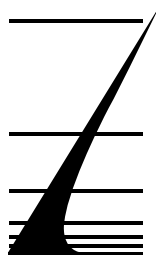


# The Market for Anti-Ship Missiles

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Product Code #F658

A Special Focused Market Segment Analysis by:



**FORECAST** INTERNATIONAL



# Analysis 3

## The Market for Anti-Ship Missiles

### 2011-2020

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## PROGRAMS

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The following reports are included in this section: (**Note:** a single report may cover several programs.)

AGM/RGM/UGM-84 Harpoon  
Chinese Anti-Ship Missiles  
Exocet  
Gabriel  
Hsiung Feng I/II  
MILAS  
OTOMAT  
Penguin/AGM-119  
RBS15  
RUR-5A ASROC/Vertical Launch ASROC  
Russian Anti-Ship Missiles  
Sea Killer/Marte Mk 1/Marte Mk 2  
Sea Skua  
South African Anti-Ship Missile  
Type 80 (ASM-1/ASM-2)/Type 88 SSM-1



## Introduction

The anti-ship missile has helped change the nature of naval warfare. However, the foundation for this shift was laid by the desperate efforts of the Japanese military to stave off impending defeat during World War II.

At the beginning of the Second World War, it was a lucky hit if a single bomb or torpedo was able to sink a major surface combatant, especially an aircraft carrier.

Naval warships proved quite resilient. Adding armored decks to aircraft carriers further improved their durability.

It took two large Japanese aerial attacks on the USS *Yorktown* during the Battle of Midway to finally put this aircraft carrier out of action. Although severely damaged and set ablaze by these strikes on June 4, 1942, the *Yorktown* did not sink until June 7.

As the war turned against Japan, its leaders became increasingly desperate. Japan could not keep up with pilot losses. Adding to Japan's troubles was a growing lack of high-quality aviation fuel.

The Japanese military leadership realized that desperate times called for desperate measures, and turned to a new weapon, the Kamikaze, for salvation. Imperial Japanese Navy Vice Adm. Takashiro Ohnishi, commander of the First Air Fleet in the Philippines, helped conceive the Kamikazes. He noted that an aircraft crashing into a carrier caused more damage than 10 planes strafing it.

On October 25, 1944, the aircraft carrier USS *St. Lo* was hit by a single Kamikaze, but the resulting fire caused the ship's bomb magazine to explode, sinking it. The success of such attacks prompted the Japanese to rapidly expand the program.

Purpose-built Kamikaze aircraft soon appeared, including the Yokosuka MXY7 Ohka. This rocket-powered bomb has been called an anti-ship missile with a human pilot for a guidance system. The first was used in March 1945.

By the end of the Second World War, Japan's naval air service had sent 2,525 Kamikaze pilots to their death, with the Army adding another 1,387 (numerous other Japanese soldiers and sailors died conducting suicide missions that had little influence on the course of the war).

Japanese records claim Kamikazes sank 81 ships and damaged 195. The U.S. military acknowledges the loss of 34 ships, the damaging of another 368 (including 23

aircraft carriers, 5 battleships, 9 cruisers, and 23 destroyers), the death of 4,900 sailors, and the wounding of more than 4,800 servicemen as a result of Kamikaze attacks.

The uncoordinated nature of Japanese Kamikaze attacks and the hoarding of these resources for the defense of the home islands degraded their effectiveness. The Japanese had more than 9,000 planes in the home islands available for Kamikaze attack, and more than 5,000 had already been specially fitted for suicide attack to resist the planned invasion.

Of the Kamikazes sent against the U.S. fleet in Leyte Gulf, about one-quarter scored hits or a damaging near miss.

Even with the use of radar, heavy combat air patrols, and massive increases in the number of anti-aircraft guns on U.S. warships, a distressing number of Kamikazes (10-15 percent) were able to successfully crash their aircraft into U.S. surface ships in the last days of the war.

Today's anti-ship missile is the West's emulation of the Kamikaze concept but without the sacrifice in human lives. Fighters and naval surface combatants, even small fast attack craft, can salvo anti-ship missiles at warships with a good chance of scoring a direct hit.

These missiles give relatively small platforms the lethal punch needed to sink almost any foe and the ability to overwhelm local defenses that otherwise would have stopped a more conventional surface attack.

No longer does a naval force need to launch massive airborne attacks to disable or destroy an opponent. Even small helicopters armed with anti-ship missiles can inflict considerable damage on a major surface combatant. These anti-ship missiles have also increased the range of engagements and decreased the warning time available to a defender.

A new generation of anti-ship missiles is entering the market, although their deployment has been delayed by changes in the worldwide threat scenario. The disappearance of the Soviet Union and Warsaw Pact alliance has decreased the need for the rapid introduction of next-generation anti-ship missiles capable of destroying a well-defended fleet.

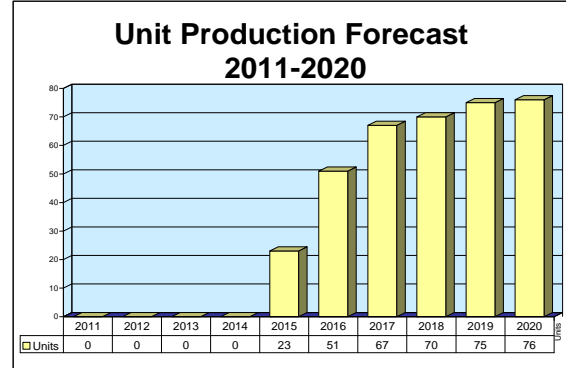
Even in unstable regions, the technological sophistication of most naval anti-missile defenses is well below the layered capability of the U.S. Navy. The **Continued.....**



# Sea Skua

## Outlook

- New designs being studied
- Sea Skua replacement in U.K. is the Future Anti-Surface Guided Weapon – Heavy (FASGW-H)
- France's requirement is the Anti-Navires Leger (ANL)
- This new missile could enter production in 2014-2015 and service around 2015-2016
- Sea Skua no longer in production



## Orientation

**Description.** Family of anti-ship missile systems.

**Sponsor.** U.K. Ministry of Defence through the Royal Navy.

**Status.** In production.

**Total Produced.** MBDA built 1,533 Sea Skua missiles (not including RDT&E units). Sea Skua production numbers have not been confirmed.

**Application.** Helicopter-launched, all-weather, anti-ship missile system originally conceived for the Lynx helicopter. Sea Skua can also be surface-launched.

**Price Range.** Estimates place the cost of a Sea Skua missile at \$316,600.

## Contractors

### Prime

<b>MBDA, Corporate HQ</b>	<a href="http://www.mbda-systems.com">http://www.mbda-systems.com</a> , 11 Strand, London, WC2N 5RJ United Kingdom, Tel: + 44 207 451 6000, Fax: + 44 207 451 6001, Email: <a href="mailto:contact.css@mbda-systems.com">contact.css@mbda-systems.com</a> , Prime
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### Subcontractor

<b>BAE Systems Land Systems Munitions &amp; Ordnance</b>	<a href="http://www.baesystems.com/Businesses/LandArmaments">http://www.baesystems.com/Businesses/LandArmaments</a> , Euxton Ln, Chorley, Lancashire, PR7 6AD United Kingdom, Tel: + 44 1257 265511, Fax: + 44 1257 242609, Email: <a href="mailto:media@baesystems.com">media@baesystems.com</a> Defunct (Warhead)
<b>Repaircraft plc</b>	<a href="http://www.repaircraft.com">http://www.repaircraft.com</a> , The Common, Cranleigh, GU6 8LU Surrey, United Kingdom, Tel: + 44 1483 273536, Fax: + 44 1483 278078, Email: <a href="mailto:hq@repaircraft.co.uk">hq@repaircraft.co.uk</a> (Propulsion Components)
<b>Roxel UK</b>	<a href="http://www.roxelgroup.com">http://www.roxelgroup.com</a> , Summerfield, Kidderminster, DY117RX Worcestershire, United Kingdom, Tel: + 44 1562 82 40 61, Fax: + 44 1562 8281 26 (Rocket Motor)
<b>SELEX Sensors and Airborne Systems</b>	<a href="http://www.selexgalileo.com">http://www.selexgalileo.com</a> , Christopher Martin Rd, Basildon, SS 3EL Essex, United Kingdom, Tel: + 44 1268 5222822, Fax: + 44 1268 883140 Defunct (Semi-Active Radar Homing Head)

## Sea Skua

<b>Thales Airborne Systems</b>	<a href="http://www.thalesgroup.com/aerospace">http://www.thalesgroup.com/aerospace</a> , Centre Charles Nungesser, 2, ave Gay-Lussac, Elancourt, 78851 France, Tel: + 33 1 34 81 60 00, Fax: + 33 1 30 66 79 66 (AHV-7 Radio Altimeter)
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Comprehensive information on Contractors can be found in Forecast International's "International Contractors" series. For a detailed description, go to [www.forecastinternational.com](http://www.forecastinternational.com) (see Products & Samples/Governments & Industries) or call + 1 (203) 426-0800.

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; [rich.pettibone@forecast1.com](mailto:rich.pettibone@forecast1.com)

## Technical Data

	<u>Metric</u>	<u>U.S.</u>
<b>Dimensions</b>		
Missile length	250 cm	8.20 ft
Missile diameter	28 cm	11.02 in
Missile weight	145 kg	319 lb
Wingspan	72 cm	2.36 in
<b>Performance</b>		
Speed	Mach 0.85	Mach 0.85
Altitude (after air launch)	5-100 m	16.40-328.08 ft
Range (min)	3 km	1.62 nm
Range (max)	15-24 km	8.09-12.95 nm

**Propulsion.** Sea Skua is powered by a solid-propellant boost rocket motor plus a solid-fuel sustainer designated Matapan; both motors are manufactured by Royal Ordnance/Imperial Metal Industries (now part of Roxel). The Matapan sustainer is an alloy-cased motor, using cast double-base propellant. The afflux comes from two nozzles in the main body. The Royal Ordnance Redstart booster is a steel-bodied unit with extruded, double-base propellant. Its afflux comes from the rear of the motor.

**Control & Guidance.** Semi-active radar guidance technology is used on the Sea Skua. The Seaspray radar illuminates and tracks the target. The Super Searcher radar is also compatible with Sea Skua. The missile descends to a sea-skimming flight profile after firing. An altitude reference system maintains this profile until terminal interception. The homing head is provided by BAE Systems. The missile's flight is controlled by four movable wings on the forebody, operated by electrical actuators that are powered by thermal batteries. Four fins at the rear are fixed and indexed at 45 degrees to the

wings. Roll stabilization is incorporated. The missile uses the same radio altimeter as the Exocet, the Thales AHV-7, which BAE Systems manufactures under license.

**Launcher Mode.** Initially, Sea Skua was deployed on the Royal Navy's Lynx helicopters, with each aircraft carrying four missiles. However, Sea Skua is adaptable to a variety of helicopters such as the Sea King and the AB-212. Sea Skua can also be launched from fixed-wing aircraft, including the Britten-Norman Defender 400. Shipborne and shore-based launching systems are also being marketed.

**Warhead.** Semi-armor-piercing, high-explosive warhead, estimated to weigh 35 kilograms (77 lb). The warhead includes 9 kilograms of RDX, wax, and aluminum, with an impact fuze. The warhead is fuzed in order to be detonated within the target, so the charge is sufficient to destroy not only a potential missile launcher but also the small naval craft itself. Royal Ordnance (now part of BAE Systems) provides the Sea Skua's warhead.

## Variants/Upgrades

The Sea Skua was primarily designed as a helicopter-launched anti-ship missile, but BAE Systems has integrated that system with shipborne and land-based platforms. Just prior to the missile's deployment during Operation Desert Storm, the Sea Skua had been modified to enhance its capabilities against small patrol boats. That modification was an outgrowth of the Iran-

Iraq Gulf War experiences. The modifications concentrated on the missile's height-keeping software, attack profile, and warhead detonation programs. Those modifications allowed the Sea Skua to fly lower and strike targets with very little freeboard. Time between warhead impact and detonation was optimized for the small targets.

## Sea Skua

In 1997, the U.K. contracted Matra BAe Dynamics (now MBDA) to carry out a life extension program for its Sea Skua missiles. Under the contract, the company will artificially age a sample of life-expired Sea Skuas by use of variable extremes of temperature and vibration. The aging and subsequent testing will be done at the company's Stevenage facility in England.

Once completed, any necessary modifications will be implemented. The service-life extension program should allow the Sea Skua missiles to remain in service well into the 21st century.

For additional information, please see the pertinent entries in the **Program Review** section.



Sea Skua

Source: German Navy

## Program Review

**Background.** In 1970, British Aerospace began the development of an anti-ship missile optimized for helicopter deployment, specifically the Lynx. The aim was to develop a light, low-cost anti-ship missile system for the Lynx and similar helicopters, as well as for light aircraft. Sea Skua development was advanced systematically and incorporated existing technology to keep the weapon cost competitive. The decision to utilize a semi-active radar homing head indicates that the British decided to use reliable and proven technology rather than embark on a costly, complex, and totally new system.

Initially used on sea-based Lynx helicopters, the missile deters threats from hostile fast patrol boats, hydrofoils, and hovercraft. Lynx/Sea Skua completed stringent sea trials in 1979 and performed airborne firing tests of the missile. Flight trials were completed in 1981. A land-based system for coastal defense and one for shipborne applications is also being offered by BAE Systems.

**Combat Experience.** In May 1982, even before the acceptance procedure had been completed, the Lynx/Sea Skua combination scored its first combat successes; in the Falklands War; all missiles hit their intended targets. Although that war provided the Sea Skua with its first successes, the Iraqi invasion of Kuwait on August 2, 1990, offered the greatest number.

During the fighting to eject Iraq from Kuwaiti territory, Lynx helicopters armed with Sea Skua anti-ship missiles mauled several Iraqi naval formations. Royal Navy Lynxes operating from the HMS *Brazen* and *Gloucester* attacked a force of 17 Iraqi patrol boats and assault craft heading south just off the Kuwaiti/Saudi border. Using the Sea Skua missile, the British helicopters sank at least four vessels and damaged 12.

Farther south, a Lynx from the HMS *Cardiff* sank a large patrol boat. Those Iraqi operations are believed to have been in support of the ill-fated attack on Ra's al Khafji in Saudi Arabia.

## Sea Skua

In a separate engagement, the Sea Skua damaged a T43 minelayer, left another one burning and dead in the water, and set an ex-Kuwaiti TNC45 (armed with Exocet anti-ship missiles) on fire.

### *Sea Skua Successor Being Studied*

**Sea Skua Follow-on.** The United Kingdom is actively seeking to procure a next-generation helicopter-borne anti-ship missile as a follow-on to Sea Skua. The new missile, known as the Future Anti-Surface Guided Weapon (FASGW), will arm the U.K.'s EH101 Merlin maritime patrol helicopters.

The FASGW will meet the perceived threat of fast attack craft (FAC). FASGW is focused on corvette-sized (and smaller) targets (including missile-firing FAC) and on coastal "soft" land targets. The U.K. would like a missile with considerably greater range than the current Sea Skua – one capable of engaging corvette-sized targets outside the range of the vessel's surface-to-air missiles.

Several studies looking into a successor to the Sea Skua have been performed. One option involves an enhanced Sea Skua. The upgraded missile would have a range of 18 kilometers and possibly an enhanced or all-new seeker. Another option is a cooperative effort with Norway, which is developing the NSM to replace part of its Penguin inventory.

In December 2005, the United Kingdom announced it was splitting the FASGW program into light and heavy components. The FASGW light requirement will be met with a guided rocket. The need for a heavy weapon could see the procurement of a medium-weight missile. The U.K. is interested in meeting the heavy portion of that requirement with a common modular munition.

MBDA will provide a missile to meet the heavy portion of this program (Thales will meet the light need) as part of the new Team Complex Weapons. The British government is moving ahead from competition to a strategic partnering agreement. This new team also involved Thales, QinetiQ, Roxel, and the British Ministry of Defence. The offering from MBDA is the Sea Skua IR (Infrared), instead of radar-guided Sea Skua Mk 2. MBDA could offer a version with a radio-frequency seeker.

France's equivalent of the FASGW-H is the Anti-Navires Leger (ANL) requirement. The new missile, which will arm the maritime patrol helicopters for both navies, is to appear in 2015 or so.

This subsonic missile will weigh around 110 kilograms, and offers an infrared seeker and man-in-the-loop capability. The missile features a boost motor aft and a sustainer at mid-body.

**Missile Models.** The Sea Skua missile is offered in multiple launcher configurations.

**Basic Sea Skua.** The semi-active Sea Skua can be preprogrammed to fly at various height profiles en route to the target. Once a target is acquired, the Seaspray radar is positioned to tracking mode. The target can also be identified visually or by electronically generated cross bearings. The pilot can select four basic sea-skimming altitudes that the missile will fly at to the designated target. Missiles can be fired in rapid succession (rippled) and are continuously updated with guidance information from the tracking radar. The fire control system also includes a distance-to-run-to-target indicator. That is important, because the helicopter will be vulnerable to counterattack until the missile impacts or the tracking radar is switched off. The warhead is lethal enough to destroy or neutralize naval craft up to destroyer size.

The proponents of Sea Skua claim that it is a superior weapon system in terms of cost, range, and versatility. In the Falklands War, the Lynx/Sea Skua team proved to be extremely effective. Existing off-the-shelf technology comprises all major components. Ease of operation is also a distinct advantage, and minimal maintenance is required.

The maximum range of the missile is put at 24 kilometers (12.95 nm), which coincides very well with the lock-on range of the Seaspray radar of approximately 12 nautical miles. That gives the helicopter a better than average stand-off capability. Although there are mixed emotions over the semi-active homing feature (the helicopter is directly exposed to counterfire, but the missile receives current target information), the British are convinced that the low radar cross-section of the Lynx, combined with its low-altitude profile, is more than an adequate trade-off. Additionally, Sea Skua was designed to operate in low visibility and rough sea conditions; therefore, sea clutter becomes another advantage for the Lynx/Sea Skua combination. Finally, the pilot can alternate modes of radar operation to deny the enemy counter-target information.

**Sea Skua SL.** British Aerospace's Guided Weapons Division developed a ship-launched version of Sea Skua in the early 1980s. British Aerospace (now BAE Systems) test-fired the ship-launched Sea Skua in late 1988 at the Aberporth firing range in Wales. The test was successful. The launch was conducted from a land-based installation near the ocean to simulate a deck firing. That success also demonstrated the system's coastal battery application, which will use elements of the shipborne variant.

## Sea Skua

The SL variant, which uses box launchers, weighs 850 kilograms (1,870 lb) in the two-round version. It is designed to be suitable for vessels down to 20 meters (65.6 ft) in length. Dimensions are as follows: length, 250 centimeters (8.20 ft); width, 110 centimeters (3.61 ft); and weight, 850 kilograms (1,870 lb).

The SL uses a Seaspray radar, although BAE officials have said that such systems as the Thales (formerly MEL) Super Searcher can be used for designation and guidance purposes. The launcher boxes double as transport containers. The SL's vertical fin is hooked to a launch shoe that runs down a launch rail so that the system can be canister-launched.

The firing sequence is slightly altered to reduce launch afflux, with the boost motor firing a fraction before the sustainer to take the missile out of its canister. That is in contrast to the air-launched version in which both motors fire simultaneously.

Otherwise, the missile's operation is essentially the same as the airborne application. The operator selects the missile(s) to be fired and chooses the sea-skimming height. Upon firing, the rocket motor ignites as the missile enters its boost phase. As the missile accelerates, the azimuth and height control is initiated. Once the booster burns out, the missile descends to an intermediate height under radio altimeter control before again descending to its final sea-skimming height. Up to four deck-mounted weapons typically would be carried on small craft down to about 20 meters long.

Integration studies have been discussed between BAE and Codag Marine regarding the installation of up to four Sea Skua SL missiles aboard the Bath-based Barracuda fast patrol boat. The 19-meter-long vessel is powered by three water jets and is capable of speeds of 111 kmph. The BAE Systems (formerly Ferranti) Seaspray Mk 3 radar will be housed on an extendable mast to increase surveillance and target acquisition range.

To further interest in the Sea Skua SL, BAE ordered a 21-meter craft, aboard which two Sea Skua SL twin launchers were installed – one on each side of the quarterdeck. The small craft also carried a masthead-mounted Seaspray 3 radar for target acquisition and illumination, and the associated display and control units were installed in a below-deck operations room. BAE said there was a high level of overseas interest in the ship-launched Sea Skua. India was reportedly

interested in the Sea Skua SL, but no order was placed. The first customer for the Sea Skua SL was Kuwait, which placed its order in the mid-1990s. Thailand was rumored to be a customer for the surface-launched version, but that was never confirmed.

Sea Skua Coastal Defense Battery. British Aerospace Dynamics Division revealed in 1988 that it was studying the feasibility of developing a new land-based Coastal Defense Battery variant of the Sea Skua missile. The Coastal Defense Battery is a further development of the ship-launched Sea Skua.

The land-based battery used a four-ton truck carrying four-canister launchers (probably similar to those to be used on the shipborne version). The vehicle also housed the target acquisition radar and launch control cabin, mounted on top of the system's generator. Radar options included the BAE Systems Seaspray Mk 3, which was already in service on British Royal Navy and Korean Navy Lynx helicopters, and the Thales (formerly MEL) Super Searcher, which had the advantages of a lower personnel requirement and greater mobility. The radar antenna was mounted on a folding mast.

Eight or 10 of those single-fire units (having four ready-to-fire missiles), under the direction of a single battery command post, could form a sector defense system. Alternatively, individual launch units or pairs could be deployed to control chokepoints.

Sea Skua Mk 2. MBDA released details on its Sea Skua Mk 2 in 2006. The missile may meet the Royal Navy's FASGW-H (Heavy) requirement.

The Mk 2 replaces the Sea Skua's semi-active radar seeker with an active radar model. The new seeker allows fire-and-forget and ripple fire attacks against multiple targets. Digital electronics are installed, as is a new booster-sustainer motor provided by Roxel UK. The missile has new control surfaces with X-shaped cruciform wings and rear fins. The missile's length is 2.5 meters and its weight is 150 kilograms, but maximum range is now 40 kilometers. The diameter is 25 centimeters.

Further proposed improvements include a datalink and an additional seeker (imaging infrared). The Sea Skua IR version could also meet the British Future Anti-Surface Guided Weapon (FASGW)-Heavy requirement.

## Sea Skua

## Related News

**South Korea Investigating Missile Malfunctions** – South Korea has launched an investigation into problems related to three different missile systems. The missile systems are the Boeing Harpoon anti-ship, the MBDA Sea Skua anti-ship, and the Raytheon Standard Missile - 2 (SM-2) air defense systems.

The South Korean Navy conducted 23 tests from July 2008 to July 2010 and results showed the missiles collectively displayed an accuracy rate of less than 80 percent. Reportedly, three of nine SM-2 missiles failed to hit their targets. One of 12 Sea Skua missiles also missed its intended target. One out of two Harpoons failed during these tests.

The South Korean Navy did conclude that the problems with the SM-2 were due to human error and defective spare parts. The Sea Skua also suffered from problems with spare parts. The failure related to the Harpoon was caused by a malfunction with the wing parts. (*Defense News*, 10/10)

**MBDA and U.K. MoD Agree to Long-Term Partnering Arrangement** – MBDA has agreed to a long-term partnering arrangement with the U.K. MoD for the development and supply of new Complex Weapons (CW) to the U.K. Armed Forces to counter current and future threats. Under the interim Portfolio Management Agreement (PMA-I), MBDA will lead the transformation of the U.K.'s CW capability through the management of a portfolio of projects potentially worth up to GBP4 billion over the next 10 years. As part of this arrangement, MBDA has signed a contract, worth GBP330 million, for the first package of projects focused on deployment of new military capabilities into Afghanistan. Over the next 10 years, as further military capabilities are added, this portfolio approach will deliver GBP1.2 billion of efficiencies for the U.K. MoD.

The initial contract will see MBDA deliver unique weapons capabilities that are directly relevant to today's war fighting environment; Fire Shadow Loitering Munition (LM) for the British Army and Selective Precision Effects At Range (SPEAR) Capability 2, Block 1, for Royal Air Force fast jets, with both projects now moving into their respective Demonstration and Manufacturing Phases. The contract also requires MBDA to carry out further Assessment Phase work on SPEAR Capability 3 to equip the Joint Strike Fighter and Future Local Area Air Defence System (FLAADS) to equip the Royal Navy's Future Surface Combatant. This is in addition to the ongoing Assessment Phase on Future Anti-Surface Guided Weapon/Anti-Navire Leger (FASGW/ANL), in cooperation with the DGA, to equip UK and French naval helicopters. (MBDA, 03/10)

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## Funding

The global economic downturn has numerous European nations scrambling to find sufficient funding to meet their defense needs. As a whole, European spending on defense has declined by 5 percent since the beginning of this crisis. As revenues decline, Europe is cutting public spending, with defense among the first to feel the budget axe.

The British defense budget is feeling the sting. The U.K.'s National Audit Office said in 2010 the national defense budget has a GBP36 billion hole. The United Kingdom is currently spending just 2 percent of its gross domestic product on defense. A lack of funding will force the U.K. to scale back numerous procurement and development projects.

Total Sea Skua program funding was estimated at \$670 million (GBP365 million) through 1989. No additional information is available from the British Ministry of Defence on Sea Skua funding (some doubt the British replaced missiles fired during the 1990-1991 fighting in Kuwait).

The United Kingdom and France are funding a study to evaluate technologies applicable to a new helicopter-launched anti-ship missile. This cooperative project could meet France's Anti-Navire Leger and the U.K.'s Future Anti-Surface Guided Weapon requirements. MBDA is performing this study.

### British Defense Budget Figures

	FY09	FY09	FY10	FY10	FY11	FY11	FY12	FY12
	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>	<u>QTY</u>	<u>AMT</u>
U.S. dollars	-	55.29	-	56.40	-	53.02	-	48.52
British Pounds	-	35.34	-	36.80	-	34.60	-	31.66

All values are in billions.

## Contracts/Orders & Options

In Sep 2009, the British and French ministries of defense announced a study to evaluate technologies applicable to a new helicopter-launched anti-ship missile. This cooperative project could meet France's Anti-Navire Leger and the U.K.'s Future Anti-Surface Guided Weapon requirements. MBDA will lead this initial assessment phase slated to last just over two years. The cost of the study effort is approximately EUR50 million (GBP35 million). This new missile could equip NH90 helicopters of the French Navy, and the Lynxs operated by the Royal Navy.

## Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1970	Design conceived
	1972	Research and development initiated
	1973	Engineering development
	1975	Advanced engineering
	1976	Advanced development
Late	1976	First prototype models
Late	1978	Flight evaluations
Mid-	1979	Lynx/Sea Skua evaluations
Sep	1980	Initial production contract awarded
Jun	1981	Initial deliveries, major production contract awarded
	1981	Sea Skua SL development begun
Mar	1982	Initial Operational Capability
	1984	First export sales
Late	1988	First successful firing of shipborne Sea Skua
Mid-	1988	First export order for shipborne Sea Skua
	1991	Shore-based Sea Skua available/Gulf War successes
Sep	1997	Kuwait signs contract for procurement of Sea Skua
Oct	2001	Malaysia orders Sea Skua
Sep	2009	France and U.K. studying new helicopter-fired missiles
	2014-2015	Initial production begins
	2015-2016	Sea Skua replacement enters service

## Worldwide Distribution/Inventories

Countries that are said to be interested in Sea Skua include **Brunei, Chile, Oman, and Singapore**. The **South African Navy** is developing a requirement for a helicopter-launched anti-ship missile as part of its larger program to acquire new surface combatants. Six companies have offered proposals to meet South Africa's requirement for six shipborne helicopters.

Germany is interested in a new anti-ship missile for use from its Lynx maritime patrol helicopters. The missile the British Royal Navy selects to replace its Sea Skua could meet Germany's need.

**User Countries.** Prime users of the Sea Skua include **Bahrain, Brazil, the Federal Republic of Germany, the Republic of Korea, Kuwait, Malaysia, Turkey, and the United Kingdom**. There is talk of a yet-to-be-identified customer in Africa.

## Sea Skua

## Forecast Rationale

Sea Skua was a success program for MBDA. This missile, then under the sole management of BAE Systems, won orders in Europe and Asia to arm both helicopters and small surface warships. Sea Skua proved itself during the 1982 Falklands War and took part in the fighting in the Persian Gulf during 1990 and 1991.

***Different Names, Same Missile***

Now, the search is on for a replacement missile. The United Kingdom and France plan to cooperate in the development and procurement of a new missile. The British requirement is the Future Anti-Surface Guided Weapon - Heavy (FASGW-H). This other half of this program is the FASGW-L (Light). The former replaces the Sea Skua; the latter is to engage small craft and soft land targets. The Lightweight Multirole Missile (LMM) from Thales is the preferred solution for the FASGW-L.

France is looking to replace its AS.15TT missiles, which is similar to the Sea Skua. This requirement is

called the Anti-Navire Leger (ANL). A single missile will meet the British FASGW-H and the French ANL needs.

Plans call for France and the United Kingdom to develop and procure a single missile system, if the two sides can agree on an approach. Production of a new missile may start in 2014 or 2015, with the missile entering service by 2015 or 2016. The British government could procure about 400 missiles. France may purchase a similar number. Germany is also showing interest in a new missile to arm its maritime patrol helicopters and might become a customer for this possible Anglo-French weapon.

Until this missile is available in quantity, the Sea Skua will remain operational with the Royal Navy. The British Royal Navy will keep Sea Skua on active duty through 2020 or even 2024. MBDA has concluded production of the Sea Skua. MBDA had hoped to win further export orders for Sea Skua, but none appeared.

## Ten-Year Outlook

ESTIMATED CALENDAR YEAR UNIT PRODUCTION												
Designation or Program	High Confidence					Good Confidence			Speculative			Total
	Thru 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
<b>MBDA</b>												
<b>FASGW - H &lt;&gt; United Kingdom</b>												
	0	0	0	0	0	12	26	28	25	28	28	147
<b>MBDA France</b>												
<b>Anti-Navire Leger &lt;&gt; France</b>												
	0	0	0	0	0	11	25	27	24	27	27	141
<b>MFR Not Selected</b>												
<b>Sea Skua Follow-On &lt;&gt; Germany</b>												
	0	0	0	0	0	0	0	12	21	20	21	74
<b>Total</b>	0	0	0	0	0	23	51	67	70	75	76	362

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