

ARCHIVED REPORT

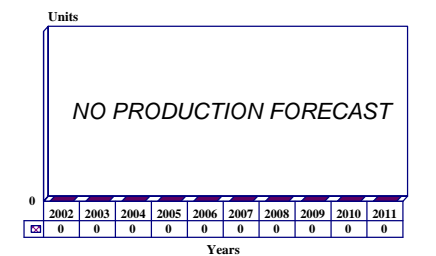
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MACAM - Archived 9/2003

Outlook

- Current status uncertain
- Spanish firms Indra, Izat, and CASA will form new joint venture with EADS
- New joint venture firm is known as INMIZE. This firm could become involved in the various MBDA programs including next-generation anti-armor missiles
- Development of a new lightweight launcher has been completed

10 Year Unit Production Forecast
2002 - 2011



Orientation

Description. Third-generation anti-tank missile.

Sponsor. Private cooperative development effort between companies in the United States and Spain.

Contractors. Gyconsa SA (Guiado y Control SA), a joint venture firm created by Hughes Aircraft Company, Missile Systems Company, Tucson, Arizona, USA, and INISEL, Madrid, Spain, was the prime contractor for this program. This joint US-Spanish company was owned by INISEL (51 percent) and Hughes Aircraft Company (49 percent). INISEL and Ceselsa merged to become Indra Sistemas, and much of its missile and electro-optical work was transferred to its Aranjuez facility south of Madrid. Meanwhile, Hughes Missile Systems Company has been purchased by Raytheon.

MBDA has since created a new joint venture with Spanish firms known as INMIZE. The Spanish companies Indra, Izat, and CASA are part of this joint venture. The first program that INMIZE will be involved in is expected to be the Meteor. Still, Madrid has long mentioned an interest in manufacturing anti-armor missiles.

Major Subcontractors. ENOSA (Empresa Nacional de Optica), the electro-optics subsidiary of INISEL.

Hughes held a 49 percent stake in ENOSA. SEA (Sistemas y Equipos para Armamento) was also involved in MACAM, of which Hughes owned a 49 percent share. ENOSA and SEA now operate as one company at the Aranjuez plant.

Status. Development suspended. Production of the MACAM was scheduled to commence sometime in 2000. The feasibility study was part of a joint venture agreement that involved the manufacture in Spain of some 200 TOW launchers and 2,000 BGM-71F TOW 2B missiles. Production of the TOW 2B missile did not start as planned. Production of the new lightweight TOW launcher commenced in September 1995.

Total Produced. Production of the MACAM never commenced.

Application. The destruction of armored vehicles and main battle tanks.

Price Range. No specific price has been offered for the Spanish MACAM anti-tank missile system. However, considering the market category it is expected to compete within, the per-unit cost of the MACAM would likely be in the area of \$33,000.

Technical Data

Design Features. No specific information is available concerning the technical specifications for the MACAM, only generalities. If the previous Aries project can be used as an example, the new MACAM could take on an appearance remarkably like that of the US-built Javelin. The Aries was expected to use a

tandem warhead, weigh in excess of 30 kilograms, and have a range of 2,000 meters. However, MACAM is to have a maximum range of 5,000 meters – boosted to 2,000 meters in 12 seconds and then coasting to maximum range. At maximum range, the residual speed is 120 meters per second.

	<u>Metric</u>	<u>US</u>
Dimensions		
Length:	1.05 m	3.44 ft
Diameter:	147 mm	5.79 in
Weight (missile):	13.8 kg	30.36 lb
Weight (system):	25 kg	55 lb
Performance		
Speed:	120 m/per sec	393.6 ft/per sec
Range (max):	5000 m	16,400 ft
Range (combat):	150-2,500 m	492-8,200 ft

Propulsion. The MACAM is expected to use a solid-fuel rocket motor propulsion system.

Control & Guidance. The MACAM is expected to be a fire-and-forget missile using focal plane array technology and a fiber-optic datalink. This provides MACAM with lock-on before launch (direct fire) and lock-on after launch modes. The man-in-the-loop capability is maintained at all times. The missile would allow the identification of targets at 6,000 meters and engagement at 3,750 meters.

Launcher Mode. The MACAM would be compatible with the new lightweight TOW 2B launcher being developed by Gyconsa. The system is expected to be man-portable, but could be mounted on vehicles and possibly helicopters.

Warhead. The MACAM is expected to use a tandem warhead system in order to deal with reactive armor-equipped vehicles.

Variants/Upgrades

A single version of MACAM is planned, although upgrades could follow once production begins. The inclusion of a sighting unit option (day-only or day/night) could result in multiple versions.

Program Review

Background. Cooperative efforts have gained importance as worldwide defense funding has declined. In accordance with this new situation, Hughes Aircraft Company Missile Systems Group formed the joint venture firm Gyconsa SA (Guiado y Control SA) with INISEL of Spain. Hughes Aircraft owns 51 percent of Gyconsa SA; INISEL holds the remainder. The new program, known as MACAM, was preceded by another effort called Aries.

Aries. In the mid-1980s, Hughes Aircraft Company Missile Systems Group formed Esprodesa, a joint venture with three Spanish companies initially led by ERT (Explosivos Rio Tinto), to develop a medium-range anti-tank missile. This new missile was to compete with the next-generation Euromissile TRIGAT/PARS-3. The Aries was to use a tandem

warhead, weighing roughly 31 kilograms (13 kilograms for the firing post and 18 for the missile) and having a range of 2,000 meters. The missile was to be soft launched, with the rocket motor boosting it to transonic velocity in less than two seconds, after which the cruise motor would take over. A simplified export variant was also being considered. Plans had called for the development of two versions: one equipped with a day-only sight, another with a day/night sight. Production deliveries were to have commenced by 1993 or 1994.

The Aries, however, appears to have been eclipsed by the MACAM due to certain changes concerning the original Spanish Esprodesa contractors. ERT of Madrid became Union Explosivos Espandola, although Instalaza of Zaragoza remained unchanged. Union Explosivos Espandola was created when the defense

unit of ERT was hived off by Koweit Investment Office after it took control of the firm. However, Ceselsa merged with INISEL. This program may have resulted from this merger, since INISEL was involved in TRIGAT and Ceselsa in Aries. Spain eventually withdrew from TRIGAT. These events, and possibly undisclosed problems with the development of Aries, may have resulted in a move toward a new effort, MACAM (Misil Avanzado Contra-Carro de Alcance Medio).

MACAM. The development of a next-generation anti-tank missile system was part of an overall agreement that included the manufacture of lightweight TOW 2B launchers and missiles in Spain. In January 1992, the Spanish Ministry of Defense awarded an ESP500 million (\$4.85 million) contract to Gyconsa SA for the development of the MACAM.

Under the new contract, Gyconsa carried out a feasibility study for the codevelopment of a lightweight anti-tank missile system; Hughes (now Raytheon) and INISEL concentrated research on an advanced missile guidance system using a fiber-optic datalink and focal plane array technology.

The MACAM deal was linked (for a time) to a second contract award for 200 lightweight launchers for the TOW 2B missile system. Under this contract, worth ESP1,600 million (\$15.5 million), the joint venture company was to produce a lighter pedestal mount for the missile. Production of the launchers was primarily carried out by INISEL with its electro-optics subsidiary, ENOSA (Empress Nacional de Optica). Gyconsa won its first export order for its lightweight TOW launcher in late 1997 from Kuwait. Austria had been mentioned as a possible customer for the lightweight launcher.

Hughes was also reportedly awarded a third contract by Spain for the production of 2,000 BGM-71F TOW 2B missiles. These missiles were to be manufactured jointly by Hughes and INISEL in Spain, but production is not known to have begun.

Some sources have said that the entire MACAM program has been abandoned, but this remains unconfirmed. Gyconsa was hoping to win export contracts for its MACAM missile once development was completed.

Funding

Outside of announced contracts awarded by the Spanish government, no specific funding figures have been released by either Hughes or its Spanish partners. The five-year full-scale development contract for MACAM is expected to cost \$200 million. Spanish defense funding has been steadily rising since 1993.

Recent Contracts

In 1997, ENOSA received a contract from Kuwait for its lightweight TOW launcher. No specifics were provided concerning the number of launchers or the value of the contract.

In January 1992, Gyconsa SA was awarded a \$20 million contract by the Spanish government. The contract calls for the supply of a new lightweight launcher for Spanish TOW 2B missiles and the development of a third-generation anti-tank system, MACAM. Under the MACAM contract, valued at \$4.85 million, Gyconsa will carry out a feasibility study for the codevelopment of the lightweight anti-tank missile system. Hughes and INISEL will concentrate on an advanced guidance system using fiber optics.

The MACAM award is linked to a second contract for 200 lightweight TOW 2B launchers, worth \$15.5 million. The joint venture company will produce a lighter pedestal mount for the TOW 2B missile. Production of the launchers will primarily be carried out by INISEL with its subsidiary ENOSA.

As part of yet another contract, Gyconsa was to manufacture 2,000 BGM-71F TOW 2B missiles for the Spanish military. No specific dollar value has been assigned to this award.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1986	Aries program announced
	1988	Development of Aries commenced

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Mid	1980s	INISEL merged with Ceselsa
	1988-89	Work on Aries continued
	1980s-1990s	Aries superseded by MACAM
Early	1990s	Development of lightweight TOW launcher begun in Spain
	1995 ^(a)	Lightweight launcher deliveries commenced
	1997 ^(a)	TOW 2B production in Spain delayed
	1998 ^(a)	MACAM program delayed due to budget shortfalls
	2001 ^(a)	MACAM program suspended
Feb	2001	EADS proposed cooperative agreement with Spanish defense industry
	2002	INMIZE established by Spanish firms and EADS

^(a) Estimate

Worldwide Distribution

The MACAM was being specifically developed for the export market and aimed at the major world alliances.

User Countries. No orders for the MACAM have been placed.

Forecast Rationale

Spain appears to have abandoned its alliance with Raytheon for one with MBDA, Europe's new megacorp. MBDA will establish a new missile joint venture firm with Spain's Indra and Izar known as INMIZE. The first program to involve this firm is expected to be the Meteor beyond-visual-range air-to-air missile. Other programs are likely to follow in the future, possibly including one involving an anti-armor missile.

As for the MACAM, a previous joint effort involving Raytheon and Gyconsa, this program appears to have been abandoned. The program's status has long been in doubt, with Spanish government officials issuing contradictory statements on a regular basis concerning

its continued existence. Madrid may have abandoned MACAM to prioritize available funding to support the Typhoon, F-100 frigate, and Leopard 2E programs.

At one time, Madrid was expected to procure upwards of 2,500 MACAM missiles, although others placed the Spanish requirement as high as 10,000+ units. Of course, this will not happen. Instead, Spain is expected to become involved in existing or new anti-armor programs under way at MBDA.

Note: Spain did sell its lightweight launcher to Kuwait in 1997 to arm its national guard units. Some had speculated that this was a launch order for the Aries, but this proved to be incorrect.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Missile	(Engine)	<u>High Confidence Level</u>				<u>Good Confidence Level</u>				<u>Speculative</u>			Total 02-11
		thru 01	02	03	04	05	06	07	08	09	10	11	
GYCONSA (Co-Product)													
BGM-71F	K-41	0	0	0	0	0	0	0	0	0	0	0	0
MACAM	UNSPECIFIED	0	0	0	0	0	0	0	0	0	0	0	0
Total Production		0	0	0	0	0	0	0	0	0	0	0	0