

MBDA – Mastering maritime environments

Scalp Naval: A strategic and structural decision

The Scalp Naval cruise missile programme should be awarded before the end of the year. Covered by the current defence programming law, the decision is of strategic importance for France. It is also crucial in terms of building France's defence industry, notably the missile sector. Moreover, the Scalp Naval is a key component of the FREMM programme, as the system will equip not only the land attack variant (AVT) but also the anti-submarine version (ASM) of the series. Modern management of crises and the planning of military interventions must, today and tomorrow, be adapted to the increasingly complex situational context that result from the close proximity of targets and civilian populations. The ability to carry out high-precision in-depth strikes is therefore a strategic necessity. Having cruise missiles aboard fighter aircraft and battleships

ensures this capability. The Scalp Naval optimises the features of the Scalp/Storm Shadow cruise missile, developed in cooperation with the U.K. Currently in service in the French Air Force aboard Mirage 2000s, the U.K. Royal Air Force on Tornado GR4s and soon to be fitted on the naval version of the Rafale F2, the Scalp/Storm Shadow has already demonstrated its operational capabilities, during Operation Telic in Iraq in 2003. The Scalp Naval's capabilities are at the heart of European operational doctrines concerning naval land attack actions: in-depth coverage of theatres, including coastal areas; the capability to penetrate enemy defences, the ability to handle a wide range of targets, a low risk of collateral damage, and simplified deployment, either on a national level or as part of a coalition. The complementarity of the Scalp Naval and

the Scalp/Storm Shadow will give France the ability to modulate its action and send a strong political message. In addition, the Scalp Naval, designed and developed for the needs of European armed forces, is the only naval cruise missile that can be deployed independently, which is vital in order to preserve the sovereignty of States. While the Scalp Naval is thus a strategic necessity, it is also a structural component for the defence industries of France and Europe via MBDA, which is in charge of the programme. The launch of the programme's construction phase will allow MBDA to confirm its excellence in the field of cruise missiles and guarantee the long-term viability of France and Europe in this strategic sector. The existence of a high-performance long-lasting industrial base will also enable forces to carry out in-depth strike missions independently.

Three questions for Marwan Lahoud, CEO of MBDA

As Euronaval draws near, how does MBDA position itself on the naval market, and what does the sector represent for your company?



ML: MBDA is the only industrial in the sector to have a complete range of missiles and missile systems covering the needs of naval, air and land forces. The naval segment, both surface platforms and submarines, is roughly equal to the other two segments. MBDA is present with high-tech products in growing fields: naval anti-air defence, with Aster and VL Mica systems; naval combat, with the Exocet Block 3 and the Marte; and land attack, with the Scalp Naval. And so the naval sector represents a driving force for the company as well as the European defence industry.

What does the launch of the FREMM programme mean for MBDA?

ML: MBDA has been a partner in the FREMM programme since it was launched in 2002 and the company participated in the initial design of the ship in terms of weapon systems. Most of the FREMM frigate's military capabilities will thus be covered by weapon systems developed and produced by MBDA: Aster, Exocet and Scalp Naval for France; Aster, Teseo, Milas and Marte for Italy. Furthermore, MBDA is handling the integration

studies, development of the missile launch electronics, etc. MBDA is thus the core of the FREMM's military capabilities. The Scalp Naval is tied to the FREMM concept. It is a key component of the programme and will be the frigate's most important weapon. The immediate launch of the FREMM programme, in my view, calls for the launch of the Scalp Naval programme in order to meet the deadlines and missions of these new ships and avoid going over budget.

Do you believe that new mergers in the defence sector are necessary? What are MBDA's plans in this area?

ML: MBDA has successfully integrated nearly all European missile activities and positions itself as the group of reference among a set of shareholders whose integration remains to be completed. Bringing together the huge firms BAE Systems, EADS and Finmeccanica, MBDA is also a privileged interlocutor of Thales and Saab while having established firm partnerships with the large American groups. Our desire is, as a result, to make our expertise available to these groups, not only for European consolidation, but also for new achievements in transatlantic cooperation programmes, not to mention regional partnerships with Brazil, Turkey, certain Gulf countries, India and Singapore.

Scalp Naval: A reliable, modern weapon

Scalp Naval's new features

Derived from the air-transportable Scalp/Storm Shadow, the Scalp Naval features the same proven sub-systems, notably with regards to cruise and target acquisition phases. Its guidance system, for example, will be largely based on the air-transportable version, with reutilisation of the avionics and infrared terminal guidance system. As a result, the Scalp/Storm Shadow's metric precision, an essential part of this type of system, will be possible with the Scalp Naval, despite a significantly greater range. The decision to re-utilise proven systems makes it possible to keep costs and development risks to a minimum, reduce the time required to build the missile, optimise operational synergies between the two weapon systems while ensuring the desired level of performance. The main differences between the air-transportable missile and the naval missile are related to the launch platforms – multi-mission

FREMM frigates and Barracuda submarines. Surface ships will feature a type A70 vertical launcher, based on the Sylver A43 and A50 family developed for Aster missiles. The A70 launcher is a lengthened version, but it retains all of the main technical aspects. This commonality will make it possible to launch Aster missiles using an A70 launcher. Development of this launcher began in January 2006 under the direction of MBDA. On the Barracuda submarine, the Scalp Naval will be fired by torpedo launcher tubes. The Scalp Naval also has new features, among which those that depend on the type of platform, and those that are intrinsic to the missile. Naval platforms offer great flexibility of use, and deployment is possible from the early stages of a crisis. The two types of platforms, submarines and surface ships, offer specific advantages. Submarines offer discretion, freedom of movement and

the "surprise effect," whereas surface ships have strong visibility and a greater load capacity, giving them a more powerful firing capability. For its part, the Scalp Naval features a new body and a greater fuel capacity, enabling it to reach a much greater range than the air-transportable version. This increased range allows it to strike targets at greater distances, either firing from far offshore or deeply penetrating into the theatre of operations. The Scalp Naval's range, far greater than the air-transportable Scalp, is therefore a major advantage in the management of crises. The Scalp Naval's military warhead is also new. It offers a compromise in terms of perforation/blast/fragmentation different from that of the air-transportable version, which positions the Scalp Naval as a complementary system for the Scalp/Storm Shadow that is not redundant in its use and effects.

► Two configurations

The present contract with DGA covers the development of the Scalp Naval missile in two configurations, FREMM and Barracuda, as well as production. Acquisition of the Scalp Naval will make it possible to fit each frigate with 16 missiles ready for use in their firing containers, vertically stored in the launcher, and each Barracuda with missiles stored in their underwater launch capsules.

► A European dimension

Thanks to its capabilities, the Scalp Naval has all the features to attract other European partners. It is likely to interest, on one hand, navies that have similar but non-independent systems with fewer capabilities, and on the other, navies who view in-depth strike missions as a new form of mission for their naval forces. Still, the decision to acquire in-depth strike missile systems is as much a political decision as a military one.

A single missile for two platforms

The Scalp Naval's feasibility study, begun in late 2002 and completed in mid-2005 confirmed the missile's uniqueness, with its booster compatible with both a vertical launcher installed on a FREMM frigate and torpedo launcher tubes on the Barracuda. Definition studies carried out on the weapon's innovative elements, i.e. booster with thrust vectoring, vertical firing container (CTV) for the frigate configuration and underwater launch capsule (DCM) for the submarine, led to the production of the first prototypes and the carrying out of validation tests. Work on the booster led to the first finalisation tests for the various sub-systems and the completion of a pre-qualification definition ready to be fired. The booster's firing

tests were carried out in late 2004 and made it possible to validate the loading and firing orientation of the concept being tested. Underwater firing tests demonstrated the proper functioning of the selected thrust vectoring and made it possible to adjust propulsion in the underwater phase. The results of these tests support the expected hypotheses regarding the booster's capabilities in the context of studies on platform separation carried out as part of the Scalp Naval's feasibility study.



Naval combat: anti-ship warfare

The Exocet family modernises

Consisting of Exocet MM40 missiles (surface ships), Exocet AM39 (air-transportable version) and Exocet SM39 (submarines), the Exocet family serves as a reference in anti-ship missiles. Its recent export successes solidify its position on the cutting-edge of naval combat. In the anti-ship missile for surface ships segment, the Exocet MM40 Block 2 is the latest generation of Exocet missiles in production. The MM40 version is already present in 18 navies worldwide. While the Exocet MM40 Block 2 is a reference and remains the weapon of choice among modern navies, MBDA is anticipating future needs and since 2004 has been developing a new variant of the Exocet MM40 called MM40 Block 3. The main features of this version, developed to meet the future needs of navies, are an increased range (180 km) and a coastal attack capability made possible thanks to a new all-digital guidance system. The first firing of this new variant took place on 6 September 2006 off the coast of Ile du Levant. All objectives were met. The second development firing is planned before the end of the year. The system features a significant growth potential that will make it possible to integrate the missile in future network-centric resources. It is expected that this new missile will eventually be fitted aboard the Forbin and Chevalier-Paul Horizon-class frigates. These ships will be equipped with two containers of four missiles each for a total of eight missiles. The second class of vessels will be the FREMM frigates, starting in 2012, which will also feature two quadruple containers. The second phase of the Exocet's modernisation concerns the AM39 air-transportable version. MBDA is developing the Exocet AM 39 Block 2 Mod 2 variant destined for the Naval Rafale based on F3 Standard, which will equip the naval air force starting from 2009 onwards. This missile is being developed for adaptation to the latest-generation combat aircraft. The AM39 Block 2 Mod 2, currently in development, features new avionics and is a so-called "all digital" missile. It is largely based on the electronics of the Exocet MM40 Block 3. Development of this variant is being carried out informally. A test campaign aboard the Charles de Gaulle aircraft carrier took place in December 2005 and the firing qualification on Rafale F3 taking off from the aircraft carrier is planned for April 2007.



First firing of the Exocet MM40 Block 3

► Teseo MK2/A

Italy has confirmed its plans to upgrade the Teseo missile currently in service in the Italian Navy. The latest version of the Teseo missile was successfully fired in May 2006. It will also equip the Italian FREMM frigates.

► Milas

The Milas missile is in production. It too will equip Italian FREMM frigates, in anti-submarine combat version.

► Marte MK2/N is available

The Marte missile comes in surface-to-surface version aboard surface vessels under the name Marte MK2/N. The system is well adapted to small-tonnage ships as its range is suited to the radar range of this type of vessel. Installation of the MK2/N is based on the MK2/S version, which is an advantage.

► For naval air forces

Marte MK2/S

Qualification of the Marte MK2/S missile, selected by the Italian Navy, has been completed on the EH-101 and NH-90 helicopters. It will be fitted aboard NH-90s deployed on Italian FREMM frigates. MBDA is working on adding a feature allowing post-firing control of the missile (MITL: Man In The Loop) in anticipation of future requirements.

Sea Skua Mark2 project

The Sea Skua MK2, if its launch is carried out, will be an enhancement of the Sea Skua MK1. The missile will need to be adapted to Lynx and Super Lynx and to the new Lynx helicopter that will equip the Royal Navy starting in the next decade. It is destined for all countries using the MK1 version.

In addition to these two responses, MBDA is looking into the possible synergies between the future land attack missile and the light anti-ship missile mentioned above.

Anti-aircraft naval defence

Thanks to a line of new-generation products featuring the latest technologies, MBDA today offers a family of systems that are particularly suited to the new contexts of operational use and the new threats that have come about as a result.

MBDA's response to a changing strategic context

The majority of anti-aircraft defence systems currently in service are based on scenarios dating from the Cold War involving large-scale deployments in high-seas operations. These scenarios led to the development of anti-aircraft defence systems whose architecture was based on the notion of successive layers of protection. This involved the deployment of a dedicated system for each of these layers: self-defence, wide area self-defence and area defence. The evolving geopolitical context, the shift towards multi-polarisation and the regionalisation of areas of tension and potential conflict have resulted in navies increasingly operating in coastal areas as part of task groups, often reduced to a single vessel. This situation is forcing navies to carry out surveillance and policing missions as well as escort missions for non-armed ships in complex environments where both military ships and commercial traffic are present. Proximity to coastlines has given rise to new threats such as the heightened risk of saturation attacks and delayed revelation of targets, factors that call into question the choice of technologies and architecture of older anti-aircraft defence systems. The VL Mica system, for one, and Aster 15 and 30 missile defence systems, took into account as early as the design phase this new context in order to offer optimised anti-aircraft defence that is adapted to the new limitation of coastal operations. In particular, and thanks notably to the use of highly manoeuvrable active homing missiles, VL Mica systems, like those based on Aster 15 and 30, have the ability to counter saturating attacks through high-speed salvo firing, to counter manoeuvring targets such as fighter jets, sea-skimming anti-ship missiles and cruise missiles, and to overcome the risks of hidden targets (presence of other ships, terrain masking, etc.). As a result, these systems are currently the only ones in their category to offer multi-layer protection in all environments using a single system. Thanks to their capabilities, VL Mica systems such as Aster eliminate the need for a complementary self-defence system; they are also the ones best suited for escorting non-armed ships. For its part, VL Mica is the wider scale self-defence system adapted for navies whose missions are mainly located in coastal areas. Thanks to its capabilities, it ensures an airtight, wide-range shield making it possible to safely carry out escort missions for non-armed ships (commercial ships or military vessels), as well as policing or coastal surveillance missions. The VL Mica was also designed to be easily integrated on small- and medium-tonnage platforms thanks to its compactness and modular architecture (container-launcher units).

► Aster 15/30

Systems based on Aster 15 and 30 (SAAM, PAAMS, etc.) ensure the consistent and homogenous equipping of navies required to operate in coastal areas and participate in operations involving large-scale deployments (e.g. coalition operations), in some cases on external theatres. For these needs, MBDA offers, with its Aster 15- and 30- based weapon system, a global line of modular solutions, from area defence to theatre defence, even featuring anti-ballistic missile capabilities. The range of the Aster 15 and the Aster 30 are 30 km and 120 km respectively.

► Simbad and Tetral

These two systems are dedicated to self defence and countering asymmetric threats. Originally intended for self-defence of all types of surface vessels, Simbad and Tetral also feature surface-to-surface capabilities in face of light, rapid ships for protection against new threats. These two systems rely on the Mistral missile, which already equips several navies around the world and which has scored a target strike rate of 93 per cent following 2,600 firings.