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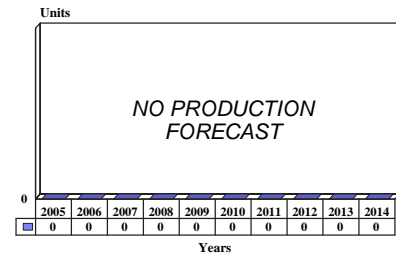
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Meroka - Archived 2/2006

Outlook

- All installations accounted for
- Will be replaced by missiles in future construction
- Any unexpected requirements will be met from existing stocks
- This report will be archived next year

10 Year Unit Production Forecast
2005 - 2014



Orientation

Description. Anti-missile Close-In Weapon System (CIWS).

Sponsor

Spanish Ministry of Defense
 Ministerio de Marina
 Madrid
 Spain

Status. In production and service. Upgrading and modernization of older versions continues concurrently.

Total Produced. Twenty-one systems have been manufactured to date.

Application. Meroka is a quick-reaction, lightweight weapon system for terminal defense against anti-ship missiles and aircraft.

Platform. Major surface combatants of the Spanish Navy.

Price Range. The unit price of a Meroka system was quoted as \$3.42 million in 1994.

Contractors

Izar, <http://www.izar.es>, Velázquez Street, 132, Madrid, 28006 Spain, Tel: 34 91 335 84 00, Fax: 34 91 355 86 52, Email: izar@izar.es, Prime

Technical Data

Specifications	Metric	U.S.
Caliber	20mm L120	
Round Weight	320 g, including 102 g projectile	0.71 lb/0.225 lb
Muzzle Velocity	1,300 m/s	4,260 ft/sec
Effective Range	0.5-1.5 km	0.3-0.8 nm
Firing Rate (2 bursts/sec)	2,700/3,600/9,000 rds/min	
Ready-Use Ammunition	720 rounds (60/barrel)	
Traverse	360°	

	<u>Metric</u>	<u>U.S.</u>
Turret Traverse Speed	90°/sec	
Elevation/Depression	-15°/+85°	
Weight	4.5 tonnes + 421 kg off mount	9,920 lb + 928 lb

Design Features. The Meroka close-in weapon system consists of twelve 20mm L120 caliber cannon barrels (RTG Oerlikon) banded together in two rows of six. The gun was designed to provide a high burst rate without suffering the time-to-rate and time-to-stop problems experienced by the Gatling-type guns. The barrels are slightly skewed in order to spread the lethal area. The mount holds 720 rounds of ready-service ammunition. Each row of guns is fed by its own belt from a magazine that can be reloaded while the gun fires.

A Selenia RAN-11L/X radar and PDS-10 tactical-data console are used for target detection and acquisition. An on-mount Lockheed VPS-2 Sharpshooter I-band monopulse pulse-Doppler radar tracks the target during engagements, with a fire control system (FCS) locking on the targets at 5,000 meters. A fire control computer, which can control four mounts, performs target evaluation.

In the original design, a low-light television camera backed up the radar, which was adopted from the Phalanx Mk 15 Block 0. More recently, an electro-optical system by ENOSA provided backup against jamming. This is being replaced by an Israeli LLTV, which was first tested in 1988. An off-bore optical sight is used to engage targets at extremely low altitudes. No closed-loop spotting is provided.

Operational Characteristics. The gun fires in four groups of three rounds to limit recoil effect; the 12 rounds are fired in 0.08 seconds. Two such groups are fired per second. In trials, the gun achieved an 87.7 percent success rate for destroying an oncoming missile with a single burst of 12 rounds. Effective destruction distance is rated at 500 meters, while the reach is reportedly 1,500 meters. The mounting can train through 360 degrees, and the elevation range is -15 to +85 degrees.

Variants/Upgrades

Model 2A. This differs from the original Meroka model in that it has a thermal imager, and a digital processor in lieu of analog, while it retains a manual mode. There are 18 systems of this type in use in the Spanish Navy.

Model 2A(V). This is a variant of the above, with two in use in the Spanish Navy.

Model 2A3. Upgraded version of Mod 2A, with three specialized digital processors instead of one (analog in Mod 2); fully automatic firing; Built-In Test Equipment (BITE); and a CD-ROM training system. All 18 2A systems were upgraded to the Mod 2A3 standard by FABAs, at a cost of ESP1,757 million (1996).

Model 2B. Features a new tracking radar with enhancements, making possible a wider range of Moving-Target Indication (MTI). The more recent models have been

designed with reduced radar cross section (RCS) in mind, also providing greater onboard ammunition stowage capacity. The Mod 2B version has 2,160 ready-use rounds. In 1993, three Mod 2B mounts with digital data processors, automatic target acquisition, improved performance against sea-skimming targets, a more powerful, PRF-agile AESN RTN-30X radar using MTI, and Built-In Test Equipment were procured, and all Mod 2A mounts were upgraded to the same standard.

Sardin was a planned replacement for Meroka, having the same basic design philosophy but using 40mm guns and being equipped for on-mount missile launchers. No new information on this system has been forthcoming, and it has probably been canceled.

Program Review

Background. The Spanish Navy began considering various Close-In Weapons Systems for its ships in the early 1970s. In 1974, the Mk 15 Phalanx appeared to have the lead in the competition. In 1975, however, the selection committee was impressed by a 20mm multi-barreled anti-aircraft artillery system being developed for the Spanish Army. A naval staff requirement for the Meroka system was issued, and development began that

year. The Meroka's designers, Centro de Estudios Technicos de Materiales Especiales, and the Navy's Junta de Metodos de Tiro, collaborated on the design and development. Later that year, Empresa Nacional

Bazán received a contract to manufacture the mount and coordinate the radar assembly and integration. The initial field tests of the naval version of the Meroka system were conducted in 1977 and 1978. The Meroka system was approved for installation aboard four Spanish warship classes in 1984. The air-capable ship ARE *Principe de Asturias* received four mounts, the Baleares class frigates each received two mounts, and the Santa Maria (FFG-7) class destroyers each received one mount. Plans to equip each of the Descubierta class frigates with a single Meroka system aft in place of one of the 40mm mounts have been abandoned.

Because of funding difficulties, the first Meroka systems were not installed until 1986, when the frigate ARE *Santa Maria* received one. Installations continued during the remainder of the 1980s. The Spanish Navy began to retrofit the Meroka to the five Baleares class frigates in late 1988. By the end of 1988, seven ships, including the carrier ARE *Principe de Asturias*, were equipped with the Meroka system.

In 1993, Bazán announced the development of a new CIWS, designated Sardin and intended to replace Meroka. Sardin features a new, reduced radar cross-section housing and a new gun of increased caliber, and is equipped to mount anti-aircraft missiles. Some reports suggest that the gun selected may be up to 40mm in caliber, although this implies a large and heavy system. Also in 1993, however, it was announced that a program had been approved for upgrading all 19 Mod 2 versions of the Spanish Navy's Meroka to the newer Mod 2B standard.

By 1996, a total of 21 Meroka systems were in service, with one system earmarked for shore-based training and trials use at the CAFTAN training base in Torregorda, near Cadiz.

In 1997, platforms for a further eight Meroka 2B systems were announced. These were the four F-100 class frigates (one system each) and the two Galicia class LPDs (two systems each). The latter fit was later downgraded to include provision for the Meroka systems only. However, it emerged in 1999 that Bazán (or the FABA business unit responsible for this particular program) had not incorporated the Meroka foundation on the F-100 class ships. Speculation was that an inner layer missile system (ILMS) such as RAM (Rolling Airframe Missile) would be used instead of the Meroka system. The two Galicia class LPDs scheduled to receive Meroka did receive their mounts and are now scheduled for this equipment on a for-but-not-with basis.

The status of the F-100 class Meroka mounting has been largely resolved by the increasing number of real photographs of the *Alvaro de Bazan* and her sisters. These appear to show that the location of the alleged Meroka mount is not only empty, but that the structural supports for a future installation have not been included. A few images that appeared to contradict this assessment have turned out to be computer-generated graphics (the days when photographs constituted strong prima facie evidence of anything are now, sadly, gone). With this application now apparently closed, it can be concluded that production of Meroka has ceased.

Funding

This program is funded by the Spanish Ministry of Defense through the Ministerio de Marina.

Recent Contracts

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Bazán	N/A	1993 – Spanish Navy receives approval to upgrade all of its 19 Meroka installations to the Mod 2A3 standard.
FABA (Bazán)	12.5	October 1995 – A subsequent upgrading of the same to 2B standard, to be done during regular 1996/1997 overhauls.

Timetable

<u>Year</u>	<u>Major Development</u>
1975	Staff requirement for naval version of Meroka issued and development begins
1975	Bazán receives production contract
1978	Sea trials of first version of Meroka commence

<u>Year</u>	<u>Major Development</u>
1980	Sea trials of first versions completed
1983	Initial sea trials of Mod 2 version carried out on the <i>Cadarso</i>
1984	Installation on Spanish Navy ships commences
1986	First installations complete
1988	Israeli LLTV tested
1992	Mod 2 versions produced for the last two Santa Maria (FFG-7) missile frigates
1994	Last Meroka system known to be in active service installed
1995	Contract for Bazán to upgrade the Armada's Merokas to 2A3 level
1996	Further upgrading to Mod 2B level initiated on two units

Worldwide Distribution

Spain. Four on CVS *Principe de Asturias*, 6 on Santa Maria class FFGs, 10 on Baleares FFGs, 1 for training at Torregorda.

Forecast Rationale

The evidence that any intention of installing Meroka on the Spanish Navy's new Alvaro de Bazan class AEGIS destroyers has been abandoned can now be considered conclusive. The position originally allocated to the system has been filled by other equipment, and the supporting structure has been fitted. This tends to eliminate the possibility of a for-but-not-with installation.

While it is possible that the impending decommissioning of the Baleares class would free up some mounts for future construction, it is more probable

that the proposed F-110 class frigates will be armed with either the U.S. Navy RIM-116 RAM (Rolling Airframe Missile) or an equivalent system. Missiles are rapidly coming to dominate the close-in air warfare environment of the future, while Meroka lacks the multi-role capability to maintain a position in a shrinking market.

The situation being thus highly unfavorable to any additional Meroka production, we are eliminating a future production forecast for this equipment. This report will be archived next year.

Ten-Year Outlook

The forecast chart is eliminated since no additional production seems probable.

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