



YEAR BOOK 2022





CONTENTS

P. 03

EDITORIAL
by Pierre Éric Pommellet,
Chairman and Chief Executive
Officer of Naval Group

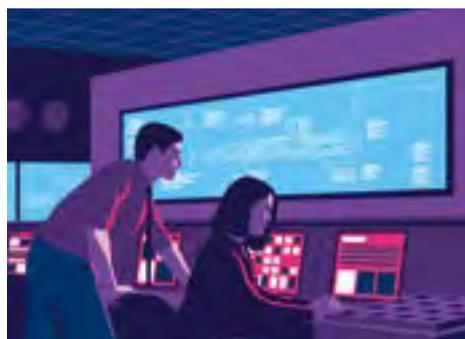
P. 06

SURFACE VESSELS
Progress of programs for defence
and intervention frigates
for the French Navy (FDI FR)
and for the Hellenic Navy (FDI HN)

P. 16

SUBMARINES
A busy year for submarines





26

P. **SYSTEMS, EQUIPMENT AND PROPULSION**
Cutting-edge expertise for navies

34

P. **DRONES, AUTONOMOUS SYSTEMS AND UNDERWATER WEAPONS**
A key component of future combat



42

P. **SERVICES**
At the service of the *Charles de Gaulle*



50

P. **SUMMARY**
Our purpose, highlights and the group profile

WE DELIVER POWER AT SEA

On 1 January 2023, Naval Group implemented its new structure. A few months earlier, the company had announced its purpose (*see p. 51*). Armed with a clear vision of their clients' challenges and objectives, the teams at Naval Group are committed to rising to the company's challenges. Interview with Pierre Éric Pommellet, Chairman and Chief Executive Officer of Naval Group for the last three years.

LIFE FOR NAVAL GROUP WAS VERY INTENSE IN 2022, AS IT IS EVERY YEAR.

Pierre Éric Pommellet: First of all, we should remember that the stopping of the Australian program, which severely affected the company in 2021, allowed us to demonstrate our resilience and our ability to bounce back in times of crisis. The negotiations that we conducted with Australia meant we were able to assert our rights and end with a fair and equitable agreement. But above all—and this is something to be proud of—we managed to find redeployment solutions for the hundreds of employees who were working on this program. Thanks to this, we were able to turn the page and look towards new challenges.

From an industrial point of view, we have achieved some great things, in France and abroad (*see Highlights p. 54-59*). To mention a few: We've signed contracts for defence and intervention frigates (FDI) for the Hellenic Navy, launched the first of four logistic support ships (LSS) for the French Navy, laid the second of twelve



// OUR GOAL IS ZERO ACCIDENTS"

mine countermeasure ships under the Belgian-Dutch rMCM program, commissioned the first of four Scorpène® submarines as part of the Prosub program with Brazil, undertaken the technical shutdown of the *Charles de Gaulle* aircraft carrier, and achieved float off of the first FDI for the French Navy. The feeling of pride in bringing all these ships to completion and in providing services to our clients motivates us to constantly strive for excellence.

THE CURRENT GEOPOLITICAL SITUATION IS EXTREMELY TENSE. WHAT ARE THE IMPACTS ON NAVAL GROUP?

P. E. P.: In the current climate, our customers have particularly high expectations. The conflict in Ukraine is causing extremely worrying disruption in terms of the economy, along with uncertainties on a global scale. However, from our point of view in the defence industry, our mission is very clear: We must remain at our clients' service because we know that they need us.

I was there when President Macron addressed the Armed Forces on 20 January and he stressed that in the face of the rising number of threats, we need to be "one war ahead". The budget for military spending that will be put before Parliament should thus stand at 413 billion euro in the context of the next military programming law (LPM) for the 2024–2030 period. This represents a major effort from the nation in terms of its defence. We must be up to the mark and make sure that we perform, both in France and internationally.

For our French client, this means that we have to be able to work with our partners to continually speed up production times, ensure that in-service support (ISS) is provided at the best price, guarantee the technical upgrade roadmaps and secure the schedules for our structuring programs, particularly the new-generation aircraft carriers (PA-Ng) and the third-generation nuclear-powered ballistic missile submarines (3G SSBN).

For our international clients, we have to meet their increased needs for defence procurement and continue with our commercial development campaigns.

WHAT IS NAVAL GROUP'S PLAN TO MEET THESE CHALLENGES?

P. E. P.: We're ready to go. On 6 July 2022, Naval Group's General Management Committee voted on a strategic plan for the next ten years, which is based on three pillars: France, the international market and finally, innovation, with a focus on drones and autonomous systems.

This plan sets out our aim to return to the growth trajectory that we were following with the Australian program. We are thus aiming for a turnover of five billion euro before the end of the decade.

To achieve this, we need to become more competitive and offer the best ships at the best price. As a result, we had to change the structure of the group to allow our teams to work together with a more cross-disciplinary, agile and efficient approach. On 1 January 2023, we set up a new, integrated, matrix-type and customer-focused structure. It is primarily made up of five

products and services departments that clearly say who we are: Surface ships; Submarines; Systems, Equipment and Propulsion; Drones, Autonomous Systems and Underwater Weapons; and Services. This new structure will enable us to be more efficient in terms of industrial performance and to put the focus on a particular area of capital growth for our business: drones. Our aim is clear: to become a European leader in autonomous and collaborative systems. We intend to consolidate our combat management system development activities at Ollioules and create a centre of excellence at La Londe-les-Maures for our drones, autonomous systems and underwater weapons activities. This project will allow us to strengthen our position as an assembly contractor and as a systems designer and builder for combat ships, in addition to boosting our competitiveness as regards our main client, the French Navy.

NAVAL GROUP'S PURPOSE WAS ADOPTED AT THE END OF 2022. HOW HAS IT FILTERED DOWN INTO THE COMPANY?

P. E. P.: Our purpose is the result of a collective effort. You might think that for a company like ours, the purpose is fairly obvious. However, this does not mean that the work that goes into formulating it is always easy. Because finding the right words really mattered to us, discussions were quite animated. "We deliver power at sea", which perfectly sums up our mission, was adopted at the end of these collaborative efforts. Going beyond just words, this is a message that guides us and which resonates when we tell our clients about it.

WHAT ARE THE CHALLENGES FOR THE COMPANY IN 2023?

P. E. P.: First of all, to improve our performance in terms of Operational Health, Safety and Environment (OHSE). We must pull together as a whole to ensure that everyone works in complete safety. Improving OHSE performance falls under the operational management goals. We are committed to promoting every single good initiative from our employees in

this area at an internal level, and at the end of January, we awarded the group's first OHSE trophies for best team performance. Our goal is zero accidents.

2023 will undoubtedly present us with some major operational challenges. We want to improve customer satisfaction in both new construction and in services, and achieve the levels of competitiveness and performance expected. We have numerous key milestones for 2023, including delivery of the *Duguay-Trouin* nuclear attack submarine, the return of the *Perle* nuclear attack submarine to duty, the first sea trip of the *Amiral Ronarc'h* FDI and the qualification firing of *Le Terrible* nuclear-powered ballistic missile submarine. With the LPM, we will also have a clearer idea of what France expects of us in the coming years. Finally, we have commercial activity supported internationally in every region across the globe.

Making progress in terms of corporate social responsibility (CSR) is also important

to us and we made some important commitments in 2022. On 25 January, we joined the #StOpE initiative alongside 152 other companies and have thus pledged to end everyday sexism in our group. In December, we signed the LGBT+ Charter of Commitment with the Other Circle association. Through this charter, Naval Group undertakes to ensure equal rights and treatment between all employees, regardless of their sexual orientation and gender identity. On an environmental level, our employees got together to organise the corporate energy efficiency plan. Thanks to their eco-friendly endeavours, the results have been positive, and together we achieved the 10% reduction in energy consumption required of companies by the French government by the end of August 2022.

In all areas, we need to maintain this fantastic energy that drives and motivates us, and do even better in 2023. Let's be there for our clients, for our partners, for our employees and for ourselves.

// DRONES REPRESENT AN AREA OF CAPITAL GROWTH FOR OUR BUSINESS"



SURFACE SHIPS

The programs for defence and intervention frigates for the French (FDI FR) and Hellenic (FDI HN) Navies reached numerous milestones in 2022, with serial production in full swing at the Lorient site. The *Amiral Ronarc'h*, the first of five FDI FR, has been floated, whilst the blocks for the first three FDI HN are being gradually laid down in the assembly unit.



JOINT INTERVIEW WITH

SYLVAIN PERRIER,
(on the left in the photo),
FDI Program Director

GILLES LANGLOIS,
(on the right in the photo),
FDI HN Program Director

Sylvain Perrier, Frigate Program Director, and Gilles Langlois, FDI HN Program Director, look at past and future steps in the construction of the new top-of-the-range frigates for the French and Hellenic Navies, and discuss the very close ties between the two programs.

PROGRESS OF THE FDI PROGRAMS IN 2022



2022 was full of contractual activity with Naval Group clients...

Gilles Langlois: Once the draft agreements with Greece had been signed in December 2021, the FDI HN program was officially launched on 30 March 2022, following the signature of two contracts in Athens on 24 March. The first of these contracts related to the manufacture of three FDI HN (the *Kimon*, *Nearchos* and *Formion* frigates), plus one as an option, while the second covered their in-service support (ISS) over a three-year period.

The frigates will be delivered within a very short timeframe: 2025 for the first two units and 2026 for the third. The first contract also includes integrated logistics support, training of the initial crews and the supply of MU90 torpedoes and Canto® countermeasures. Moreover, a robust and ambitious cooperation plan is gradually being put in place with the Greek defence sector. On 30 June, four contracts were signed in Athens. This was followed by another five on 18 October, in addition to four framework agreements signed at the Euronaval exhibition. In total, more than



“A ROBUST AND AMBITIOUS COOPERATION PLAN IS GRADUALLY BEING PUT IN PLACE WITH THE GREEK DEFENCE SECTOR.”

Gilles Langlois,
FDI HN Program Director

twenty contracts and cooperation agreements have been concluded with Greek companies. To name a few for the platform, some of the most illustrative are Salamis Shipyards, which will produce pre-armed hull blocks in Greece, Mevaco, and for the combat and mission systems, Akmon, Marel or Simon Technologies. The designated Greek companies will integrate with Naval Group's supply chain and provide equipment not only for the Greek and French FDIs, but also, potentially, for other programs. ▶

THE LORIENT TEAMS IN THE ASSEMBLY UNIT, IN FRONT OF THE HULL OF THE AMIRAL RONARC'H.



PERFORMANCE

LORIENT STEPS UP ITS PRODUCTION

With an objective to produce two ships a year from 2025, the Lorient site has invested heavily in modernising its industrial resources. It has also modified its organisation to keep pace with its production schedules and increase the rate at which floater blocks to be assembled

are pre-armed in the assembly unit. On site, digital tablets have replaced paper drawings to facilitate assembly, ensure compliance and record progress. At the end of 2022, 450 tablets had been allocated to employees.



THE HULL OF THE AMIRAL RONARC'H PHOTOGRAPHED AT NAVAL GROUP'S LORIENT SITE IN JANUARY 2023.



"THE FDI FRANCE AND FDI GREECE PROGRAMS ARE HIGHLY INTERCONNECTED. IS A REAL EXAMPLE OF SERIES PRODUCTION, AT ALL LEVELS."

Sylvain Perrier,
FDI Program Director

Sylvain Perrier: Following the signature of the contracts with Greece, important work was undertaken with the French client, represented by the French Defence Procurement Agency (DGA) to negotiate and add a rider to the FDI FR contract in order to reschedule delivery to the French Navy for FDI no. 2 and no. 3, and the payment plan for the whole series. Moreover, Naval Group has raised several major change proposals that we're hoping to put into contract form shortly, such as the organisation of missile firing following delivery of the first unit, and improvement of the operational capabilities of the FDI in terms of vertical launch missiles and electronic warfare.

Serial production of the FDI's has started. Where are you with that?

S. P.: In the months following the laydown of the first floater block, at the end of 2021, for the *Amiral Ronarc'h* (the first FDI FR), the other pre-armed blocks were routed to the Lorient assembly unit. Naval Group joined together the floater for FDI FR no. 1 in less than five months! This performance, which was exceptional for a first in series, meant the ship was able to be

temporarily floated in May 2022, at the same time as the second Gowind® corvette built for the United Arab Emirates was definitively floated, allowing the *Amiral Ronarc'h* to move to the front of the assembly unit. The work to arm the floater then continued. The sonar array, propulsion lines and propellers were fitted prior to the permanent float off, which took place in the presence of the French Minister of the Armed Forces and his Greek counterpart on 7 November, two days

before it finally left the construction facility. At the end of 2022, the *Amiral Ronarc'h* was in full commissioning phase before the start of dock testing. The first sea trip will take place before the end of 2023, with delivery in 2024.

G. L.: The first block of the first FDI HN, which is the second FDI of the series, was laid down in the assembly unit on 21 October 2022, a month ahead of the initial schedule. The machining of the hull blocks for the second FDI HN (the third FDI in the series) started on 13 July, three months ahead of schedule. Keeping to schedule is crucial for the Greek client, who wants new capabilities quickly. In this respect, getting ahead with the initial construction steps for FDI HN no. 1 and no. 2 is fundamental to our relationship with this new client. We aim to sustain this momentum! There are a number of milestones to reach in 2023, including the float off of FDI HN no.1 and the launch of combat system tests for the Panoramic Sensors and Intelligence Module (PSIM), bringing the first block of FDI HN no.2 into the assembly unit and starting machining work on the hull blocks for FDI HN no. 3, the fifth in the series. The

Buyer Management Team or HN Detachment in Lorient, made up of twelve Greek military specialists, arrived at Lorient on 13 June to supervise the smooth running of the program. This highly competent team wants to obtain a detailed understanding of the features of the FDI in order to prepare for its acceptance and takeover by the first Greek crew, and to quickly make it the spearhead of the Hellenic fleet. ►

INNOVATION

THE FDI: A DIGITAL, CYBERSECURE SHIP

Data centres will virtually house almost all of the on-board applications. They boast unequalled computing power to process the increasing complexity of modern combat data. The Cyber Management System (CyMS) is built in to the FDI at the design stage. This cyber "loop" will cover the entire armed ship and will be updated throughout its life cycle to adapt to new threats, thus ensuring total cyber resilience across the ship. Naval Group is also developing asymmetric threat control systems (LCMA) for the FDI. These comprise a specific management station designed to combine several detection

methods (sensors, automatic detection chain) and aids for decision-making and neutralisation/response (lethal and non-lethal effectors). This solution, interfaced with the Combat Management System (CMS), ensures unrivalled added value from an operational standpoint, which will be deployed as soon as sea trials begin for the first FDI. This innovation, also present on the logistic support ships (LSS), can also be retrofitted on all types of ship, including those not built by Naval Group.



50 METRES HIGH AND WEIGHING 140 TONNES, THE PANORAMIC SENSORS AND INTELLIGENCE MODULE (PSIM) HOUSES A LARGE PART OF THE FDI COMBAT SYSTEM IN ITS UNIQUE MAST STRUCTURE.

S. P.: The FDI France and FDI Greece programs are highly interconnected. It is a real example of series production, at all levels, for equipment production, for the production and pre-arming of hull blocks, and for the assembly and arming of the ships. The FDI FR and HN follow on from one another. As a result, at the end of 2022, the machining of the hull blocks for the FDI FR no. 2, the fourth in the series, had already started in the hull workshop. Four FDI (two French and two Greek) have been in the production cycle at Lorient for several months already, with feedback from the construction of the first unit being taken on board for the subsequent units.

“THE FDI GREECE PROGRAM GETS THE FULL BENEFIT OF THE SYNERGIES WITH THE FDI FRANCE PROGRAM!”

Gilles Langlois,
FDI HN Program Director

CORPORATE SOCIAL RESPONSIBILITY (CSR)

This is the reduction* in gas consumption achieved at Lorient as a result of optimising boiler rooms and sub-stations, changing regulations and monitoring consumption in production areas.

* Compared to 2021.

- 43%

- 29%

Water consumption has fallen* by 29%, thanks to fixing leaks in the underground networks and monitoring leakage rates on a daily basis.

These performances were recorded following the roll-out of the Energiency energy data analysis and management tool at the Lorient site in 2022.

What measures have been taken to ensure this sustained pace and maintain the delivery deadlines?

G. L.: Firstly, specific management approaches have been put in place. For example, a team shared between both programs was set up in spring 2022 as soon as the Greek contract was launched, so that series production for the eight or nine FDI (five for France, three or four for Greece) would be fully integrated. Each role in the organisation of the program, as well as each stage, covers both the French and Greek programs. This makes us more efficient, with the FDI HN program benefiting fully from the synergies with the FDI FR program.

S. P.: From an industrial standpoint, numerous measures have been taken to ensure that we can maintain our pace. For every ship in the series, we are looking, for example, to start the commissioning work and installation tests for the FDI as early as possible, in order to keep the dock and sea test periods as short as possible. The PSIM is the best example of this because the concept allows us to start the tests and trials for the combat system in parallel with the construction of each floater. In the specific case of FDI FR no. 1, we have also

made a special effort to have functional integration platforms that are as representative as possible on all our sites at an early stage, in order to test and approve the operation of the systems before starting the on-board tests.

What progress has been made in this regard?

S. P.: In Lorient, the PSIM for FDI FR no. 1 was armed in a test area that was set up specifically alongside the hull workshop, between October 2021 and summer 2022. Its installations have gradually gone live, with tests started in early 2022. This considerably de-risked the commissioning of the combat system before the PSIM was fitted on the floater. Following the go-live of the Combat Management System (CMS) and data centres in December 2021, the SeaFire® radar with four fixed panels emitted its first signals at Lorient. Following on from that, the first Identification Friend or Foe, electronic warfare and communication systems were commissioned, along with the equipment for the all-new Asymmetric Threat Control (LCMA) system. ▶



EFSTATHIA DROSOU,
POINT OF CONTACT WITH THE GREEK CLIENT IN LORIENT.

TALENTS

What was your career path before coming to Lorient?

I worked as an Assistant in the representation office of Naval Group in Athens since it first opened in 2008. I followed the negotiations with Greece up until the contracts were signed in March 2022. Naval Group then asked me to come to France to continue the business relationship with the Greek client.

What's your role?

I'm in charge of coordinating discussions with the Buyer Management Team, so that everyone gets maximum benefit from the Greek delegation being on site. This allows Naval Group to better understand what the client needs and helps the client to be better prepared to take over their future ships.

SIF complements that on the PSIM; it involves testing the operation of the entire combat system in a configuration similar to that on board and in all situations. Thousands of tests are performed to validate the operation of each piece of equipment, alone and then in conjunction with others and with the CMS.

The functional integration of the other systems (platform operation, propulsion, navigation, networks and data centres, cybersecurity, remote monitoring, access protection etc.) also continued throughout 2022, not only on Lorient's distributed digital systems integration platform but also on numerous other platforms in the program, at Naval Group and partner sites.

In September 2022, the PSIM was taken to the dock. It was fitted on the floater of the *Amiral Ronarc'h* on 10 November. This was the first time that Naval Group had installed a single mast of this size (50 metres) and weight (140 tonnes). A special mobile crane (only two of this size exist in Europe) was installed and used to position the PSIM to the millimetre on the floater. Since this outstanding industrial operation, work on the PSIM has continued, to join and connect it to the on-board facilities.

At the same time, tests and trials on the Shore Integration Facility (SIF) continued throughout 2022 at Saint-Mandrier, ensuring functional integration of the combat system. This work on the



2022 HIGHLIGHTS

13 APRIL
The last offshore patrol vessel for Argentina

The fourth and final Argentine OPV 87 offshore patrol vessel, the *ARA Contraalmirante Cordero*, was delivered to the Argentine Navy.



29 APRIL
The first of four logistic support ships (LSS), the *Jacques Chevallier*, for the French Navy's fleet logistics program (Flotlog), was launched in Saint-Nazaire. It made its first sea trip in December.

13 MAY
THE SECOND OF THE TWO GOWIND® CORVETTES
the *Al Emarat*, ordered from Naval Group by the United Arab Emirates, was floated in Lorient.

14 JUNE
rMCM program: A milestone reached
Built for the Royal Netherlands Navy, the second of twelve mine countermeasure ships for the Belgian-Dutch rMCM program, the *Vlissingen*, was laid down in Lanester.



13 SEPTEMBER
Headed for Alexandria
The fourth and final corvette in the Egypt Gowind® program, the *ENS Alismailia*, left the Alexandria Shipyard to go to the naval base there.

18-20 OCTOBER
The design of the new-generation aircraft carrier (PA-Ng) was unveiled to the public at the 28th Euronaval global naval defence exhibition.



16 NOVEMBER
OCCAR (Organisation Conjointe de Coopération en matière d'Armement — organisation for joint armament co-operation) took delivery of the *Lorraine*, the second multimission frigate with enhanced air defence capabilities (FREMM DA). This was the eighth and last FREMM in the program.



SUB- MARINES

2022 was a very busy year for submarines, as proven by the advances in our iconic programs for both our French client and the export market. In France, the Barracuda nuclear attack submarine (SSN) program continued to make progress. At the same time, the teams were already working on the future third-generation nuclear-powered ballistic missile submarine (3G SSBN) program. At the international level, we have seen the *Riachuelo* enter into active service, the first unit in the Brazilian Prosub submarine program. Here is a recap in pictures...



BARRACUDA

A deep dive into the series

Packed with technological innovations, the *Suffren* nuclear attack submarine (SSN), the first in the Barracuda series, entered into active service on 1 June 2022, enabling France to consolidate its rank as a great naval power.

It fully meets the requirements of the French Navy. Sailors are eager to receive the upcoming replacements for the Rubis class. Across all Naval Group sites, this satisfaction drives the individual and collective commitment of the individuals who reach each of the milestones of the Barracuda program in turn.



AMONG THE MOST EFFICIENT IN THE WORLD, THE SUFFREN TYPE NUCLEAR ATTACK SUBMARINES (SSN) PRODUCED UNDER THE BARRACUDA PROGRAM WILL ENABLE FRANCE TO MAINTAIN ITS RANK AS A GREAT NAVAL POWER.

Based on its main indicators (budget, deliveries, hours worked etc.), Naval Group's flagship program hit "mid-stream" in 2022, in the words of director Hervé Glandais. A few months from delivering ship no. 2, all the teams on the Barracuda program were deeply and intensely committed. This second phase of the adventure confirms the industrial strategy, marked by a degressive approach to financial plans and schedules, between the first and the last. Competitiveness is a key factor in achieving the goal of delivering one submarine every two years until the end of the decade.

From series to programs

More digital than ever, the new generation of nuclear attack submarines (SSN) is also becoming more automated. This high level of automation means that the crew no longer has to do repetitive tasks, allowing them to focus on tasks with higher added value instead. From Naval Group's point of view, this involves a highly demanding degree of integration and robustness that is greatly appreciated by the crews. This positive feedback keeps the teams' levels of enthusiasm high in the long-term. Staying on target and ensuring the long-term maintenance of the skills and ability of Naval Group to construct nuclear submarines is a key focus throughout the program. It is this pool of both young and seasoned employees that will feed into what happens next; the building of the third-generation nuclear-powered ballistic missile submarines (3G SSBN), for which the first panels are set to be cut next year.



THE EXPERIENCE ACQUIRED WITHIN THE SUFFREN TEAM WHILST IT WAS BEING COMPLETED IN CHERBOURG AND THEN IN TOULON, AND INITIAL FEEDBACK FROM THE OPERATIONS CREWS WILL BENEFIT THE SOON-TO-BE-COMPLETED DUGUAY-TROUIN.

DUGUAY-TROUIN, UPDATE

Completed by the TechnicAtome and Naval Group teams, the first divergence of the second submarine in the Barracuda series took place in autumn 2022. This operation, both strategic and symbolic, entailed triggering a controlled nuclear reaction in the core of the ship's nuclear reactor for the first time. Some months previously, the Cachin mobile intervention workshop, known as AMIC, had been withdrawn. To understand the delicate nature of this operation, imagine a structure weighing several tonnes, installed above the submarine's nuclear steam supply system. The role of this structure is to facilitate access for teams and materials, during operations linked to loading the nuclear core. Installed on the launch system (a boatlift) at the Cachin assembly unit since late 2021, the *Duguay-Trouin* is undergoing a series of dock tests. For the teams responsible for the combat system, the aim is to guarantee the availability of all linked installations for its first sea trip in spring 2023.



NAVAL GROUP IS SPECIFICALLY AIMING TO RECRUIT WOMEN INTO 35% OF ITS MANAGERIAL AND PRODUCTION ROLES. PAULINE FOREAU IS AN ILLUSTRATION OF THIS MINDSET: FIVE YEARS AFTER STARTING AT THE GROUP, THE ENGINEER HEADS UP THE CONSTRUCTION OF SUBMARINES UNDER THE BARRACUDA PROGRAM.

3G SSBN

An adventure on the national scale

21 February 2021: Florence Parly, then Minister for the Armed Forces, announced the launch of the third-generation nuclear-powered ballistic missile submarine (3G SSBN) program intended for the French Navy. A major challenge for all Naval Group sites, mobilised in the name of French sovereignty. 2022 saw the first concrete results of the program.



THE 3G SSBN DRAWS ON DEVELOPMENTS FROM THE BARRACUDA GENERATION AND INCLUDES ITS OWN SPECIFIC DEVELOPMENTS IN ORDER TO GO ONE STEP FURTHER IN TERMS OF DISCRETION, DETECTION AND NUCLEAR SAFETY, WHILE IMPROVING LIVING CONDITIONS FOR THE CREW.

The 3G SSBN program aims to supply a new generation of four nuclear-powered ballistic missile submarines to fulfil the operational needs of the French deterrent strategy between 2030 and 2090. The first submarine in the series is scheduled for commissioning in 2035. Three other submarines will then be built and delivered every five years. They will gradually replace the submarines from the Triomphant generation. Naval Group benefits from a unique positioning as an architect, systems designer and builder which allows it, in collaboration with TechnicAtome (the contractor for the nuclear steam supply system), to commit to the performance of all these warships and to assume overall responsibility for their manufacture.

Ultimately, more than 200 industrial and technological defence companies based in France will be directly mobilised by Naval Group to ensure the design and build of equipment and systems. Over the next 30 years, this program will equate to 100 million hours of work, including 15 million hours of design and over 80 million hours of construction.

Among the achievements for 2022 are:

- The enhancement of the industrial tool with the construction of new manufacturing cells at Cherbourg and Nantes-Indret.
- Long-term procurements with orders for the main blanks for the nuclear steam supply system, hull production machinery and the first forged components for the hull.
- Continuation of the overall design with an initial, key meeting to gather client policies for future design choices.
- The early stages of construction of the steam supply system, with machining of its pressuriser starting in September 2022 at Nantes-Indret.

PROGRAMS / TESTIMONY

"I'm in charge of executing part of the 3G SSBN program, in terms of costs, quality and deadlines. To fulfil my role, I use feedback from previous programs to estimate timings required for operations or to re-use elements from other submarines with the aim of improving our performance. To encourage the transfer of skills between the Barracuda and 3G SSBN programs, employees from the first program are gradually joining the second, bringing with them their knowledge of the design, industrialisation, production and commissioning phases. In concrete terms, the work to enhance and upgrade industrial resources has largely started at the Cherbourg site and our suppliers are already working on components that have a long delivery time: the industrial transition between a 5000-tonne SSN and a 15,000-tonne 3G SSBN is already well underway."

Pierre-Édouard Gille,
3G SSBN Platform,
Industrialisation, Removal
and Hull Program Manager

Multi-site mobilisation

Most of Naval Group's sites have been mobilised for this program. Design activities are currently underway in Cherbourg where the teams are building the platform (hull, structure, some of the internal modules) and integrating the equipment and systems. They will also complete the tests and trials for the submarine installations here.

The Nantes-Indret site is making the key components for the steam supply system and is building certain major modules, including the motor device and the nuclear boiler module.

Angoulême-Ruelle is designing and building structuring equipment for the submarine, including material for the deterrent weapons system, missile launch tubes, masts, weapons handling systems etc.

Ollioules is the specialist site for on-board information systems.

It will design and integrate the combat system and the deterrent weapons system.

The sites at Paris and Bagneux are responsible for various program management activities.

Lorient is home to the teams implementing the information systems. It is also contributing to the design of the 3G SSBN and will construct the composite parts.

Brest will produce certain modules and prepare to welcome and support the future 3G SSBN.



NAVAL GROUP IS INVESTING HEAVILY TO UPGRADE ITS INDUSTRIAL TOOL. AT ANGOULÊME-RUELLE, TWO NEW INDUSTRIAL MACHINING FACILITIES HAVE BEEN SET UP TO OPTIMISE THE MACHINING AND DRILLING CAPACITIES FOR THE SHAFT LINES, STRATEGIC COMPONENTS FOR THE SHIPS' PROPULSION SYSTEMS.

PROSUB

Major milestones reached in 2022

With the milestones achieved by the ambitious Prosub program in 2022, Brazil now joins the closed circle of nations equipped with a modern submarine force. It continues to invest to develop a nuclear-powered conventional submarine (SCPN), a measure of sovereignty reserved for major powers.



THE ENTRY OF THE RIACHUELO INTO ACTIVE SERVICE IS A SUCCESS SHARED BY ALL THE TEAMS IN BRAZIL AND FRANCE. IT PROVES THE CAPACITY OF NAVAL GROUP AND ICN TO SUPPORT THEIR BRAZILIAN CLIENT IN THE DESIGN AND CONSTRUCTION OF ITS FUTURE SUBMARINES.

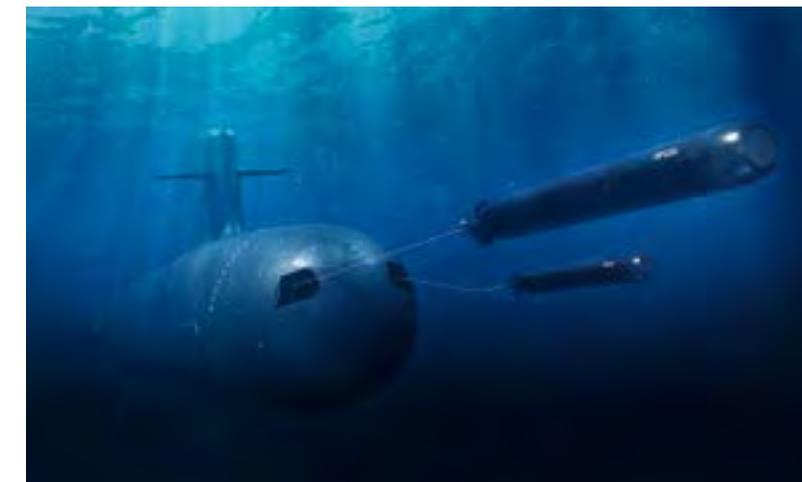
In 2022, Naval Group continued to support Brazil in constructing a modern submarine force for state use, to control the exclusive “Blue Amazonia” economic area. Equivalent in size to the Amazon rainforest, it is rich in biodiversity and energy resources and extends over 3.6 million square kilometres.

The transfer of technology at the heart of Prosub

The success of the program lies in the transfer of considerable amounts of technology, which was ensured by Naval Group. This has already paid off, with Brazil acquiring the industrial skills necessary to produce and test the four conventional Scorpène® submarines. At the same time, thanks to a transfer of cutting-edge systems engineering and architectural technology, Prosub has enabled the Brazilian Navy to start developing its future nuclear-powered conventional submarine (SCPN) and to incorporate, very soon, the nuclear steam supply system developed completely independently by the Brazilian Navy.

The first two Scorpène® in 2022

On 1 September 2022, Naval Group and Itaguaí Construções Navais (ICN), its joint subsidiary with Novonor, reached a major milestone with the entry into active service of the first conventional Scorpène® submarine, the *Riachuelo*. A second key step was completed simultaneously on the second Brazilian Scorpène®, the *Humaitá*. Launched on 31 August 2022, it began its dock and sea tests and is scheduled for delivery in late 2023. The other two ships in the series (the *Tonelero* and the *Angostura*) will be delivered at the end of 2024 and the end of 2025 respectively. Looking beyond the construction phase of the submarines, ICN and Naval Group will remain partners of the Brazilian Navy throughout their life cycle, ensuring in-service support is provided for the submarines, alongside the Brazilian client.



WITH ITS UNPARALLELED RANGE AND SPEED, NAVAL GROUP'S HEAVYWEIGHT TORPEDO IS DESIGNED TO OPERATE IN DEEP WATER, BUT ALSO IN COASTAL AREAS THAT ARE VERY NOISY AND HEAVY WITH MARITIME TRAFFIC.

F21, AN AGILE, RAPID AND INTELLIGENT TORPEDO

Prosub aims to equip all the Brazilian submarines with the heavyweight torpedo, the most powerful of its generation. Here again, the program completed a major step in 2022 with the success of the acceptance firing carried out from the *Riachuelo*. The F21, intended to equip the entire Brazilian submarine fleet, is a latest-generation heavyweight torpedo designed and developed by Naval Group. Built to the highest standards, it offers navies a considerable tactical advantage while responding to a broad range of operational scenarios. Its performance is unparalleled, featuring an advanced self-guided mode, shallow and confined water capabilities, and resistance to the latest generation of countermeasures.



INTENDED FIRST AND FOREMOST FOR THE OPERATION AND MAINTENANCE OF CONVENTIONAL, AND SUBSEQUENTLY NUCLEAR-POWERED, SUBMARINES, THE ITAGUAÍ BASE ALSO HOUSES CREW SUPPORT AND COMMAND BUILDINGS, IN ADDITION TO TRAINING CENTRES.



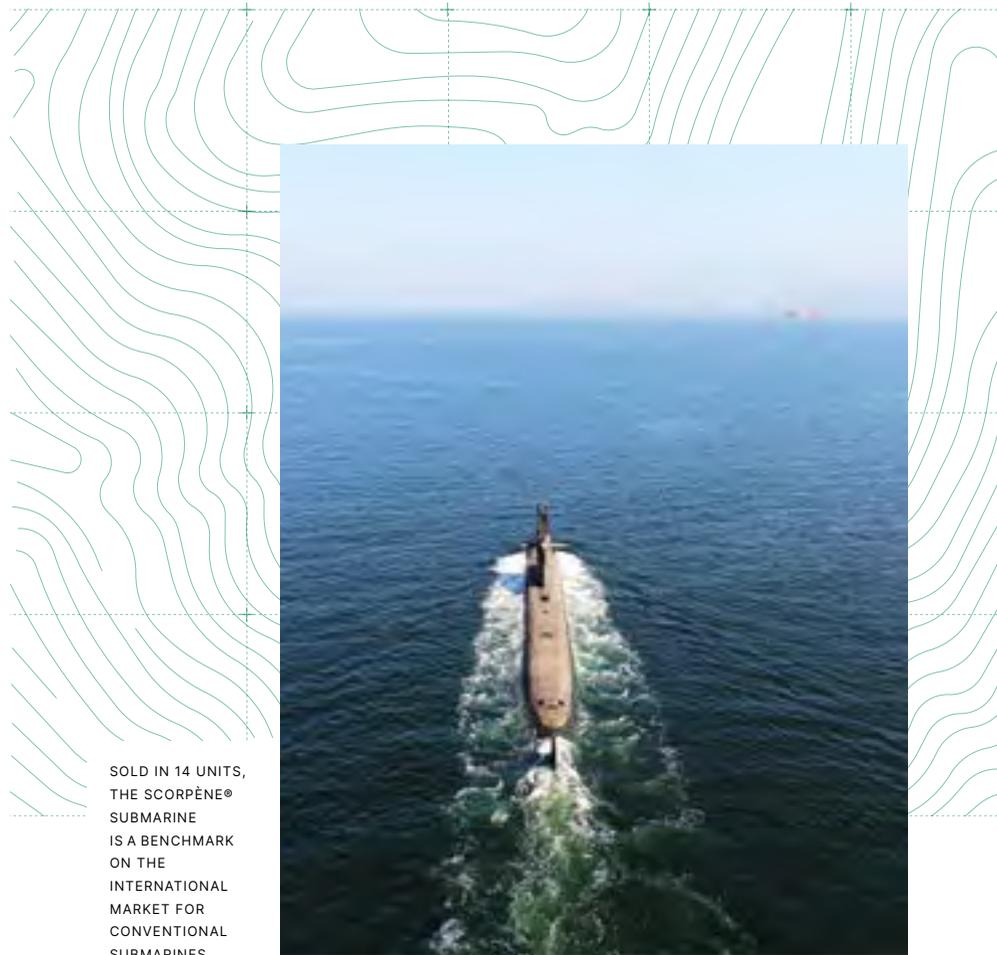
ICN HAS MORE THAN 1600 BRAZILIAN EMPLOYEES AND AROUND 15 FRENCH EMPLOYEES. NUMEROUS NAVAL GROUP TEAMS ARE ALSO WORKING ON THE PROGRAM ACROSS ALL FRENCH SITES.

ICN, DRIVER OF THE LOCAL ECONOMY

Mainly dedicated to Prosub, Itaguaí Construções Navais (ICN) has over 1600 Brazilian employees and around 15 Naval Group employees. Its Chief Executive Officer, Renaud Poyet, explains how ICN makes a real contribution to the local economy and employment market: "ICN uses many local suppliers and helps to grow the industrial and social fabric of Rio. Soon, it will also contribute to the São Paulo region, where the company plans to set up an advanced production unit in 2023". Through its own activities and those of ICN, Naval Group thus contributes to the development of a robust and sustainable Brazilian industrial ecosystem with the desire, in particular, to continue to drive the culture of health and safety at work—which is already well embedded into local practices—and to maintain skills, as seen through the support provided by 16 ICN welders at the Cherbourg site in 2022.

TRAINING AND PREPARING CREWS, FROM CHERBOURG TO ITAGUAÍ

With Prosub, Naval Group has gone further than ever before with transferring technology and training engineers, technicians and sailors from the Brazilian Navy. This took place in Cherbourg over the course of several months to enable them to manufacture and assemble the four Scorpène® submarines in Itaguaí. In terms of crew, the submariners were trained in Brazil. Part of this training involved using four simulators designed by Naval Group to cover all the ship's systems: sonar, combat management, surface warfare, navigation, weapons, environmental studies, platform and dive safety. In addition to training users on how to handle the submarine properly, the simulators allow for the operation of all its features, including the ability to respond appropriately in the event of an incident while diving. Finally, thanks to a 3D display, they allow the crews to familiarise themselves with the overall layout of the submarine.



SOLD IN 14 UNITS, THE SCORPÈNE® SUBMARINE IS A BENCHMARK ON THE INTERNATIONAL MARKET FOR CONVENTIONAL SUBMARINES.



2022 HIGHLIGHTS

17 AND 18 MAY

Feedback meeting for the 3G SSBN program

The first feedback meeting (RR1) for the third-generation nuclear-powered ballistic missile submarine (3G SSBN) program took place, with the French Defence Procurement Agency (DGA), the Commissariat for Atomic Energy and Alternative Energies (CEA) and key state representatives in attendance. The work and commitment of the teams meant that this step was achieved successfully. In addition, site changes are underway to accommodate the construction of the 3G SSBN, with the extension of the production building in Nantes-Indret and the Legris workshop in Cherbourg. This construction work will generate an additional 2000 m² in Indret and 2800 m² in Cherbourg for the set-up of new machines and processes.



1 AUGUST

LE TERRIBLE'S FCD

Four months after its transfer from dock 8 to the operational base at Île Longue, the nuclear-powered ballistic missile submarine (SSBN) *Le Terrible* hit a key milestone in its periodic full cycle docking (FCD), namely, the transfer of responsibility for implementation from Naval Group to the user client.

10 FEBRUARY

Cooperation agreement with Indonesia

Naval Group and PT PAL signed a cooperation agreement to strengthen their capacity to fulfil the increasing needs of the Indonesian Navy. This agreement also covers the opening of a joint R&D centre involving other local companies.

20 APRIL

The *Vagsheer*, the last of six P75 Scorpène® class submarines, was launched in India. She was built entirely by the Indian shipyard Mazagon Dock Shipbuilders Limited (MDL), thanks to a technology transfer from Naval Group.



1 SEPTEMBER

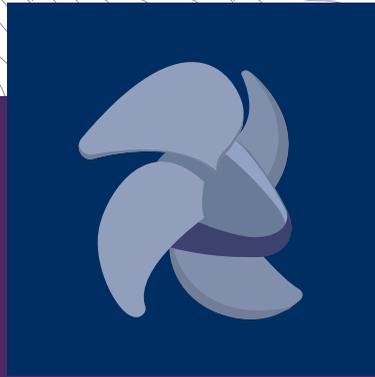
Commissioning of the *Riachuelo*

The *Riachuelo*, the first of four Scorpène® submarines under the Prosub program, was commissioned by the Brazilian Navy. It was built entirely in Brazil by Itaguaí Construções Navais (ICN), thanks to a technology transfer from Naval Group. The ceremony took place at the Itaguaí naval base.



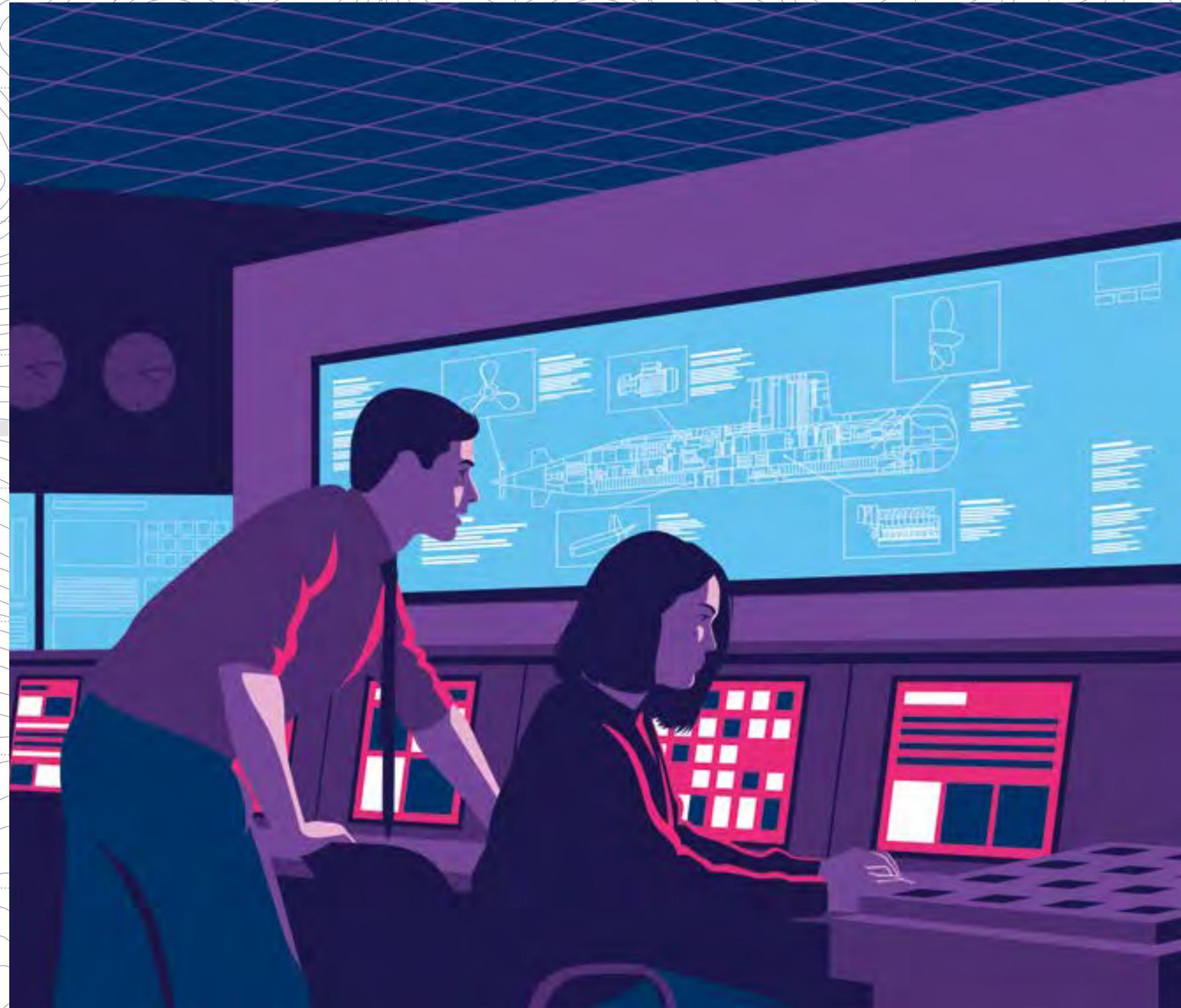
30 SEPTEMBER

The teams from Naval Group and TechniAtome started the divergence of the nuclear reactor on the nuclear attack submarine (SSN) *Duguay-Trouin*, in other words, the start of the fission chain reaction and the first step in commissioning. This is the second SSN in a series of six planned as part of the Barracuda program.



SYSTEMS, EQUIPMENT AND PROPULSION

The essence of naval defence is a series of capabilities that distinguish a simple navy from an armed navy. At Naval Group, these capabilities stem in particular from the energy and propulsion system, the combat system, the digital core, sensors and effectors, the platform control system, cybersecurity, composite activities and more. They are all, however, combined under the new department known as Systems, Equipment and Propulsion (SEP).





At the heart of naval DEFENCE

The creation of a department dedicated to systems, equipment and propulsion (SEP) activities, staffed by almost 4200 employees distributed across different sites, demonstrates the drive of Naval Group to strengthen its position in the sector.



WITH AROUND 1200 EMPLOYEES, THE OLLIOULES FACILITY, DEDICATED TO ON-BOARD SYSTEMS AND DIGITAL, MAKES ITS EXPERTISE AVAILABLE TO OUR PROGRAMS FOR THE FRENCH NAVY AND OUR INTERNATIONAL CLIENTS.

The SEP department works closely with the program departments (Surface Ships; Submarines; Drones, Autonomous Systems and Underwater Weapons; and Services) to effectively contribute to fulfilling their commitments in terms of costs, quality and deadlines, and to increase customer satisfaction. More agile and better built to respond, the department also wants to promote its expertise across “complementary” external naval sites via the commercial development of stand-alone product lines, i.e. by dealing directly with naval shipyards (who are also strategic partners) across the globe, including Fincantieri, BAE Systems and Kership.

Energy and propulsion, the crux of war

“The energy and propulsion system, along with the combat system, is the other flagship system of the warship”, states Emmanuel Chol, Director of the Energy and Propulsion department, which supplies nuclear boilers, electricity production and power distribution systems, and propulsion systems for Naval Group (the “P” in SEP). Electrical energy has a very important role to play on the ships, while the increased level of performance of the on-board systems means that even more power is required. This will be the case for the 3G SSBN program, the third-generation nuclear-powered ballistic missile submarines, as well as for the new-generation aircraft carriers (PA-Ng), where

a good third is reserved for energy and propulsion. Everything will be bigger, from the nuclear steam supply systems to the energy conversion modules, not forgetting the exchangers, propellers and reducers. To adapt to this dual change of scale and generation, the Nantes-Indret site has committed to a major overhaul of its infrastructures and industrial resources (machining, welding and assembly). Furthermore, this will be done without interrupting supplies to the other programs, primarily the Barracuda program (see the feature on p. 30–31), and without pausing the development of future systems.

Harmonised combat systems for sailors

“On board, the combat systems for surface ships and submarines and the platform control system use all the available sensors to allow the crew to drive the ship and use its weapons in an optimal manner”, states Laurent Cuillerier, Director of Performance, Control and Competitiveness. ▶



“NAVAL GROUP DELIVERS
STAND-ALONE NAVAL
EQUIPMENT AND
SYSTEMS ACROSS
THE GLOBE.”

Lilian Braylé,
Executive Vice President, Systems, Equipment
and Propulsion since 1 January 2023

IN THE FIELD

Aware of the challenges involved in optimising the global programming effort, the SEP department structures these systems into product lines: Setis® 3.0 for surface ships, Sycobs 3.0 for submarines and so on. "It's a merging process that is currently carried out with the client to support them in defining their requirements for the different carriers. The department aims to define a solid, common basis and to limit variability with the aim of optimising investments and pooling development and maintenance costs, in addition to training and skills management. The goal is to accelerate capability upgrades in quick, successive increments, harmonised across the entire fleet". The digital combat ship is scalable and communicative, while remaining reliable and secure from the design stage in order

THE BARRACUDA PROGRAM

Keeping pace. With the first-in-series delivered (the Suffren), the pace of the Barracuda nuclear attack submarine (SSN) program has moved into "supersonic" mode to finish the Duguay-Trouin. The mission of the SEP teams is to complete the production-line equipment right up to the last Barracudas. This is a sprint pace but for a marathon duration — that is the state of play for submarines 4, 5 and 6 in the series from the perspective of systems, equipment and propulsion.

DE GRASSE

INTEGRATION IN PROGRESS



In the autumn, the motor device module (MAM) for the fourth in the series left Nantes-Indret to go to Cherbourg, for integration into sector A of the boat. Full-power tests were carried out to validate the required levels of performance. The cradles for the various sections that comprise it are being gradually equipped. Also delivered are the propeller pump module, the auxiliary steam supply system modules, the steam feed-through, the weapons launch and handling system and the weapon launch tubes from Nantes-Indret and Angoulême-Ruelle. Following delivery of the main module of the nuclear steam supply system in late 2021, the compartment was closed off last summer. Boats no. 3 and no. 4 will benefit from an updated risk analysis based on the latest methodologies recommended by the French national cybersecurity agency (ANSSI) and from all deliverables with capacity upgrades. The capacity upgrades will also be developed in the area of electronic warfare with the integration of a digital radar detector (digital RESM).



THE SHEET METAL WORKSHOP IN CHERBOURG: 5000 M² OF WORKSHOP SPACE, 60 EMPLOYEES, 20 DEDICATED PIECES OF MACHINERY AND EQUIPMENT AND 16,000 SECTIONS OF PIPE PRODUCED TO FORM A COMPLEX NETWORK OVER 20 KILOMETRES IN LENGTH ON BOARD A BARRACUDA.

RUBIS AND CASABIANCA

MANUFACTURE AND EQUIPMENT

The last two in the series are still in the hull manufacturing and equipping phase in Cherbourg. Prefabrication of the rear ballast of the fifth SSN has begun. From preparation of the first panel up until delivery, this work will take approximately eighteen months. The structure will then be welded to the ship's hull. The systems, equipment and propulsion (SEP) activity is well underway at the Angoulême-Ruelle and Nantes-Indret sites to manufacture the "first last" equipment and modules in the series, such as the condensers for the no. 6 motor device module. The last nuclear steam supply system compartment was completed at the hull workshop in Cherbourg. The last mechanically welded assembly

that constitutes the future reactor pool and its support system was taken by sea and river from Cherbourg to Nantes-Indret to begin its integration. This is the last nuclear steam supply system in the Barracuda program. In Ollioules, the software teams are busy optimising the obsolescence of the combat system. The aim is to cover many areas, including internal productions of the Combat Management System (CMS), the armed ship's network (RZNA), navigation and communications. However, they are also looking at equipment procured from major sub-contractors such as Thales or Safran, with the same ultimate concern: to qualify the combat system on the land-based integration platform to de-risk its on-board deployment.

► to meet the challenges of the 21st century. "We're making huge investments in R&D to prepare the digital ship of the future and are constantly adapting to the latest available technologies."

Creation of a cyber centre of excellence

Already natively organised by product line, Naval Group's Cybersecurity department, now part of SEP, will continue its endeavours to improve the cyber performance of the group's products and infrastructures, with an attached business component, while developing the cyber centre of excellence to serve the group. "The cornerstone of our activities", indicates Patrick Radja, its Director, "is to understand the cyber threat so that we can use suitable defensive systems to protect submarines, surface ships and future drones across their entire life cycle. The group's cyber strategy also applies to terrestrial infrastructures, internal information systems and our suppliers. Our activities also include control of cyber R&D and the development of products, cyber improvement plans for the ships, and service offers. The aim is to strengthen this role within the centre of excellence, which can already count on the transfer from all the cyber architects working on the ships to reduce dispersion and reinforce the synergies and coherence between the group's cyber professions."

Composites: A world of possibilities

SEP also aims to grow the composites activity of Naval Group, the only naval defence facility in the world to integrate the composites it produces itself on-board, while others are buying them in. Identified as a strategic orientation in 2020, composite materials have the wind in their sails within

THE ORION BUILDING IS ONE OF THE LARGEST BUILDINGS ON THE NANTES-INDRET SITE. IT MARKS THE MAJOR TRANSFORMATION OF THE SITE, WHICH IS DEDICATED TO ENERGY AND PROPULSION AND COMMITTED TO MANUFACTURING THE SHIPS OF TOMORROW, SUCH AS THE NEW-GENERATION AIRCRAFT CARRIER (PA-NG) OR THE THIRD-GENERATION NUCLEAR-POWERED BALLISTIC MISSILE SUBMARINES (3G SSBN).



the group! They are lighter than any other metal alloy, less prone to marine corrosion and are often used to address problems of weight, stability and maintenance, thus helping to improve performance and reduce costs. In 2022, Naval Group approved the establishment of a 100% composites workshop at the Angoulême-Ruelle site, the second of its kind after Lorient, with around 100 employees. Dedicated to long-body and tubular parts, Ruelle will be gradually assisting in replacing some of its metal equipment (masts, tubes, shafts) with composite alternatives, and developing new applications such as pressurised capabilities. Meanwhile, the Lorient site is growing its expertise in the manufacture of hull components and large-scale structures that can be functionalised, such as composite massifs or antenna systems integrated during qualification. These investments are backed by a strong drive for innovation in both products and processes, while preparing for the future with a new composites

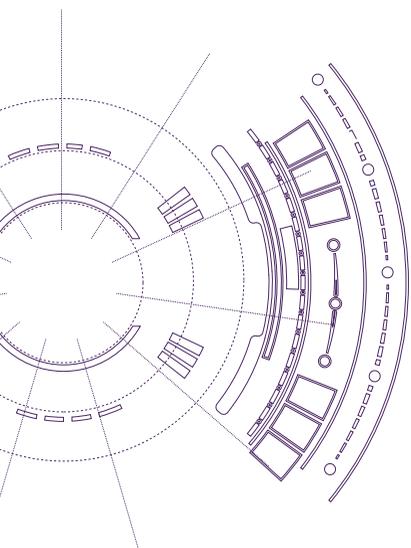
plant scheduled for Lorient. There are no secrets here — the amount of composites on top-tier boats will increase. Drones will also benefit from this technology. For all these reasons, Naval Group has launched a comprehensive platform for industrial and technical expertise. As well as connecting all its sites together, it is open to a dynamic ecosystem, enabling it to offer a global composite product range across all its programs.



**"NAVAL GROUP HAS
OVER 60 YEARS
OF EXPERIENCE
IN INTEGRATING
COMPOSITES ON BOARD."**

Jérôme Sablé,
Director, Composite Equipment

IN THE FIELD OF COMPOSITES, THE TEAMS AT LORIENT AND ANGOULÊME-RUELLE ARE COMBINING THEIR KNOWLEDGE FOR USE WITH REGARD TO THE EQUIPMENT, HULLS AND STRUCTURES OF OUR SHIPS AND DRONES.



2022 HIGHLIGHTS



23 FEBRUARY

The Commissariat for Atomic Energy and Alternative Energies (CEA), Framatome and Naval Group signed a framework agreement for research and experiments on materials used in nuclear propulsion. The aim is to better control the design-to-production cycle of the steel blanks. This framework agreement contributes to the durability and development of the skills essential to the success of nuclear defence programs.

FEBRUARY

Zero accidents!

In Cherbourg, the "grey" workshop team covering the Nantes-Indret to Cherbourg assembly stage (EMIC) celebrated 1800 days without an accident stopping work. The "grey" workshop is a production area dedicated to assembling and integrating pipework for the propulsion equipment. It employs ten staff, including pipe fitters and assemblers, as well as a welder.



MARCH

TECHNICAL SHUTDOWN OF THE FRIGATE LA FAYETTE

As part of the renovation and modernisation program for La Fayette (FLF) class frigates, the frigate, also called *La Fayette*, left the dock at Toulon as scheduled. The main changes concerned the hull, the combat system and the control of the platform. The frigate will benefit from new combat and anti-submarine warfare capabilities.

14 SEPTEMBER

To ensure that it remains attractive, Naval Group uses awareness-raising activities and partnerships to promote maritime professions (particularly those experiencing shortages) to students, graduates, the national education authorities and civil society. In this vein, on 14 September, representatives from the Angoulême-Ruelle site met with 60 first-year students from the "42 Angoulême" programming school.

OCTOBER

Successful first firing of the F21 model

In a series of tests carried out at Lorient, the X-pulse expulsion system demonstrated its ability to eject an F21 torpedo.

20 OCTOBER

At the BAE Systems UK Supplier Event in Farnborough, Naval Group, represented by its Business Programs & Equipment (BPE) entity, received one of five Supplier Award Recognition accolades. This award reflects the quality of Naval Group products and the work of every employee at Nantes-Indret and Angoulême-Ruelle on exchangers and shafts.





DRONES, AUTONOMOUS SYSTEMS AND UNDERWATER WEAPONS

Since the very first research on integrating drones into military ships at the beginning of the 2000s, Naval Group has invested in autonomous and collaborative systems to offer its naval clients—and first and foremost the French Navy—a new and distinctive capability incorporated into submarines and surface ships. To meet the technological challenges of the field and be present in the market, the group is affirming its strategy and is all systems go.



DRONES

A key component in future combat

The sea is at the heart of security issues. Because the combat strategies of the future are likely to be drone-based, connected and collaborative, mobilising ships with and without crew, Naval Group is picking up the pace in this area.

The current geopolitical conflicts and issues show that controlling the seas—including control of the seabed—is crucial. The increase in non-conventional or asymmetric threats (frogmen, light craft loaded with explosives etc.) during naval operations is clear to see. The French Ministry of the Armed Forces has confirmed that “risks weigh on the free action of [its] forces in [its] maritime approaches and in French military resource deployment areas”. To remove these threats, future efforts will be needed on a naval level within a tight budgetary context. The use of drones in maritime space now seems inevitable. Whether for reconnaissance, surveillance, area denial or even attack missions, aerial, surface and underwater drones offer various possibilities and capabilities that make them real “force-multipliers”, while helping to preserve their own strengths. In line with developments already observed in recent



CYBERSECURITY HAS BEEN A STRATEGIC PRIORITY FOR NAVAL GROUP SINCE 2013. THE GROUP HAS DESIGNED AND DEVELOPED ON-BOARD CYBER CAPABILITIES FOR SHIPS TO ENSURE GLOBAL PROTECTION AND RESILIENCE AGAINST THREATS.



30%

WORKFORCE

This is the growth rate of the workforce at the Drones, Autonomous Systems and Underwater Weapons (DSA) department in Saint-Tropez over a three-year period.

INNOVATION

At the end of April 2022, thanks to the joint work of teams from the Technical department and from Drones, Autonomous Systems and Underwater Weapons (DSA), Naval Group inaugurated two collaborative research laboratories created within its subsidiary Naval Group Belgium. These are the MCM Lab and the Cyber Lab, which bring together Belgian and European institutional, industrial and academic experts who are engaged in accelerating innovation to develop mine countermeasure systems. These developments will also play a part in incorporating capacity increments for the rMCM program.



NAVAL GROUP BELGIUM HAS BECOME THE BENCHMARK OF THE GROUP FOR MINE COUNTERMEASURES.

conflicts, future combat initiatives will rely heavily on drones. They will also require a cooperative approach, between inhabited and uninhabited areas, including in the naval domain.

A dedicated department

Naval Group is getting organised to anticipate the transformation in naval forces, as driven by drones, regardless of the environment. This stance became official on 6 July 2022, with the adoption of a new strategic plan for the next ten years by the General Management Committee. As a result, France, the international field and innovation—particularly innovation centred on drones and autonomous systems—are the three pillars of the group's growth strategy. One of the five departments resulting from the recent reorganisation of Naval Group is now dedicated to drones, autonomous systems and underwater weapons (DSA). Ultimately, it will bring together teams currently spread between Saint-Tropez, Lagoubran and Ollioules onto one site, creating a new centre of excellence dedicated entirely to this activity. It also relies on the skills of Sirehna, a subsidiary of the group, for drone technology, scientific calculations and even the development of software and algorithms.

A self-financed demonstrator

The ambition of Naval Group is clear: to become a European leader in autonomous and collaborative systems. It is one of the rare manufacturers that is able to offer, in partnership with other players, such a broad range of aerial, surface and underwater drones, along with solutions to integrate them into a warship or naval force. Whether these are organic drones (attached to an existing capability) or oceanic drones (with their own capability), they all operate for a third party and thus constitute collaborative systems. “Our goal? To offer robust, long-endurance modular oceanic drones, or in other words, drones that are able to respond to the various operational needs expressed, which can

withstand their environment (the sea) and have an in-built autonomy that is made to last”, states Cyril Lévy, Head of Drones and Autonomous and Collaborative Systems. Drone technology is a natural extension of our professional activity, which is to supply warships and high-performance naval systems such as underwater weapons. One of our current challenges is to offer sailors systems that have the autonomy to make far-reaching and sometimes long-term decisions, in which they can be fully confident. To achieve this, we have built our first self-financed Oceanic Underwater Drone Demonstrator. We want it to evolve via an iterative and collaborative process with the French Navy and the French Defence Procurement Agency (DGA) to combine technology, innovation and a doctrine of use. This step-by-step approach is fundamental to support the change and allow those at sea to feel confident in this autonomous system.”

production methods (by considering the potential offered by additive manufacturing more quickly, for example). Naval Group will thus be in a position to offer products that are more competitive, better performing and quicker to market”.

Drones and mine warfare

Naval Group teams are currently working on a number of programs. Amongst these is the mines countermeasures (rMCM) program, involving 12 minehunters (6 for Belgium and 6 for the Netherlands), with delivery scheduled between 2024 and 2030. At this time, the Belgium Naval & Robotics consortium, composed of the Naval Group and ECA Group and the most successful consortium in the market in 2019, will be the first in the world to provide a navy with a complete unmanned mine warfare solution, referred to as a stand-off. Up until now, no manufacturer had even conceived of such a concept. The idea of introducing a group of around 20 drones and robots deployed remotely by each mother ship is completely new. Named Toolbox, this group, comprising aerial, surface and underwater drones, offers unprecedented flexibility in planning and executing detection, classification and neutralisation operations which can, moreover, be run in parallel. This operational modularity is also a gauge of the speed of execution, with no exposure of human life. A multi-national, multi-industrial and multi-site program, rMCM is also characterised by its highly innovative top-tier multi-systems component, which the combat system is part of. It falls to Naval Group to integrate the many types of different software and hardware for a seamless client handover, which, in other words, is fully harmonised and optimised. Naval Group’s expertise as a systems designer and builder, and manager of complex programs is a considerable asset, both in naval architecture (the mother ships are supplied by Naval Group in collaboration with Kership) as well as in the design of highly specialised software systems. Through this program, ►

Virtuous synergy with underwater weapons

For Damien Raby, Director of Underwater Weapons and of the Saint-Tropez site, “The skills acquired with regard to munitions by employees at Saint-Tropez and Lagoubran are extremely valuable for drones, particularly those relating to decision-making autonomy, mobility and interfacing with ships. Conversely, the skills to be improved with regard to drones will benefit the munitions product lines. In addition, the work on drones will accelerate the adoption of agile processes and new design methods (for example, by reinforcing the direction taken with the internal digital twin project known as Virtual Torpedo or

UNDERWATER WEAPONS: INNOVATION AND EXCELLENCE

In order to increase the operational capabilities of its clients, Naval Group offers its expertise in underwater weapons. The department has a unique knowledge when it comes to designing and manufacturing torpedoes and anti-torpedo countermeasures. The F21 torpedo is currently the most modern heavyweight torpedo in the world. Developed in close collaboration with the end user, it guarantees the sovereignty of its benchmark client, the French Navy, and now equips the Brazilian Navy. It supports the group’s warship offerings with an essential added value. Recognised for many years as the benchmark lightweight torpedo on the international market, the MU90 has won over new navies. In 2022, the threshold of 1000 torpedoes sold was reached, with three new clients opting for the MU90. Both innovative and unique at the global level, Naval Group’s countermeasures have already gained the trust of eight navies (including two new ones in 2022) by responding to the change in operational needs. In a context of intensified underwater combat, plus emerging asymmetric underwater threats, the group provides a complete offering of underwater and anti-torpedo weapons and is accelerating its development of increasingly innovative and effective products.

PARTNERSHIPS

The dynamic of open and collaborative innovation which guides Naval Group involves being open, identifying talented partnerships and inventing new methods of collaboration, in France and worldwide. In October 2021, during the Naval Innovation Days, Naval Group unveiled an Oceanic Underwater Drone Demonstrator, which it developed using its own funds and alongside the support of partners such as JV Mechanics and CESIGMA. In 2022, Naval Group upgraded the Oceanic Underwater Drone Demonstrator with a view to re-running its tests in spring 2023. Furthermore, in mid-2022, in order to make progress in the use of artificial intelligence (AI) technologies for underwater drones and weapons, Naval Group and MBDA decided to link up with Delfox, a Gironde-based start-up specialising in AI and with defence sector manufacturers in its client list. Naval Group also connected with another start-up, Dronisos, to counter threats, drone swarms and robot swarms. Together, they are conducting experiments with the French Navy, taking a prospective approach similar to that of the Red Team of the French defence innovation agency (AID) which addresses the use cases and new threats of tomorrow.



10 metres
10 tonnes

LENGTH/WEIGHT

Those are the stats for Naval Group’s Oceanic Underwater Drone Demonstrator.



THE BELGIAN-DUTCH RMCM MINE COUNTERMEASURES PROGRAM IS LED BY BELGIUM NAVAL & ROBOTICS (BNR), A NAVAL GROUP AND ECA GROUP CONSORTIUM. IT INVOLVES MANY EMPLOYEES FROM THE NAVAL GROUP SITES IN LORIENT, OLLIOULES, NANTES-INDRET, ANGOULÊME-RUELLE AND PARIS.

2024

DELIVERY DATE

The delivery of 12 mine hunters for Belgium and the Netherlands is scheduled to take place between 2024 and 2030.

Naval Group has built a product line that is dedicated to drone projection ships, thus reinforcing its position as a naval systems designer. It will be the first manufacturer in Europe to deliver a ship of this type to a navy in 2024.

Drones and augmented vision

Let's take a look at the aerial drone system for the French Navy (SDAM), a project which meets its requirements to equip its top-ranking ships with vertical take-off and landing (VTOL) drones. It aims to equip them with three sensors: an optronic ball, an Automatic Identification System (AIS) detector and a surveillance radar to offer "augmented vision of a ship" and conduct information gathering, surveillance and reconnaissance missions. This system, designed in partnership with Airbus, can be used to view a situation for several hours without interruption, dozens of nautical miles away from the ship. The SDAM made its first successful above-sea flights in December 2022. During this campaign, the French Defence Procurement Agency (DGA) was able to assess the performance of Naval Group's I4@Drones mission system for the surveillance, detection and identification of maritime targets. The thirty or so planned units are set to be commissioned from 2030.

Submarines too...

The Naval Group site at Angoulême-Ruelle has perfected a waterproof drone that, when launched underwater from a submarine, releases a small pneumatic quadcopter on contact with the surface. Developed jointly by Naval Group and Diodon, a Toulouse-based company, the HP30 is designed for reconnaissance missions beyond the range of a submarine's sensors and thus complements the existing capabilities of the ship. In 2023, the group will continue its work in this area with the aim of commissioning a torpedo-style underwater drone and recovering it from a nuclear attack submarine (SSN).



A TOP-TIER NAVAL CONSTRUCTOR AND SYSTEMS DESIGNER, NAVAL GROUP OFFERS TRIED-AND-TESTED DRONE INTEGRATION SOLUTIONS THROUGH ITS I4@DRONES PRODUCT LINE (MISSION SYSTEM, CONTROLLED DECISION-MAKING AUTONOMY, DEPLOYMENT AND RECOVERY SYSTEM).

I4@Drones

Intelligence always: Naval Group has designed and developed I4@Drones, a mission management system for naval drones. Including preparation, implementation, data mining, recovery and mission debriefing, it combines and supervises all the key phases of naval drones in all environments (aerial, surface and underwater) on surface ships and submarines, just like a land-based command centre. I4@Drones facilitate mission management for deployed drones, including in joint and inter-allied coalitions, and also increase drone/ship interoperability, a key asset for the collaborative combat initiatives of tomorrow.

TALENT

Their everyday tool? Artificial intelligence (AI). **Eva Artusi, Study Manager in the Human and Systems Architecture department of CEMIS (Centre d'expertise pour la maîtrise de l'information, des facteurs humains et des signatures — centre of excellence for information, human factors and signature management) examines this algorithmic technology for assisting crews with operational decisions. "The aim is to support them in the event of cognitive overload or in a difficult tactical context, by offering them adapted decisions on certain tasks".**



2022 HIGHLIGHTS

JANUARY New milestone reached in Saudi Arabia

Naval Group reached its first milestone for integrating reaction tables on two Saudi Arabian Avante 2200 ships. Five Saudi ships will be equipped with the Contralto® system.



FEBRUARY
Naval Group signed a contract with Rheinmetall for the supply of two anti-torpedo defence suites, which are integrated into their MASS decoy launcher system, providing the ability to launch Canto® countermeasures. Bulgaria became the eighth export reference for the Contralto®/Canto® solution.

24 MARCH GREECE LAUNCHED ITS PROGRAM FOR THREE DEFENCE AND INTERVENTION FRIGATES (FOI HN)

with Naval Group. They will be fitted with MU90 torpedoes and Canto® countermeasures.

25 MARCH Successful acceptance firing for Prosub

Acceptance firing was a success for Naval Group for the first batch of F21 combat torpedoes, as part of the Brazilian Prosub submarine program. The F21 torpedo is the highest-performing heavyweight torpedo of its generation. It is quicker, more agile and more intelligent than its competitors on the international market.

2 JUNE
Naval Group teams were involved during in-service support operations on board the La Fayette class frigate (FLF) to install and accept the Contralto® countermeasures system.



17 OCTOBER
Representatives of Naval Group and the Philippine Navy Department of National Defence carried out a pre-delivery inspection of the Contralto® reaction module in Saint-Tropez. This important step allows the Contralto® to be installed into the C-Guard decoy launching system of two Jose Rizal class frigates in the Philippine Navy.



SERVICES

Toulon naval base, 7 June: The *Charles de Gaulle* came in for a technical shutdown. Managed by Fleet support services, Naval Group's Services teams were kept busy maintaining and upgrading its installations. They put everything in place to return the French Navy's flagship on time and optimise its operational capabilities.



At the service of the
CHARLES DE GAULLE



Maintenance of installations, modernisation of systems, renovation of living quarters and preparation for the interim technical shutdown in 2023: the *Charles de Gaulle* was a real hive of activity in summer 2022. All the operations were carried out successfully and on time.

As a strategic ship, the aircraft carrier plays a decisive diplomatic and military role. The *Charles de Gaulle*, the first and only nuclear-propelled surface ship to be built in Europe, has been the flagship of the French Navy since 2001, providing strong representation for France on the international scene. Working alongside the French Navy, Naval Group is tasked with ensuring the availability of the only French aircraft carrier and maintaining it at optimum levels until its retirement from service at the end of the decade in 2030. The challenge is thus to continually modernise and support the upgrade of its installations, which were designed in the 1990s. In turn, this enables the ship, which is central to the air and sea task force, to operate with the latest-generation aircraft, surface ships and submarines. The *Charles de Gaulle* has a technical shutdown every summer at the Toulon naval base. This means that the Toulon site is a hive of activity in summer, to ensure that the aircraft carrier leaves fully operational and ready for duty. The 2022 technical shutdown included preventive maintenance on the two nuclear steam supply systems, the modernisation of the combat system, work on four engine hoists and the aviation systems, continued renovation of the living quarters and so on — all in all a very intense schedule. On time, on budget, quality services and a relationship of trust with the client — these are the four ingredients for this extraordinary technical shutdown to be a success.

Retrospective.



THE 2022 TECHNICAL SHUTDOWN KICKED OFF after the required two-month organic preparation period, during which the aircraft carrier, back from the Clemenceau 22 mission, was stripped of its equipment and had its fuel and munitions offloaded.

TRUST



Along with the crew, we lavished the *Charles de Gaulle* with attention all summer.

Together with the crew and Fleet support service, we rose to the challenge with a spirit of mutual trust and interaction. We were all working towards the same goal, which was to return the aircraft carrier to duty, fully upgraded, on time and on budget."

Pierre-Yves Bagur,
 Program Director

4500

THIS IS THE NUMBER OF WORK LINES COMPLETED DURING THE TECHNICAL SHUTDOWN.

On the agenda were corrective operations, including reworking a propulsive turbine and scheduled preventive maintenance, modernisation and a cybersecurity upgrade of the systems. Added to that was platform work, including painting more than 3000 m² of the flight deck and cleaning the hull, work on the aviation systems and continued renovation of the living quarters.

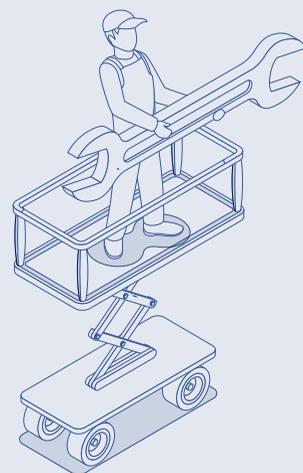
TOGETHER!



AROUND 200 NAVAL GROUP EMPLOYEES AND SUB-CONTRACTORS WERE WORKING ON SITE EVERY DAY TO MEET THIS CHALLENGE.

As overall project manager, Naval Group coordinated the work of the Services teams, supported by experts from other group sites (Nantes-Indret for propulsion, Ollioules for systems, Angoulême-Ruelle for equipment) and from 160 partner companies working alongside them on this extraordinary site.

RARELY FOUND EXPERTISE



THE CHARLES DE GAULLE IS THE FIRST AND ONLY NUCLEAR-PROPELLED SURFACE SHIP TO BE BUILT IN EUROPE. One of the most complex industrial items in the world and the result of sixty years of experience, the aircraft carrier requires rare expertise, particularly relating to nuclear propulsion, naval architecture and aviation systems. The challenge for Naval Group is to maintain these critical skills for national sovereignty. This is made possible by the in-service support for the *Charles de Gaulle* and the pre-project studies for its successor.

670

ACTIONS TO MAINTAIN SECURITY were carried out on board by the cybersecurity teams from Services. This is in addition to the systems updates, all the tests and checks (anti-virus, restoration etc.), and the verification of nearly 900 pieces of equipment fitted on board. The *Charles de Gaulle* is the only ship in the French Navy to include cyber personnel in its crew. Its IT security system will be replaced in 2023 by the Cyber Management System (CyMS), which has already been deployed on the multimission frigates (FREMM) and the defence and intervention frigates (FDI), and will provide cyber protection up until 2038. This new cybersecurity system will be natively integrated into the digital systems and data centres of future aircraft carriers. It will monitor all the systems on the ship.



A TURNING POINT IN THE TECHNICAL SHUTDOWN Work was in its sixth week. It had been an intense month and a half, but everything was going well on the face of things. This was until 21 July, when a propulsion issue was detected on one of the turbocompressors, a key component of the four diesel alternators that generate electricity on board. The other three were checked immediately and suddenly it dropped — all four needed replacing for the aircraft carrier to get underway again. The parts were not in stock. The technical shutdown then took another direction, in a race against the clock to source these parts from the Swiss sub-contractor. Meanwhile, on site, the operators prepared to remove, route and refit these parts, each weighing 500 kilos.

TAKING ACTION for the environment



REDUCE THE CARBON FOOTPRINT OF ITS SITES AND ACTIVITIES BY 5% PER YEAR UNTIL 2050.

This is one of the commitments made by the group as part of its corporate social responsibility (CSR) policy. During any technical shutdown, precautions are taken to minimise the impact of the work on the environment, particularly when cleaning the hull and doing painting work, tasks which are carried out in such a way as to avoid any discharge of toxic waste into the sea or the air. Moreover, since 2021, the Toulon site has been recycling IT equipment replaced on the boats and a re-use study is carried out with each modernisation.

GOAL:
ZERO

0

ACCIDENTS

ENSURING THAT EVERYONE WORKS IN THE BEST POSSIBLE SAFETY CONDITIONS IS A PRIORITY FOR THE GROUP. This represents an ongoing endeavour and course of action during the three months of work, on account of the co-activity on board and the major handling operations undertaken. Shared vigilance and the principle of precaution are central to this project. In particular, protective measures were put in place, due to the potential presence of toxic substances in the paint, a risk that was subsequently dismissed. Exosuits were provided for the sailors on board to prevent musculoskeletal problems.

Modernise and innovate

ENABLE THE CHARLES DE GAULLE, COMMISSIONED IN 2001, TO FACE THE THREATS OF TODAY AND TOMORROW: Enable the *Charles de Gaulle*, commissioned in 2001, to face the threats of today and tomorrow: This is the challenge for the Services teams during each technical shutdown. In addition to modernising the installations of the aircraft carrier, the site was the scene for trialling innovative industrial processes to improve productivity and limit environmental impact. One of these was a new solution for cleaning the hull, a major conundrum when afloat, given the surface area remaining underwater. The underwater drone developed by Norwegian company Ecosubsea took charge of this, without removing the anti-fouling paint and without discharging residue into the sea. This clean procedure has given the aircraft carrier back its potential to reach full speed. As part of the overall process, two inspections by other drones mapped the residual fouling and calibrated the DALAS NG optronics system, a camera that helps air controllers and Rafale pilots to land on deck.

RESILIENCE



15 September and not a day later!

This is the completion date that we were working to following the reconfiguration resulting from the events of 21 July. Given the colossal impacts of having the aircraft carrier out of service in a highly tense international context, not to mention the consequences on planning organic operations for the air and sea taskforce, this date had to be kept at all costs. Resilience is the key word, because we had to pick up the pace after a heavy blow and galvanise the troops in order to honour our commitment. There were some very difficult moments.”

Olivier Carlin,
Lead Production Engineer

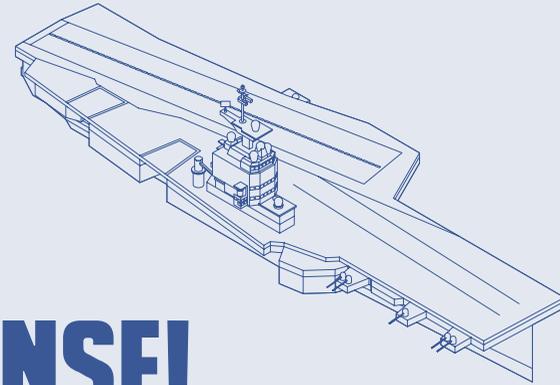


Looking to 2038

After forty years of active service, the *Charles de Gaulle* is making way for its successor, the new-generation aircraft carrier (PA-Ng) of which Naval Group is the overall architect. The detailed pre-project phase, which will continue until 2025, will specify the key characteristics of the warship and its system architectures, particularly those of the aviation, energy, combat and digital systems, which are being designed by Naval Group. As the largest warship ever built in Europe, the PA-Ng should be capable of operating the future aerial combat system (SCAF) and the future strategic air force missile ASN4G, along with the future naval force combat system.

Planning for 2023

THE 2022 TECHNICAL SHUTDOWN ENABLED MILESTONES TO BE SET FOR WHEN THE AIRCRAFT CARRIER UNDERGOES AN INTERIM TECHNICAL SHUTDOWN, scheduled in the docks in the second half of 2023. Carried out over a six-month period, the interim technical shutdown represents a high volume of work, the equivalent of four standard technical shutdowns, and will include the replacement of two shaft lines, preventive work on the nuclear steam supply system, modernisation of the combat system, upgrade of the hospital and continued renovation of the living quarters. This is work which has been planned since the summer and notably includes identification and de-risking operations, 3D scans and inspection—afloat—of the propellers.



INTENSE!

WHAT WORD SUMS UP THE TECHNICAL SHUTDOWN?

"Intense" was the one chosen by William Delalande, Propulsion Work Manager. "Before 21 July, everything was going smoothly, despite a few delicate but planned operations. And then suddenly, it all changed. We had to call up the teams at short notice and

mobilise a whole plant in the middle of the summer. In short, we were working on all fronts. Inspectors, preparers, engineers and technicians, employees and sub-contractors... everyone had to step up. When you're servicing aircraft carriers, you know it is going to be a busy summer!"

98%

THIS IS THE LEVEL OF SATISFACTION EXPRESSED BY THE CREW UPON COMPLETION OF THE TECHNICAL SHUTDOWN WHICH IS AN EXCEPTIONAL RESULT.

"The synergy between the industrial teams and the sailors contributed to this success, we know each other well and trust one another", stated the Ship's Captain and Aircraft Carrier Commander Sébastien Martinot.



15 SEPTEMBER MARKED THE END OF THE 2022 TECHNICAL SHUTDOWN. CHALLENGE COMPLETED!

"It was difficult, but we succeeded together, and pride was the dominant emotion at the end", recalls Olivier Carlin, Lead Production Engineer. "Another sentiment has emerged, that of gratitude», adds Pierre-Yves Bagur, Program Director. Gratitude towards our client for the trust they place in us which allows us to complete this type of work."



2022 HIGHLIGHTS

20 OCTOBER Inauguration of the Training Village at the Brest naval base

This Village combines six Naval Group learning facilities which deliver training courses run by operational specialists. The aim: to pass on knowledge in order to progress and get things right first time!



19 JANUARY

Inaugurated in Brest, SCAPIN, which stands for cyber services applied to legacy digital installations, is Naval Group's new cyber department dedicated to nuclear-powered ballistic missile submarines (SSBN). Based on the CyASAP toolchain developed by Naval Group, it ensures that a copy of the on-board digital systems is constantly available, even when the ship is at sea. The cyber teams thus have much more time to analyse and leverage the raw data in order to detect potential anomalies. This new and innovative capability has been put in place jointly by the French Navy's Strategic Oceanic Force (FOST), Fleet support services and the manufacturers.

10 MARCH

The second phase of periodic full cycle docking (FCD) for the nuclear-powered ballistic missile submarine *Le Terrible* is complete after fourteen months of work in dock 8 of the Brest naval base.

21 OCTOBER Final crossing

The nuclear attack submarine (SSN) *Rubis* left Toulon for its last crossing to Cherbourg before being retired from active service and dismantled by our teams.

OCTOBER Work in the Missiessy area continues

The Toulon defence infrastructure service facility (ESID) announced the acceptance of the last part of the contract to renovate dock 1 and quays 505 and 506 of the Missiessy area. This will be the culmination of ten years of work for the group's teams.



17 NOVEMBER

THE NUCLEAR ATTACK SUBMARINE (SSN) *PERLE*, currently in a state of periodic full cycle docking (FCD), took another step forward, leaving dry dock in Toulon.

24 NOVEMBER

The French Navy announced the return to operational service of the renovated frigate *La Fayette*. Following the refurbishments of the frigates *Courbet* and *La Fayette* in Toulon, the Naval Group teams prepared for the next and last phase of the program. This involves the frigate *Aconit* and is scheduled for the first quarter of 2023.



18 DECEMBER New premises in Alexandria

Naval Group and the Egyptian Navy inaugurated a new building at the Alexandria naval base. These new premises bring together employees from the group and representatives from the Egyptian Navy, with the close proximity serving to anchor the relationship in the long-term.

SUM- MARY

OUR PURPOSE: A COLLECTIVE REFLECTION

In autumn 2021, numerous employees volunteered to join or coordinate working groups focusing on the purpose of Naval Group. Numerous proposals resulted from their six months of reflection on the contribution of Naval Group to society. These were then put to nearly 8000 employees in a survey conducted in May 2022. The purpose can be summed up in one sentence and an explanatory text containing all the terms that have attracted strong support from employees. Defining our purpose involves affirming what Naval Group brings to society.

The environment in which most of us work and in which sailors sail our products.

“ WE DELIVER POWER AT SEA

We have sovereign expertise that is indispensable to French allies.

The **sea** brings us together. Naval Group, **an industrial company for sovereignty**,

In line with our slogan “Power at sea”.

is dedicated to serving the sailors who protect their country, and plays an essential role in the French **deterrence**. Drawing on the diversity

Naval Group has contributed to deterrence since its origins, without interruption.

and engagement of its **talents** and its centuries-old industrial tradition, Naval Group designs, produces and maintains high-performance, sustainable and reliable ships, systems, equipment and services to ensure the superiority and availability of fleets. Through the excellence of its know-how and its passion for innovation, Naval Group is **responsibly** shaping tomorrow’s naval industry.

“The talents” are our group employees. Our activity is made possible by the diversity and commitment of employees who come together on a daily basis.

Together, we prepare for the future responsibly, including limiting our impact on the environment and fighting corruption and influence peddling.

NAVAL GROUP: AN INTERNATIONAL GROUP AT THE FOREFRONT OF INNOVATION

10 SITES
IN FRANCE

- ANGOULÊME-RUELLE**
Equipment, simulators and training,
control and navigation systems
- BAGNEUX**
Systems
- BREST**
Services
- CHERBOURG**
Submarines
- LORIENT**
Surface ships
- NANTES**
(Indret, Technocampus Ocean-TCO)
Energy/propulsion, R&D, innovation
- OLLIOULES**
Systems, Cybersecurity, Computer
Emergency Response Team (CERT)
- PARIS**
Head office
- SAINT-TROPEZ**
Underwater weapons
- TOULON**
Services

18
COUNTRIES

AUSTRALIA / BELGIUM / BRAZIL / CHILE /
COLOMBIA / EGYPT / FRANCE / GREECE / INDIA /
INDONESIA / ITALY / MALAYSIA / MEXICO /
NETHERLANDS / PHILIPPINES / SAUDI ARABIA /
SINGAPORE / UNITED ARAB EMIRATES



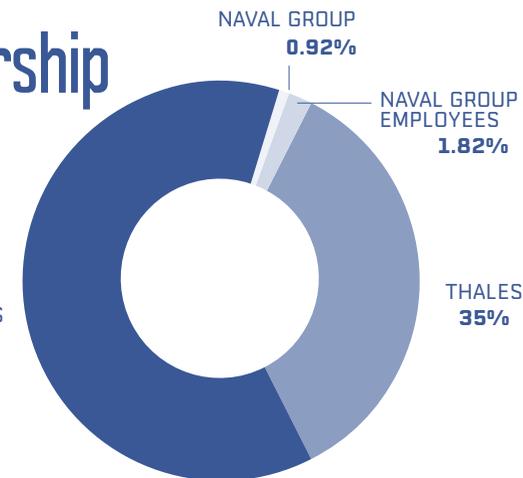
5.750 €BN
ORDER INTAKE RECORDED
DURING THE 2022
FINANCIAL YEAR

15.3 €BN
FRENCH AND
INTERNATIONAL
BOOKED ORDERS

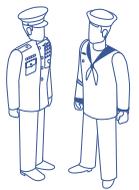
4.353 €BN
2022 REVENUE

Share ownership

FRENCH
GOVERNMENT
SHAREHOLDING
AGENCY
(AGENCE DES
PARTICIPATIONS
DE L'ÉTAT)
62.25%



50
NAVAL CLIENTS
GLOBALLY



40 000
DIRECT, INDIRECT
AND INDUCED JOBS



16 029
EMPLOYEES*
(*full-time equivalents)



2022 HIGHLIGHTS

25 JANUARY

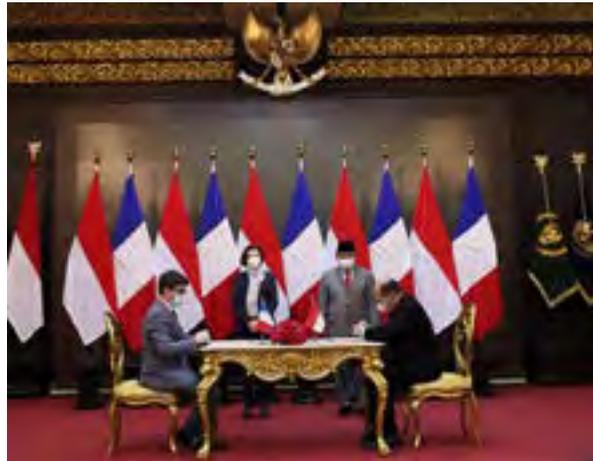
Naval Group joined the #StOpE initiative alongside 152 other companies and thus pledged to end everyday sexism within the group.



FEBRUARY

Small Modular Reactor

Naval Group, strategic partner of the Nuward™ program run by EDF, de-risked the new technologies and processes to support the development of the Small Modular Reactor (SMR). This solution, based on pressurised water reactors, is designed to meet the growing needs of the decarbonised electricity market.



10 FEBRUARY

TO STRENGTHEN THEIR CAPACITY TO MEET THE INCREASING NEEDS OF THE INDONESIAN NAVY,

Naval Group and PT PAL signed a cooperation agreement. This agreement also covers the opening of a joint R&D centre involving other local companies.

19 FEBRUARY One year ago...

19 February 2021 saw the launch of the program to construct third-generation nuclear-powered ballistic missile submarines (3G SSBN) for the French Navy. The industrial enhancement of the Naval Group sites and their specific production resources are underway, as is the initial procurement. From 2035, the 3G SSBNs are set to replace the Le Triomphant class submarines, which are currently in service in the French Navy's Strategic Ocean Force.



23 FEBRUARY

The Commissariat for Atomic Energy and Alternative Energies (CEA), Framatome and Naval Group sign a framework agreement for research and experiments on materials used in nuclear propulsion. The aim is to better control the design-to-production cycle of the steel blanks. This framework agreement contributes to the durability and development of the skills essential to the success of nuclear defence programs.

10 MARCH Best diversity and inclusion strategy

At the Sustainable Transformation Summit organised by the Leaders League from *Décideurs magazine*, Naval Group won the award for the best diversity and inclusion strategy. This recognition is the result of sustained work by the group in this area, to which it is deeply committed. A new diversity and inclusion agreement has been established with corporate partners and was signed by all the representative trade unions in September 2021.



17 MARCH Swarms of drones

Naval Group and the start-up Icarus Swarms (a Dronisos entity) joined forces to develop drone swarm solutions for navies.

24 MARCH

Greece signed the contract for the construction of three defence and intervention frigates (FDI), plus one as an option, and the contract for their in-service support (ISS). Two FDI HN (Hellenic Navy) will be delivered in 2025, with the third arriving in 2026.

25 MARCH

ACCEPTANCE FIRING WAS A SUCCESS FOR NAVAL GROUP FOR THE FIRST BATCH OF F21 COMBAT TORPEDOES

under the Brazilian Prosub submarine program. The F21 torpedo is the highest-performing heavyweight torpedo of its generation. It is quicker, more agile and more intelligent than its competitors on the international market.



13 APRIL Delivery to the Argentine Navy

The fourth and final Argentine OPV 87 offshore patrol vessel, the ARA *Contraalmirante Cordero*, was delivered to the Argentine Navy by teams from Naval Group and Kership, a joint subsidiary of Piriou and Naval Group. The delivery ceremony and taking of command of the last ship in the series mark the successful completion of the program.



20 APRIL

The *Vagsheer*, the last of six P75 Scorpène® class submarines, was launched in India. She was built entirely by the Indian shipyard Mazagon Dock Shipbuilders Limited (MDL), thanks to a technology transfer from Naval Group.



28 APRIL

In Brussels, Naval Group inaugurated the MCM Lab and Cyber Lab, two collaborative research laboratories created by its subsidiary Naval Group Belgium. The labs bring together Belgian and European institutional, industrial and academic partners to develop the innovations of tomorrow in mine countermeasures and cybersecurity.



2022 HIGHLIGHTS



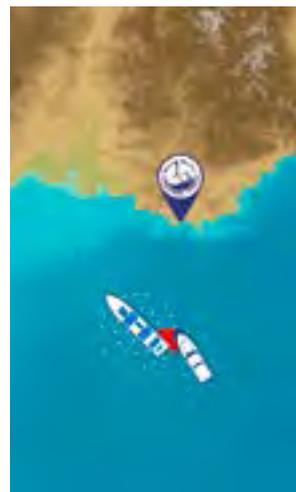
29 APRIL

THE FIRST OF FOUR LOGISTIC SUPPORT SHIPS (LSS)

in the fleet logistics program (Flotlog) for the French Navy, the *Jacques Chevallier* was launched in Saint-Nazaire. It made its first sea trip in December.

11-12 MAY

Naval Group and its partners successfully led a major demonstration of the Effector project under operational conditions. This demonstration took place at the regional operational centre for monitoring and rescue in the Mediterranean (CROSS MED) using the SeaMIS maritime surveillance and rescue coordination system developed by Naval Group, along with maritime surveillance systems from other European states in the context of cross-border cooperation operations.



13 MAY
Gowind® corvettes

The second of two Gowind® corvettes, the *Al Emarat*, ordered from Naval Group by the United Arab Emirates, was floated in Lorient. *Bani Yas*, the first corvette, was floated in December 2021.

7 JUNE

The aircraft carrier *Charles de Gaulle* came in for its summer technical shutdown. The teams from Services, along with experts from the group's other sites, spent the summer providing in-service support.

7-8-9 JUNE
Cyber security

At its sixth time at the International Cyber Security Forum (ICSF) at the Grand Palais in Lille, Naval Group presented its innovations in the cyber field, as well as its recruitment goals.

14 JUNE

Built for the Royal Netherlands Navy, the second of twelve mine countermeasure ships for the Belgian-Dutch rMCM program, the *Vlissingen*, was laid down in Lanester.



15 JUNE
Regional office in Mexico

Naval Group announced the opening of a regional office in Mexico to promote its products and services and develop partnerships in the country. Mexico is now the 18th country in which Naval Group is present. The opening of this office represents the first step in a long-term partnership and cooperation commitment to develop naval capabilities in Mexico.

20 JUNE
Partnership with the Italian shipping company Grimaldi

Members of the European project Life-PIAQUO, led by Naval Group, signed a partnership agreement with the Italian shipping company Grimaldi. This project aims to reduce the impact of maritime traffic noise on marine ecosystems by developing concrete solutions for maritime transport. This agreement marks an important milestone in the project, which will demonstrate the relevance of two solutions and test them in real conditions on a Grimaldi ship.

30 JUNE

Naval Group met with its Greek industrial partners at the French Embassy in Athens to sign key contracts and cooperation agreements as part of its plan to collaborate with Greek industry to build defence and intervention frigates (FDI) for the Hellenic Navy.



13 JULY
Greek defence and intervention frigate

The ceremony to mark the start of machining on the second Greek defence and intervention frigate (FDI HN) took place in Lorient.



13 JULY

The unique Panoramic Sensors and Intelligence Module (PSIM) mast system was installed on the Gowind® corvette, the *Bani Yas*, at the Lorient site. The on-board PSIM represents Naval Group's vast knowledge of systems. This is an autonomous and extremely high-tech modular assembly that ensures 360° coverage. It combines sensors, the SETIS® combat system (which guarantees exceptional performance across all combat areas) as well as operation and communication stations for the ship.

1 AUGUST

Four months after its transfer from dock 8 to the operational base at Île Longue, the nuclear-powered ballistic missile submarine (SSBN) *Le Terrible* hit a key milestone in its periodic full cycle docking (FCD), namely, the transfer of responsibility for implementation from Naval Group to the user client.



1 SEPTEMBER

THE *RIACHUELO*, THE FIRST OF FOUR SCORPENE® SUBMARINES UNDER THE PROSUB PROGRAM, was commissioned by the Brazilian Navy. It was built entirely in Brazil by Itaguaí Construções Navais (ICN) thanks to a technology transfer from Naval Group. The ceremony took place at the Itaguaí naval base. It made its first sea trip in December.





2022 HIGHLIGHTS

13 SEPTEMBER

The fourth and final corvette in the Egypt Gowind® program, the ENS *Alismailia*, was delivered to Alexandria. Following the delivery in February of the ENS *El Moez*, the third Egyptian Gowind®, the delivery of the *Alismailia* marked a further great success for the program this year.



21 SEPTEMBER Titans of the seas

Following visits to Saint-Malo, Brest, Angoulême, Nantes and then Toulon, the photo exhibition "Titans of the seas" made a stop at Ollioules. Curated by Ewan Lebourdais, Official painter of the French Navy, this exhibition invites you to dive into the world of naval defence.



30 SEPTEMBER

THE TEAMS FROM NAVAL GROUP AND TECHNICATOME STARTED THE DIVERGENCE OF THE NUCLEAR REACTOR ON THE *DUGUAY-TROUIN*,

in other words, the start of the fission chain reaction and the first step in commissioning. This is the second nuclear attack submarine (SSN) in a series of six planned as part of the Barracuda program.

10-18 OCTOBER New collective agreement

At the staff elections, Naval Group employees elected their new staff representatives for the next four years. As departmental contacts for dialogue within the company, these individuals are tasked with discussing key corporate issues and engaging in negotiations. This is an essential role, particularly for adapting the company to the new collective agreement for the metalworking industry, which will take effect on 1 January 2024.

17 OCTOBER

Representatives from Naval Group and the Philippines Department of National Defence carried out a pre-delivery inspection of the *Contralto*® reaction module in Saint-Tropez. This important step allows the *Contralto*® to be installed into the C-Guard decoy launching system of two Jose Rizal class frigates in the Philippine Navy.



18-20 OCTOBER Euronaval exhibition

The design of the new-generation aircraft carrier (PA-Ng) was unveiled to the public at the 28th Euronaval global naval defence exhibition. To be commissioned in 2038, the ship will measure 310 metres in length and will weigh 75,000 tonnes, making it the largest warship in Europe. This event also provided an opportunity to present the *Blue Shark concept ship*, which demonstrates Naval Group's capacity to enter into future naval combat with innovative technological responses, all while reducing environmental impacts.

OCTOBER

In a series of tests carried out at Lorient, the X-pulse expulsion system demonstrated its ability to eject an F21 torpedo.

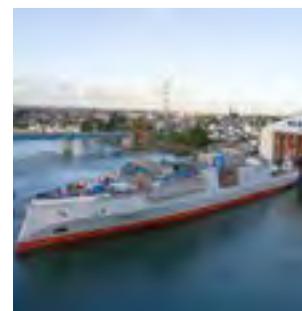


20 OCTOBER Equipment activity is rewarded!

At the BAE Systems UK Supplier Event in Farnborough, Naval Group, represented by its Business Programs & Equipment (BPE) entity, received one of five Supplier Award Recognition accolades. This award reflects the quality of Naval Group products and the work of every employee at Nantes-Indret and Angoulême-Ruelle on exchangers and shafts.

7 NOVEMBER

The *Amiral Ronarc'h*, the first defence and intervention frigate (FDI) ordered by the French Defence Procurement Agency (DGA) and intended for the French Navy, was floated in Lorient. On 10 November, the Panoramic Sensors and Intelligence Module (PSIM), the innovative integrated mast system, was installed on the frigate.



8 NOVEMBER

NAVAL GROUP RECRUITS... AT MONTPARNASSE STATION!

With more than 1500 positions available in 2022, the internal mobility and recruitment dynamic continued. The group is focusing on professional integration, skills transfer and providing opportunities for young people and those looking for a change of career.



16 NOVEMBER

OCCAR took delivery of the *Lorraine*, the second multimission frigate with enhanced air defence capabilities (FREMM DA). This was the eighth and last FREMM in the program.



17 NOVEMBER

The nuclear attack submarine (SSN) *Perle*, currently in a state of periodic full cycle docking (FCD), took another step forward, leaving dry dock in Toulon.

18 NOVEMBER Purpose

Naval Group set out its purpose in a document that affirms its commitments to its clients, partners, suppliers and employees and which aims to guide the company's strategy and actions.



30 NOVEMBER Controlled decision-making autonomy

The first sea test of controlled decision-making autonomy (ADC) was carried out on an underwater drone demonstrator.



7 DECEMBER

Naval Group signed the LGBT+ Charter of Commitment with the Other Circle association to promote an inclusive environment for LGBT employees.

A MAJOR PLAYER IN NAVAL DEFENCE, WITH A UNIQUE MODEL



01
DESIGN
AND PREPARATION

NAVAL GROUP'S ENGINEERS, RESEARCHERS AND EXPERTS RESPOND TO THE TECHNOLOGICAL MARITIME CHALLENGES OF TOMORROW.

02
PRODUCTION
AND BUILDING

THE INDUSTRIAL SITES PRODUCE, ASSEMBLE OR BUILD HIGH-TECH NAVAL SOLUTIONS.

03
TRAINING
AND SUPPORT

NAVAL GROUP OFFERS ITS CLIENTS A COMPREHENSIVE RANGE OF TRAINING AND CONSULTING SERVICES IN ALL AREAS OF NAVAL DEFENCE.

04
MAINTENANCE,
UPKEEP AND
MODERNISATION

NAVAL GROUP ENSURES THE IN-SERVICE SUPPORT OF SURFACE SHIPS, SUBMARINES AND EQUIPMENT.

05
DECOMMISSIONING
AND DISASSEMBLY

NAVAL GROUP PERFORMS THE DISASSEMBLY OF VESSELS AND THE DECOMMISSIONING OF FRENCH NAVY NUCLEAR SUBMARINES.

As an international high-tech company, Naval Group uses the extraordinary know-how of its employees, its unique industrial resources and its 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.

GENERAL MANAGEMENT COMMITTEE

The General Management Committee considers all the major strategic, economic, financial or technological policies relating to the company's activity. As of 1 January 2023, Naval Group's General Management Committee has been composed of:

Chairman:
Pierre Éric Pommellet.

Administrator appointed by decree as a representative of the State:

Vincent Le Biez
(replaced by Pierre Jeannin on 15 February 2023).

Administrators appointed by the Shareholders' General Meeting:

Pierre Éric Pommellet, Patrice Caine, Nathalie Ravilly, Pascal Bouchiat, Bernard Rézat, Jacques Hardelay, Valérie Champagne, François Geleznikoff, Guenaëlle Penin de la Raudière, Geneviève Mouillerat and Monique Legrand-Larroche.

Administrators appointed as staff representatives:

Laurent Elie, Didier Chavrier, Tony Lecorps, Olivier Ménard, Béatrice Unia and Yvon Velly.

Censor: Paul Teboul.



PIERRE ÉRIC POMMELLET
Chairman and Chief Executive Officer



FRANK LE REBELLER
Senior Vice President, Finance



MARIE-LAURE BOURGEOIS
Executive Vice President, Sales and Marketing



GÉRALDINE LE MAIRE
Executive Vice President, General Secretary



VINCENT MARTINOT-LAGARDE
Executive Vice President, Services

THE MANAGEMENT TEAM



OLIVIER DE LA BOURDONNAYE
Executive Vice President, Surface Ships



LAURENT ESPINASSE
Executive Vice President, Submarines



CAROLINE CHANAVAS
Executive Vice President, Human Resources



GUILLAUME ROCHARD
Executive Vice President, Strategy, Partnerships and Institutional Affairs



ÉRIC PAPIN
Executive Vice President, Technical



DAVID QUANCARD
Executive Vice President, Operations and Performance



LILIAN BRAYLÉ
Executive Vice President, Systems, Equipment and Propulsion



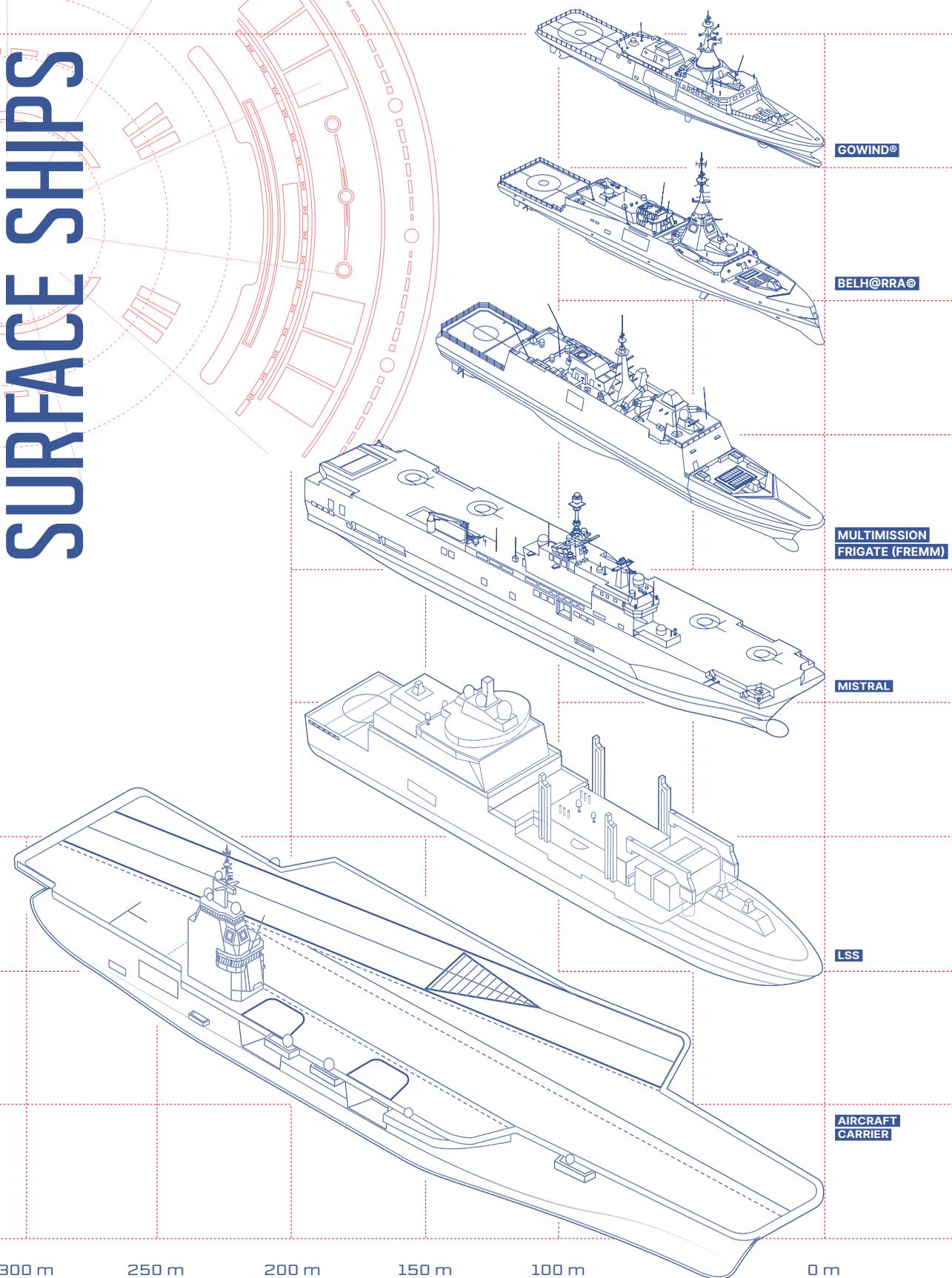
CLAIRE ALLANCHE
Executive Vice President, Communications



AURORE NEUSCHWANDER
Executive Vice President, Drones, Autonomous Systems and Underwater Weapons

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.

SURFACE SHIPS



+ **GOWIND®**
 + **BELH@RRAR®**
 + **MULTIMISSION FRIGATE (FREMM)**
 + **MISTRAL**
 + **LSS**
 + **AIRCRAFT CARRIER**

The benchmark multi-role corvette.

MISSIONS: maritime defence and security operations, coastal and open sea, autonomous or in cooperation with a naval force.

The latest generation digital frigate.

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

The expedition-capable multimission frigate.

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

The amphibious helicopter carrier with proven efficiency.

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

The logistic support ship.

MISSIONS: to ensure the operational availability and permanent presence of a task force at sea.

The power projection ship.

MISSIONS: expeditionary aero-naval operations command, air support for sea to land 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 submarines and combat ships.

ON-BOARD MISSION AND COMBAT SYSTEMS

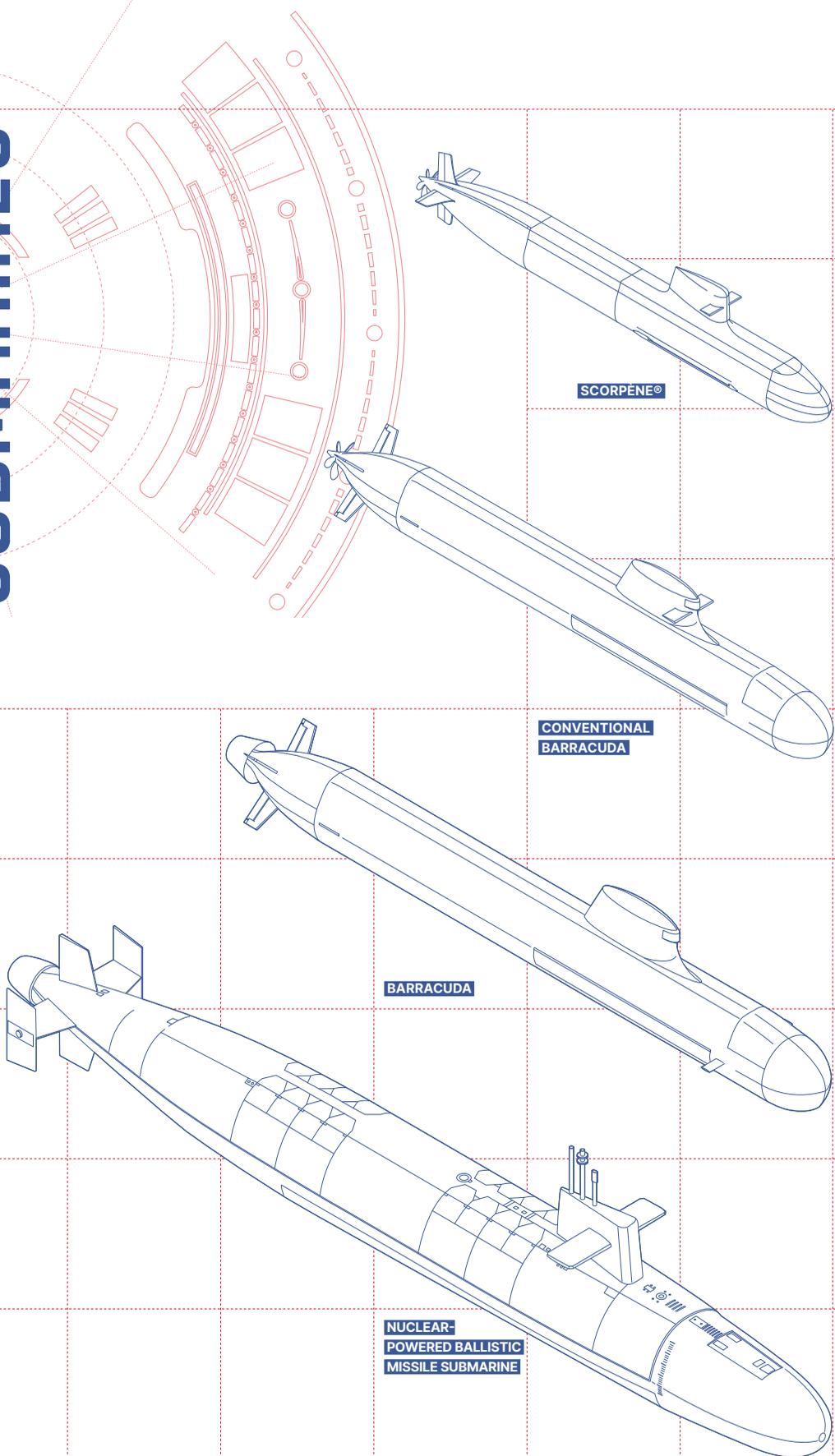
SETIS®
The combat system for warships in high-intensity naval operations.

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.

SUBMARINES



150 m 125 m 100 m 75 m 50 m 25 m 0 m

SCORPENE® +

The international benchmark for conventional submarines.

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

CONVENTIONAL BARRACUDA +

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 stealth 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 +

The best performance for nuclear dissuasion. Invulnerable because undetectable.

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

SERVICES

A range of bespoke services to ensure the operational excellence of surface ships and submarines in France and internationally.

MAINTENANCE, LOGISTICS SUPPORT AND MODERNISATION

Ship maintenance and logistics support solutions meeting precise requirements: supply of spare parts via digital platforms such as Navagate, technical assistance from our experts and equipment manufacturers, back-up and support, and complete overhaul and incremental change solutions for ships.

EDUCATION AND TRAINING

A complete range of education and training solutions for the operation and maintenance of ships.

UNDERWATER WEAPONS

F21 TORPEDO

The latest-generation heavy torpedo for submarines.

MU90

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.

STAKEHOLDERS

OUR COMMITMENTS

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.

INDUSTRIAL PARTNERS

To engage in win-win cooperation.

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

SHAREHOLDERS

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

PUBLIC AUTHORITIES, INSTITUTIONS

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

SCHOOLS, UNIVERSITIES

To ensure the expertise of current and future generations.

CLIENTS

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

SUPPLIERS

To unite them around shared growth objectives.

CHANNELS FOR EXCELLENCE AND INNOVATION

To be at the forefront of technologies that make a difference.

MEDIA, JOURNALISTS

To create a positive dynamic of outreach and influence.



As an international player in the naval defence sector and with a rich heritage of French naval expertise, Naval Group partners with various nations in the management of their maritime sovereignty. Naval Group develops innovative solutions to meet its clients' needs.

Present throughout the entire vessel life cycle, it designs, builds, integrates, maintains in service and upgrades submarines and surface ships, as well as their systems and equipment, right through to their disassembly and deconstruction. It also provides services for shipyards and naval bases. As a high-tech industrialist, Naval Group relies on its exceptional expertise, unique design and production means, and its ability to establish strategic partnerships, particularly through technology transfers.

Aware of its corporate social responsibilities, Naval Group is a member of the United Nations Global Compact.



For more information:
NAVAL-GROUP.COM

