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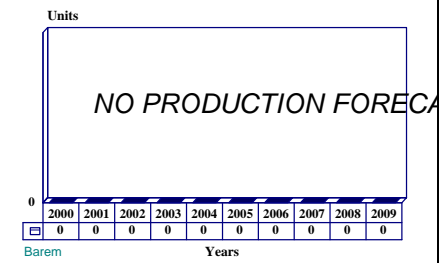
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Barem - Archived 8/2001

Outlook

- Approximately 209 systems in service
- Barring any future activity, this report will be archived next year, August 2001

10 Year Unit Production Forecast
2000 - 2009



Orientation

Description. The Barem jamming pod is designed to protect combat aircraft from radar-guided missiles and similar threats.

Sponsor

Delegation Generale pour l'Armement (DGA)
10/14 Rue Saint Dominique
F-75997 Paris Armees
France

Contractors

Thomson-CSF DETEXIS
(formerly Thomson-CSF Radars & Contre-Mesures)
178 boulevard Gabriel Peri
F-92240 Malakoff
France
Tel: +33 1 46 55 4422
Web: www.thomson-csf.com

Licensee. No known production licenses have been granted.

Status. In service, with production believed to have ended.

Total Produced. Through 1999, approximately 209 systems were supplied for Mirage variants, Super Etendards, and Crusaders in service with the French Navy, French Air Force and Taiwan.

Application. Dassault-Mirage IV-P aircraft modified to deliver the air-to-surface, medium-range (ASMP) nuclear missile are reported to be fitted with Barem. Barem also equips Dassault-Breguet Mirage 2000N two-seat low-altitude penetration nuclear strike aircraft. French Navy selected the Barem jammer to equip its Super Etendards.

Barem forms part of the MSPS (Modular Self Protection System) for Mirage 2000 when combined with the Sherlock or Serval radar warning receivers. Jaguar A aircraft that took part in the Persian Gulf War are also believed to have carried Barem pods.

Price Range. A unit cost of US\$400,000 (1994 dollars) was approximated based upon the known costs of equivalent systems coupled with the relatively low rate of production.

Technical Data

Characteristics

Frequency coverage:	6-20 GHz
Band coverage:	H, I and J bands
Power requirement:	700 VA on 115 V 400 Hz single phase 180 W on 28 V DC
Speed clearance:	Up to Mach 2

	<u>Metric</u>	<u>US</u>
Dimensions		
Length:	3.45 m	11.5 ft
Diameter:	0.16 m	6.35 in
Weight:	85 kg	187 lb

Design Features. The Barem system is a lightweight, pod-mounted, self-protection jammer. The system is designed for use by tactical strike aircraft on penetration missions. The system provides electronic countermeasures (ECM) against surveillance and tracking radars and can instantaneously detect, identify and jam potential radar threats.

The pod has been rated to Mach 2 and consists of reception/transmission antennas, threat receiver and transmitter. The jamming component of the system is an ultra-wideband, traveling wave tube, amplified transmitter that uses noise and deception modes as its main defensive response.

The system operates equally effectively against pulse and continuous wave radars. Manual and automatic control of the pod are options, and automatic control can be overridden by the pilot/weapons operator. The

system has a modular software design which permits adaptation of the system to future threats.

Barem may also be fitted as an internal system composed of two distinct packages.

Operational Characteristics. A pod-mounted, self-protection jamming system designed for penetration missions in tactical/strike aircraft. The jammer is designed to provide protection against pulsed, continuous wave, and pulse Doppler radars used for fire control, tracking and target illumination.

Threats and radars detected by the antennae are analyzed by the receiver against a broad range of pre-programmed radar parameters. If a threat is detected, the system will automatically begin jamming within one second of detection.

Barem has the ability to counter up to two threats at the same time.

Variants/Upgrades

Modular Self Protection System (MSPS). In combination with the Sherlock radar warning system, Barem forms the Modular Self Protection System. This is intended to provide a low-cost integrated electronic warfare system for light attack aircraft and for retrofit to existing airframes. This combination equips French Navy Super Etendards.

Orchidee Prototype. The combination of the Barem jamming pod and Sherlock radar warning receiver was proposed for the now-canceled Orchidee helicopter-mounted battlefield surveillance system.

Program Review

Background. The Barem pod is a lighter and improved system developed from the basic technology and concept of the first-generation Remora jammer. Remora is often found aboard the Dassault-Breguet Mirage F1 in French Air Force service. Barem is

optimized for low-level supersonic penetration missions, and it is deployed with the French Mirage 2000N fleet, having entered service in July 1988. The pod has also been procured for service with the French Navy for use on Super Etendard aircraft.

Mirage 2000 aircraft deployed to Saudi Arabia as part of the Desert Storm campaign carried the rival Barax system. Barem was, however, issued to French Jaguar A aircraft, presumably reflecting the low-altitude penetration role of those aircraft. This represented a temporary fit, and it appears that Barem is normally restricted to the nuclear-capable portions of the French Armed Services. The production run of the Barem pod is likely to be reduced accordingly.

In November 1992, Dassault Aviation was awarded a Taiwanese order worth US\$3.8 billion for 60 Mirage 2000-5 aircraft plus 1,000 Magic-2 and MICA air-to-air

missiles. The first of the new aircraft was delivered in 1995. These aircraft carry the standard internal electronic warfare (EW) fit for the Mirage 2000 family supplemented by the Barem EW pods.

The French Navy placed the contracts for the upgrade to its Super Etendard fleet in September 1993. This provided for the installation of Sherlock radar warning systems, Barem jammers and chaff launchers. The Barem pods used were drawn from stock released by a rundown in other classes of aircraft, and do not represent new production.

Funding

Barem was a company-funded development.

Recent Contracts

No new contractual information has been made publicly available.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Jul	1988	First Mirage 2000N enters squadron service
Mar	1989	Mirage 2000N production cut from 112 to 87
Aug	1990	Orchidee canceled
Jan	1991	Barem used operationally in Desert Storm
Mar	1991	Believed ordered for French Navy Crusaders
Sep	1993	Existing systems installed on Super Etendards
	1995	Deliveries to French Forces completed
	1997	Deliveries to Taiwan completed

Worldwide Distribution

France. 149 pods believed to be in service for use on the following: 63 on Mirage 2000N-series, 18 on Mirage IVP, 50 for French Navy Super Etendards, and 18 for French Navy Crusaders.

Taiwan. 60 believed to have been procured for use on Mirage 2000-5.

Forecast Rationale

Thomson-CSF's Barem jamming pod is a lighter and improved system over the first-generation Remora jammer. Deployed with the French Mirage 2000N fleet, Barem is optimized for low-level supersonic penetration missions. The pod has also been procured for service with the French Navy for use on Super Etendard aircraft.

Electronic countermeasures (ECM) against surveillance and tracking radars is Barem's main function. The

system can instantaneously detect, identify and jam potential radar threats. Its jamming component is an ultra-wideband, traveling-wave-tube amplified transmitter using noise and deception modes as its main defensive response.

Since entering service in 1988, the system has had a successful run, with approximately 209 pods being procured through 1999. With the exception of Taiwan, however, foreign sales have proven to be a

disappointment. The island procured 60 units through 1997 for use on their fleet of Mirage 2000-5 jet fighters. Since that time there has apparently been no further procurement, either in France or for export.

Older versions of Mirage aircraft may continue to be a possible source of retrofitting orders. Current market trends, however, seem to indicate that owners of such aircraft are more inclined to seek out newer and more fully integrated systems.

In addition, potential new platforms under development have their own dedicated and fully integrated jammers. The Hawk 200 airframe, for example, is already available with the Sky Guardian 200 RWR and Apollo jammer.

As indicated below, the 10-year outlook has been omitted, as all known systems had been delivered by the end of 1998. After that year, no additional contracts or orders have been identified.

Ten-Year Outlook

No additional production forecast. Barring any future activity, this report will be archived next year, August 2001.

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