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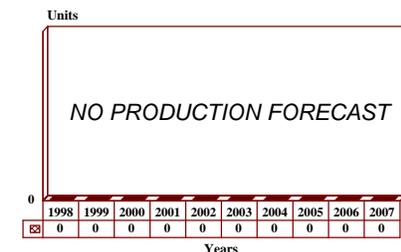
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Sky Shadow - Archived 3/99

Outlook

- Production run ended in 1996
- Sky Shadow program revival is unlikely
- THIS REPORT WILL BE DROPPED IN 1999 BARRING A PROGRAM RESTART

10 Year Unit Production Forecast
1998-2007



Orientation

Description. Pod-mounted modular jamming system providing defensive jamming against sophisticated threat environments.

Sponsor

Ministry of Defense (PE)
Contracts Branch CB/TOR31A
Room 614 St. George's Court
14 New Oxford Street
London WC1A 1EJ
United Kingdom

Contractors

GEC-Marconi Defence Systems Limited
The Grove
Warren Lane
Stanmore
Middlesex HA7 4LY
United Kingdom
Tel: +44 181 954 2311
Fax: +44 181 954 5218
Telex: 99201

Licensee. No production licenses have been granted.

Status. In service. No longer in production.

Total Produced. An analysis of the market indicates that approximately 300 pods were produced through 1996.

Application. The Sky Shadow ECM pod was developed during the early-1970s to provide an up-to-date ECM capability for the Tornado GR.1 strike aircraft.

Price Range. Although no unit cost data have been released, a comparison with similar pods suggests that each Sky Shadow pod costs in the region of US\$2 million.

Technical Data

<u>Characteristics</u>	<u>Metric</u>	<u>US</u>
Dimensions:	3350 cm x 38 cm	120 x 15 in
Weight:	200 kg	440 lb.
Frequency range:	(estimated) G to J bands	

Design Features. Each Sky Shadow pod contains dual receivers and jammers which, with a power management and logic and control unit, permit multiple threat jamming. Each jammer operates in autonomous mode and can automatically select the most effective response after comparing received threat signals to those stored in its data library. The threat library is programmable, and software

additions are possible to bring the jamming pods up to date. The pod has a control-display unit which provides a graphic representation of the radar and threat environments to the pilot or weapons operator. In common with other ECM pods of its generation, the Sky Shadow has a modular construction permitting the addition to or modification of the pod's ECM capability.

Variants/Upgrades

The modular construction of the Sky Shadow system was chosen in order to permit continuous updating. Programs to enhance its capability and enable it to defeat new types of radar are already in hand. Also in early development stages is a miniature warning radar to detect incoming missiles early enough to permit adoption of countermeasures.

Thor. As part of the midlife upgrade of the Royal Air Force Tornado GR.1 fleet, Marconi Defense Systems was awarded a contract for a major Sky Shadow upgrade. This

program is designated by GEC-Marconi as Thor and involves changes to the onboard computer systems and providing software written in Ada.

Blue Eric. During the Falklands Campaign, Sky Shadow electronics were hastily packaged into the 30 mm gun pods fitted to Harrier GR.3 aircraft. This extemporized emergency fit was designated Blue Eric after the engineer who did the design work. Blue Eric is not currently in RAF service but has been retained in store for use on Harrier GR.5 and GR.7 aircraft should the need arise.

Program Review

Background. Marconi Defence Systems received an initial development contract for Sky Shadow in 1972. The finished product was first displayed by Marconi Defence Systems at the 1976 Farnborough Air Show. The Instruction To Proceed (ITP) was received in 1978 with the production contract being received in 1979. First deliveries of the production Sky Shadow pod were made in 1980. During 1989, GEC-Marconi Defense Systems were awarded a major contract for the upgrade and updating of the Sky Shadow pod. This program, designated as Thor by GEC-Marconi, effectively brought the Sky Shadow system up to the same standard as the later Zeus system.

During the 1980s, the Sky Shadow ECM pod continued in full production for the Royal Air Force Tornado GR.1 fleet. Total RAF requirements for the Tornado GR.1 were approximately 225 pods plus additional systems to allow leeway for additional systems and spare units to maintain optimum operational capability. This includes sufficient pods to ensure an adequate inventory while a proportion

are being upgraded. The system is also fitted to Saudi Arabian Tornado GR.1 aircraft.

The Tornado GR.1 first saw combat during the Desert Storm air campaign. The Sky Shadow pod proved to be an effective and capable electronic warfare system, fully able to counter the threats presented by this environment. Photographs taken during Desert Storm indicate that Sky Shadow was also fitted to Tornado F.3 aircraft but there is no indication as to whether this was an experimental installation, a field modification or an increase in scale of issue.

In January 1993, the long-awaited order for 48 Tornado GR.1 aircraft from Saudi Arabia was finally confirmed. The aircraft, which were delivered thru 1996, were supplied with the associated support including approximately 48 Sky Shadow pods. This remains the last publicized activity in this program.

The 1993 Defense White Paper announced that the British Tornado F.3 fleet was to be cut back to 100 aircraft.

Subsequently, 24 of the surplus Tornado F.3 aircraft were leased to Italy as a supplement to that country's air defense. This deal, however, is unlikely to involve Sky Shadow pods. If the aircraft are equipped with EW pods,

they would most likely be Italian, and even if Sky Shadow pods *were* to be transferred with the aircraft, they would be drawn from stocks rather than new production.

Funding

Funding was by Royal Air Force with Marconi Defense Systems as prime contractor.

Recent Contracts

No recent contracts have been identified for this system; none are expected.

Timetable

1972	Development started
1976	Initial display at Farnborough Air Show
1978	Instruction To Proceed (ITP) received
1979	Production contract awarded
1980	Initial deliveries
1987	Post Design services contract awarded
1989	Modification/upgrade contract awarded
1992	Modification & upgrade kits delivered
1993	Additional systems for Saudi Arabia ordered
1996	Production run ended

Worldwide Distribution

Saudi Arabia: 48 systems in service on Tornado GR.1, a further 48 on order for the second batch of Tornado GR.1 aircraft

UK: Approximately 245 systems in service on Tornado GR.1 and GR.1A aircraft; possibly some of these transferred to Tornado F.3 aircraft.

Forecast Rationale

Sky Shadow is specific to the Tornado program, and thus sales of the system are linked to sales of that aircraft. The Sky Shadow program appears to have gone smoothly and proved entirely satisfactory under combat conditions. RAF procurement of new systems has now ended following the delivery of attrition loss and training systems. As a result of defense economies, plans for major upgrades to the Tornado GR.1 (to GR.4 standard) and the Tornado F.3 (to F.5 standard) were scaled back. Subsequently, some of the intended capability upgrades have been restored. This suggests that a further upgrade of Sky Shadow pods, beyond that presently encompassed by the Thor program, may be undertaken.

The 1993 order by the Saudi Arabian government for 48 Tornado IDS (Interdiction Strike) aircraft provided new

life to the Tornado market that had all but disappeared. However, these orders could well be the last for new-production Tornado combat aircraft, and consequently the last order for new Sky Shadow pods. Although other sales potential does exist, Saudi Arabia was perhaps the only solid candidate to extend Tornado production.

With the approach of the production and fielding of the Tornado replacement, the Eurofighter 2000, it can be safely assumed that the Tornado, and by extension Sky Shadow, has reached the end of its production life. If Britain were to sell and/or give the Tornado away as a foreign military package, it is probable that Sky Shadow pods would also be sent/sold as a piece of ancillary equipment. These would not be new builds but would be drawn from existing stock.

Ten-Year Outlook

No further production of this system is forecast.

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