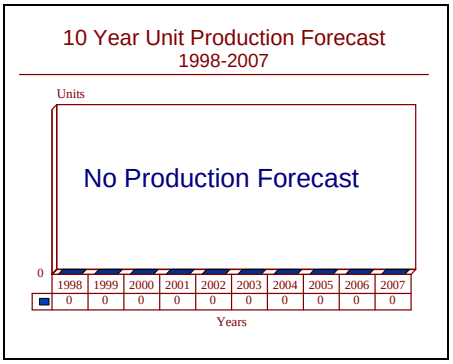
Carapace - Archived 4/99

Outlook

- Belgian F-16 refits completed in 1996
- No interest has been generated among other nations for this system
- **BARRING RENEWED ORDERS THIS REPORT WILL BE DROPPED IN 1999**



Orientation

Description. Airborne radar warning system.

Sponsor
Dassault Electronique
Saint-Cloud Cedex
France

Contractor
Dassault Electronique
Saint-Cloud Cedex
France

Licensee. No production licenses have been granted.

Status. Out of production but in service.

Total Produced. 135 systems were originally ordered but the number has since been scaled back to 100. By the end of 1996, 72 systems had been installed on Belgian F-16s. The 28 additional systems are believed to be in storage, along with a number of F-16 aircraft, due to Belgium's decision to downsize its air force.

Application. The Carapace EW suite was designed to provide EW protection for F-16 aircraft.

Price Range. Unit price is estimated at US$1.13 million.

Technical Data

Design Features. Dassault Electronique's Carapace airborne EW self-protection jammer system provides warning to the pilot of hostile radar emissions. Carapace features the capability to localize potential threat radar signals in a precise and discrete manner that warns the pilot, in real-time, of threats in his flight path before he enters the attack envelope of these threats. The ability to undertake frequency-jamming emissions to thwart threat radar-guided munitions or radar-directed AAA emplacements has been deleted on cost grounds. The central element of Carapace is a patented sensor which improves tenfold the accuracy of conventional sensors without affecting the system's ability to measure each pulse transmitted by threat radars and analyze them in real- time.

Operational Characteristics. This sensor is able to select and identify all threats without ambiguity in less than one second, even in a dense EW environment. Its high angular accuracy also enables it to determine very quickly the range of ground-based systems. System hardware is internally mounted.

Variants/Upgrades

Carapace is a passive ECM derivative of the ABD-2000 system used on the Mirage 2000. There are no other derivatives of this system.

Program Review

Background. Carapace was selected by Belgium in late 1988 following a long and tedious process to update the EW jammers on its F-16s. Originally Belgium was going to adopt the Loral RAPPORT III system, an improved version of the RAPPORT II in use on Belgian F-5s, but funding problems forced the government to shelve the program in 1983. In 1985, the program was restarted but was canceled three years later in 1988 due to escalating development costs. About US$33 million was spent on RAPPORT III by the time the decision to terminate the program was made. It was also reported that Loral could not guarantee transfer of sensitive technology required by the Belgians to produce the system locally. In its place, Belgium evaluated Dassault Electronique's Carapace and a new EW entry from Litton designated the TWS-95, a fourth-generation radar warning receiver. Following side-by-side evaluations of the two remaining competitors, Carapace was selected in December 1988.

The first Carapace deliveries were made in 1991. Some of these were sent to Eglin AFB for EW trials. These were accompanied by unconfirmed reports that serious problems were being experienced with integrating the French EW equipment with US avionics. Following these trials, General Dynamics Corporation was awarded a US$29 million contract for modifications to the Belgian F-16 aircraft to integrate the Carapace system. This contract ran through 1997 and was subsequently taken over by Lockheed on the purchase of the General Dynamics Fighter Division.

The number of F-16 aircraft due to remain in Belgian service has been steadily reduced, and a low point of 75 has been reached. This has resulted in a furious dispute between the Air Force Chief of Staff and the Defense Minister over the fate of the remaining 43 aircraft (two F-16s having been lost by this time). Officially these aircraft are to be sold, with Hungary putting in a bid for 15 aircraft. As part of the dispute, it was revealed that the planned modification rate for the F-16/Carapace retrofit was 20 aircraft per year to 1995. This dispute was finally resolved in October 1993, when the Defense Minister agreed to an F-16 force level of 90 aircraft; all would be equipped with Carapace. This leaves an excess of 45 systems from the original order, which are believed to have formed the basis of a number of Carapace bids for other programs.

In January 1995, it was announced that the operational test phase of the Carapace system had been completed and that work on installing the system in 90 F-16 aircraft of the Belgian Air Force was to start. The first operational Carapace system installed on an F-16 would be operational in April 1995. It was also revealed that the active jamming portion of Carapace had been deleted on fiscal grounds and that ex-USAF ALQ-131 pods were to be evaluated to fill this gap. This will require another round of compatibility trials.

Later in 1995, it was disclosed that the number of F-16 aircraft to be maintained in service was to be cut back, reverting to a force level of 72 aircraft in six tactical squadrons. All surplus F-16s other than 20 B-models held in storage were to be sold.

Funding

Company-sponsored development. Under the terms of Dassault Electronique's US$225 million (BFr7.5 billion) procurement contract, it provided offset terms valued at 80 percent of the contract's value. Work was shared by Belgium's three linguistically divided regions: Flanders, Wallonia and Brussels. SABCA acted as system integrator for the Belgian Carapace program.

Recent Contracts

No recent contracts have been identified for this program.

Timetable

	1983	Belgium shelved RAPPORT III program
	1985	RAPPORT III was restarted
Sep	1988	RAPPORT III canceled after expending about US$33 million (US) in RDT&E
	1988	Carapace and Litton TWS-95 evaluated
Dec	1988	Carapace won Belgian F-16 EW contract
	1991	First deliveries to Belgian Air Force
	1995	Carapace deliveries terminated
Dec	1996	Installation of 72 systems completed

Worldwide Distribution

Belgium - 72 systems installed on F-16s, with an additional 28 set aside for spares/retrofit.

Forecast Rationale

The only known order for Carapace has been by the Belgian Air Force for an initial order of 135 systems. Following budget cuts in the early 1990s, the order was dropped to a total procurement of 100 systems. Of these, 72 were emplaced on F-16As, 20 were set aside or installed for 20 mothballed F-16Bs, and 8 are considered spares.

Since 1993, Dassault Electronique has bid the Carapace system at very low cost and with very short delivery times on a number of aircraft EW requirements. This suggests that the systems already exist, most likely in the form of 35 extra systems from the Belgian order.

In 1995, the Belgian government was reportedly in negotiations with Dassault to avoid having to take delivery on the extra 35 systems, though there has been no reliable confirmation of an agreement one way or another. In any event, none of the bids on the existing systems are reported to have been successful, as much more sophisticated ECM devices are now readily available.

The name Carapace will remain specific to the Belgian F-16; packaged for any other aircraft, the system would have retained the name of the parent system, ABD-2000. It appears that Carapace will remain a one-off system used only by the Belgian armed forces.

Due to the completion of all Carapace system procurement in 1996, coupled with the noticeable lack of international interest, future orders are not expected.

Ten-Year Outlook

No further production is expected for this system.

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