.



## Barracuda conventionnel

An extremely quiet, powerful and versatile submarine that can be deployed on distant and lengthy operations.

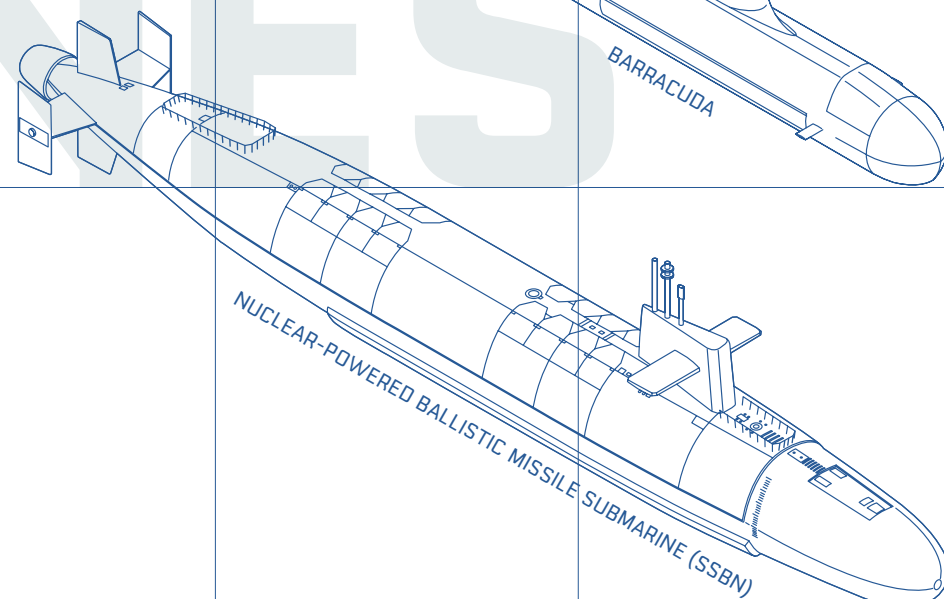
**MISSIONS:** all areas of warfare, high weapons carrying capability, various means of action for special forces and onshore strikes.



## Barracuda

A nuclear sealth attack submarine that is particularly mobile and has great endurance.

**MISSIONS:** all areas of warfare, dissuasion support, long-range strikes, wide-area surveillance, deployment with an aero-naval force and coalition deployment.



## Nuclear-powered ballistic missile submarine (SSBN)

The best performance for nuclear dissuasion. Invulnerable because undetectable.

**MISSIONS:** nuclear dissuasion and ultimate protection of France's vital interests.

150 m      100 m      50 m      0 m



## SERVICES

A range of bespoke services to ensure the operational availability of surface ships and submarines.

**EDUCATION AND TRAINING**  
A complete range of education and training solutions for crews and maintenance and industry personnel.

**MAINTENANCE, LOGISTICAL SUPPORT AND MODERNISATION**  
Solutions for maintaining operational readiness and for modernisation adapted to all types of ships and all navies.

**NAVAL INFRASTRUCTURES**  
Rare skills for infrastructure upgrades, complete program management for new infrastructures and the operation and maintenance of naval infrastructures.



## SUBMARINE WEAPONS

**F21 TORPEDO**  
The latest-generation heavy torpedo for submarines.

**MJ90**  
The best-performing light torpedo in the world, adopted by nine navies and deployable from any naval or aerial platform.

**CANTO-V® FOR SURFACE SHIPS AND CANTO-S® FOR SUBMARINES**  
The countermeasure operating on the principle of confusion/dilution, revolutionary in anti-torpedo warfare for surface ships or submarines.

# Commitments to all our our stakeholders

Both in France and internationally, Naval Group wishes to advance its social approach in a collaborative and collective way with all stakeholders affected. Here are our commitments to each of them.

**PUBLIC AUTHORITIES, INSTITUTIONS**

To involve them in decision-making by understanding their local constraints

**EMPLOYEES**

To give meaning to their tasks, to provide them with the keys to develop and commit themselves, and thus actively contribute to the company's performance

**INDUSTRIAL PARTNERS**

To engage in win-win cooperation

**CLIENTS**

(France and internationally)  
To create a favourable environment to meet their expectations

**MEDIA, JOURNALISTS**

To create a positive dynamic of outreach and influence

**SUPPLIERS**

To unite them around shared growth objectives

**SHAREHOLDERS**

To carry out the missions entrusted to us by relying on their support and expertise

**CHANNELS FOR EXCELLENCE AND INNOVATION**

To be at the forefront of technologies that make a difference

**SCHOOLS, UNIVERSITIES**

To ensure the expertise of current and future generations

“ 2020. What can we take away from this extraordinary year? At Naval Group, we will remember that, at the height of the crisis, we successfully carried out essential tasks on behalf of our clients. We owe our achievements to both the individual and collective commitment of all our employees. During 2020, each surpassed expectations to contribute to the progress of their site, subsidiary, and more broadly, to the future of our group. To be part of Naval Group is to grow and learn among enthusiasts, innovators and experts, all committed excellence. If there is one memory to cherish from 2020, it would be our ability to serve united as one for the French Navy and our international clients. ”

**Pierre Éric Pommellet**

Chairman and Chief Executive Officer of Naval

For more information:

[NAVAL-GROUP.COM](https://www.naval-group.com)

