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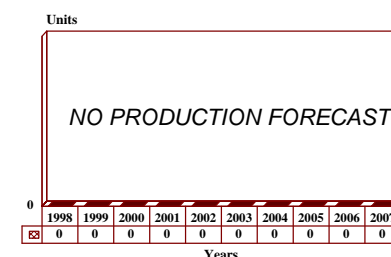
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Iguane/Agrion 15/Varan - Archived 2/99

Outlook

- Production has ceased for Iguane, Agrion 15, and Varan
- THIS REPORT WILL BE DROPPED IN 1999 BARRING A PROGRAM RESTART

10 Year Unit Production Forecast
1998-2007



Orientation

Description. Family of multi-mission I-band frequency agile naval airborne radars.

Sponsor

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

Contractors

Thomson-CSF
Division Equipements Avioniques
178 Boulevard Gabriel-Peri
F-92240 Malakoff
France
Tel: +33 1 46847190

Licensee. Agrion 15 is believed to be produced under license in China.

Status. Production ended but still in service

Total Produced

Agrion 15. A total of 99 known Agrion 15 radars have been produced.

Iguane. A total of 72 Iguane radars have been produced.

Varan. A total of 25 Varan radars have been produced.

Application

Agrion 15 is in service in Aerospatiale SA.365F Dauphin 2 helicopters; and Eurocopter AS 565SA Panther anti-sub/anti-ship helicopters.

Iguane is deployed on Alize and Atlantique 1 and 2.

Varan is deployed on Dassault Aviation Guardian and Guardian 20 maritime patrol aircraft as well as on the Super Puma helicopter.

Price Range. These radars have a unit price of approximately US\$1.8 million.

Technical Data

Design Features. The Iguane radar is the basic member of the family, with Agrion 15 and Varan being specialized

variants. The radars are composed of seven Line Replaceable Units (LRUs): Servo mechanism unit,

transmitter/receiver, high-power Radio Frequency (RF) unit, control box, radar display (ten-inch), antenna (including radome), and auxiliary antenna. The weight of the Agrion 15 and Iguane systems is under 170 kilograms. The Varan system weighs only 110 kilograms. Each subassembly is fitted with a cooling fan.

The antenna is a Cheese type with narrow beam. It is roll stabilized, with 360-degree or sector scanning and two scanning speeds. Frequency agility over a large frequency bandwidth gives good protection against jammers. The display has seven scales, from seven to 240 nautical miles, and is equipped with two target designation markers. SLAR imagery and ground speed measurement are supplied as options.

Pulse compression, in conjunction with different pulse widths, gives discretion at very low peak power with respect to conventional radar detectors, good performance on small targets with short pulse switching, and good long-range detection with long pulse switching.

Operational Characteristics. Iguane has a reported range in sea state 3/4 of 28 nautical miles against a snorkel, 60 nautical miles against a fast attack craft, and 130 nautical miles against a medium-sized ship. For Varan in sea state 3/4, these figures are slightly reduced; typical detection ranges are 25-30 nautical miles for snorkels, 55-60 nautical miles for FACs and 120-125 nautical miles for medium-sized ships.

Variants/Upgrades

Agrion 15 (TMV-118A). The Agrion 15 radar was designed as a multi-purpose radar primarily for helicopter use, but with potential for fixed-wing operation. It is intended for Anti-Surface Warfare (ASuW) and Anti-Submarine Warfare (ASW) roles. Agrion 15 allows the platform aircraft to operate autonomously or in conjunction with surface-unit weapon systems. In the missile guidance mode Agrion 15 is designed to detect the AS-15TT missile after launch by means of an auxiliary antenna, automatically track both missile and target, measure the differential between target-missile range and bearing, and transmit differential data to the missile using a transmitted pulse as guidance link. A number of secondary missions were incorporated into the design, including coastal patrol, Search and Rescue (SAR), flight safety, navigation, and weather avoidance.

Acting in the ASW role, Agrion 15 is said to be capable of detecting snorkels and periscopes in rough seas, and functions as an OTH radar for surface units. In both the ASuW and ASW role, the radar is optimized for targeting

and tracking the Thomson-CSF AS-15TT missile system. The performance of the radar is enhanced by the use of pulse compression, frequency agility, monopulse and Track While Scan (TWS) technology. The equipment has Built-In Test Equipment (BITE). The use of pulse compression improves the chances of remaining undetected by passive monitoring.

Iguane (TMV-118). This is an ASW-oriented surface search radar intended for installation on fixed-wing aircraft.

Varan (TMV-118B). This system is similar to the Iguane radar, but with reduced antenna size to permit operation in smaller airframes. In its maritime environmental protection role, Varan offers detection and mapping facilities for ice and oil spill detection. Varan is capable of high performance in all weather, at high sea states, and at any altitude. The basic model features operation in the I-band, pulse compression (with several pulse widths), frequency agility, and beacon detection.

Program Review

Background. The Iguane development program was initiated in 1974 to provide a replacement for the DRAA-2A radars installed on the Alize and the DRAA-2B radars installed on Atlantique 1. DRAA-2 was derived from the US-supplied APS-33 with some elements of APS-20 technology. Technical evaluation of the Iguane radar was commenced in 1979; the first prototype Iguane radars flew in May 1981.

Iguane was approved as equipment for the Atlantique 2 by mid-1984, and is currently being delivered to the French navy. A total of 42 Atlantique 2 ASW aircraft were planned with deliveries extending until 1999. Iguane was

ordered by the Italian navy in 1988 to retrofit to the Atlantique 1 aircraft currently in service.

The development of the Agrion 15 radar was initiated in 1975 as a modification of the Iguane to suit it for helicopter-borne applications. At an early stage, Agrion 15 became linked with the AS-15TT missile program and it is now primarily viewed as an ASuW radar. A modified Aerospatiale SA.365N Dauphin 2 helicopter flight tested the Agrion 15 radar and associated avionics in February 1982. This was followed by the first production SA.365F Dauphin 2 in July 1982. It is in this configuration that the radar has been sold to the Saudi Arabian navy. Once the original order for Saudi Arabia had been completed, there

was apparently a very long period during which a number of possibilities were unsuccessfully followed. This may be misleading, since it appears there were substantial unannounced sales to Israel and China in this period, and a possible licensed production agreement with China. In July 1988, an order from Iraq covered the supply of six Dauphin 2 helicopters equipped with AS-15TT missiles and Agrion 15 radars.

In planning to replace its aging fleet of Pacific-based Lockheed Neptune maritime patrol aircraft, the French navy studied the possibility of mounting the new Iguane radars onboard Dassault-Breguet Mystere-Falcon airframes. Using the engineering experience gained from the US/French HU-25A Guardian program, a version of Iguane with reduced antenna size and some minor system modifications was developed by Thomson-CSF. The first of these adapted Mystere-Falcon 200 aircraft flew on April 15, 1981 and was delivered to the French Naval Air Force on April 14, 1983. All five Guardians were operational at their respective Pacific bases at Faaa, Tahiti, and Tontouta, New Caledonia, by July 1984.

Following an apparent six-year gap, Varan re-entered production as a result of an order from the Chilean navy. Eight sets were ordered to equip two Falcon Guardian 20 maritime reconnaissance aircraft, four AS.522 Cougars, and two AS.365F Dauphin helicopters. Varan was also selected as equipment for the abortive ATM-42S maritime patrol aircraft. A more significant acquisition was an order for 16+ systems to equip S-2E(T) Tracker aircraft of the Brazilian air force. As with Agrion 15, the apparent production gap may be misleading.

During this period the Chinese navy introduced two types of maritime patrol aircraft, a large flying boat and a modification of the Xi'An Y-8 transport (a copy of the Russian An-12). Both carry the Varan maritime reconnaissance radar and have been built in very limited quantities. When formally announced at the 1992 Farnborough Air Show, seven flying boats and five Y-8 conversions were reported to have been completed. The radars for these may have been purchased directly or built under license.

The Dauphin 2/Agrion 15/AS-15TT combination was used in action for the first time on January 30, 1991 when aircraft of the Royal Saudi Navy took part in the Battle of the Bubiyan Channel. During this engagement, two Iraqi small craft were detected on radar by a Saudi frigate, which sent its Dauphins to intercept. The two helicopters are reported to have fired eight missiles, scoring two hits and sinking both targets. On February 3, 1991 another three small patrol craft were sighted in the same area and sunk by AS-15TT attack.

As a result of these reported successes, Aerospatiale relaunched the MM-15 surface-launched derivative of the AS-15TT missile at the February 1992 Asian Aerospace Exhibition. This version was originally launched in 1986, but met with no success and was quietly dropped. It is now envisaged as filling a range gap between light gun armaments (maximum range 8 km) and the Exocet missile. Apart from reported Kuwaiti interest as equipment for a their class of eight Combattante I craft, no interest had been expressed in the revived version by the end of November 1993. British Aerospace is offering a surface-launched version of Sea Skua to this sector.

During 1994, the MM-15 missile was offered for a number of light craft requirements. A major contract proposal was for missiles to equip the proposed eight Omani Project Mawj (P-400) class patrol craft. Three of these ships are on order, with five more projected. Part of the armament fit is for a lightweight anti-ship missile, a requirement for which MM-15 and Sea Skua are competing. If the MM-15 solution is selected, this provides openings for up to eight Agrion 15 radars. Also during 1994, a single Mexican Isla Coronado Extra-Fast Attack Craft (EFAC) was equipped with a pylon-mounted MM-15 launcher and an Agrion 15 fire control radar as a testbed for this proposed outfit.

In May of 1995, reports were released that the United Arab Emirates (UAE) chose the Thomson-CSF Agrion 15 radar for seven AS565 Panther helicopters that it had ordered from Eurocopter. As of late 1996, however, no recent contracts have been identified for this system, and it is likely that production is winding down.

Funding

Development of these radars was funded under a French government contract.

Recent Contracts

No recent contract activity has been identified.

Timetable

	1974	Iguane development program commenced
	1975	Agrion 15 development commenced
Jan	1979	Technical evaluation of Iguane commenced
	1980	Agrion 15 ordered by Saudi Arabia to equip Dauphin 2 helicopters
Apr	1981	Varan flight trials commenced onboard Guardian
May		Flight trials of Iguane commenced
Feb	1982	Agrion 15 flight tested onboard Dauphin 2
		First production Dauphin 2 with Agrion 15 delivered
Apr	1983	Guardian delivered to the French Naval Air Force
Jul	1984	Varan entered operational service
Feb	1988	Iguane ordered by Italy as retrofit for Atlantique 1
Jul		Agrion 15 ordered by Iraq for Dauphin 2
Sep		Agrion 15 ordered by Bahrain for Dauphin 2
Nov		Varan ordered by Chile
Feb	1991	First combat use of Agrion 15 in 2nd Gulf War
Feb	1992	MM-15 surface-launched system re-introduced
	1994	MM-15 trialed on Mexican EFAC
	1995	Last deliveries of Iguane equipped Atlantique 2 Maritime Patrol Aircraft

Worldwide Distribution

Bahrain. 2 Agrion 15 on Dauphin 2 equipped with AS-15TT.

Brazil. 12 Varan radars on upgraded S-2E(T) Tracker aircraft.

Chile. 10 Varan for use on Super Puma helicopters and Falcon 20 aircraft.

China. Up to 50 Dauphin 2 helicopters are being produced under license in China for the Chinese Navy. A significant proportion of these, perhaps half, carry Agrion 15, also produced under license.

France. 5 Varan on Guardian MPA, 27 Iguane on Alize ASW aircraft, 42 Iguane on Atlantique 2.

Iraq. 6 Agrion 15 on Dauphin 2 helicopters equipped with AS-15TT. It is possible that these were never delivered. Allowing for spares and replacements, the total order was for 8 sets.

Israel. An unknown number of Dauphin 2 helicopters equipped with Agrion 15 radars have been ordered from France.

Italy. 18 Iguane radars were ordered for upgrading Atlantique 1 aircraft.

Pakistan. 8 Varan on Fokker F.27-200 helicopters.

Saudi Arabia. 20 Agrion 15 on AS565 Panther helicopters equipped with AS-15TT. Allowing for spares and replacements, the total order was for 25 sets.

UAE. 7 Agrion 15 on Eurocopter AS565 Panther helicopters equipped with AS-15TT missiles.

Forecast Rationale

The Iguane family of radars, including Agrion 15 and Varan, have essentially been replaced by the new Ocean Master radar, also produced by Thomson-CSF. This new system overcomes the Iguane-series tactical inflexibility as a highly specialized system by being software-driven, making it flexible enough to replace all three members of the family. Initial Ocean Master deliveries started in 1994 which coincides with the last known deliveries of the Iguane radar for the Dassault Atlantique 2 MPA program

With the final deliveries of the Dassault Atlantique 2 aircraft having occurred in 1995 no further orders for the Iguane radar are expected. Should further Atlantique 1

upgrades take place, additional orders for Iguane will be received, but such retrofits are only a remote possibility. The large numbers of surplus P-3 aircraft now becoming available at very low prices make the replacement of the aging Atlantiques preferable to their upgrade.

The Varan system apparently ceased production in 1992, having produced 25 units. The radar is quoted as standard equipment for a variety of twin-engine maritime patrol aircraft, all of which have failed to win customer acceptance. Analysis suggests that Varan is unlikely to be selected as retrofit equipment for existing airframes, and

the possibility of the radar being specified as a preferred fit in foreign-built airframes is remote.

Agrion 15 also appears to have reached the end of its production life. No known orders have been placed for the system since 1992-1993. Agrion 15 was mated with the AS 565 Panther ASW/ASuW helicopter.

Due to a combination of factors (i.e. the production of Ocean Master, no known orders awarded, the final Atlantique 2 deliveries, and the confirmation of the Varan production line shutdown), it is doubtful that the Iguane-series of radars is currently in production. As such the ten-year forecast is for no further production of this system.

Ten-Year Outlook

No further production of the Iguane-series is forecast.