

ARCHIVED REPORT

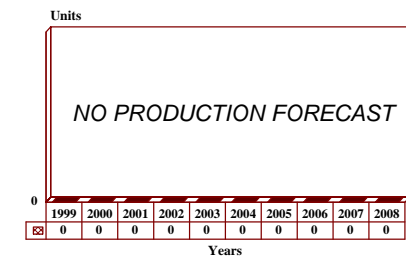
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Nightbird - Archived 09/2000

Outlook

- UK night vision goggles for use on fighter aircraft
- Market potential is considerable, but sales information is scarce
- **Barring any future activity with this program, this report will be archived next year, 2000**

10 Year Unit Production Forecast
1999-2008



Orientation

Description. Night vision goggles intended for fighter-jet aircrews.

Sponsor

UK Ministry of Defense Procurement Executive
Room 609
St Georges Court
14 New Oxford Street
London WC1A 1EJ
UK

Contractors

GEC-Marconi Electro-Optics Ltd
Head Office
Christopher Martin Road
Basildon
Essex SS14 3E2
United Kingdom
Tel: +44 1268 522822
Fax: +44 1268 883140
Website: <http://www.gec-marconi.com>
E-mail: Query form available through website

Licensee. No production licenses are known to have been granted.

Status. In service.

Total Produced. An estimated 510 Nightbird NVGs have been produced.

Application. Nightbird is used on Royal Air Force attack aircraft, including the Tornado GR.1, Jaguar GR.1 and Harrier GR.7. It was also type-qualified for several aircraft, such as the A-4, F-5, F-16, Hawk, MiG-21, and Viggen.

Price Range. An accurate price cannot be determined from available information.

Technical Data

Characteristics

Field of view:	45 degrees
Typical resolution:	0.85 cycles/mm
Light amplification:	25,000x

Dimensions

	<u>Metric</u>	<u>US</u>
Weight:	815 g	1.67 lb

Design Features. Nightbird is a conventional NVG system based on the Nite-Op system used aboard helicopters, but optimized for use by pilots of fighter aircraft by offering an automatic detachment feature for safety in case of ejection. The system has a fully circular, 45-degree field of view, and the design allows 30 mm eye relief to permit the use of protective visors. Like Nite-Op, Nightbird is manufactured from lightweight composite materials, which is especially helpful in reducing the load on a pilot's head during high-G

maneuvers. Power is provided by 3.5-volt batteries contained within the NVG unit (one per eyepiece).

Operational Characteristics. Head-up display (HUD) symbols can be viewed through Nightbird. In aircraft equipped with a forward-looking infrared (FLIR) device and raster/cursive HUDs, this feature allows the outputs from the sensors to be combined, giving dual-band vision. The auto-detach feature central to the Nightbird variant of Nite-Op releases the goggles from the helmet about four milliseconds after pilot ejection is initiated.

Variants/Upgrades

Nightbird is itself a fighter-jet variant of Nite-Op (an NVG intended for helicopter pilots) with a rapid detachment capability. No variants of or upgrades to Nightbird have been identified.

Program Review

Background. In 1982, the UK Royal Aircraft Establishment sent six Gen 2 and six Gen 3 NVGs plus its cockpit lighting modification kits and helmet mounts to support Royal Navy helicopters deployed to the Falkland Islands War. This equipment was used to modify four Sea King Commando HC.4 helicopters. The success of this equipment in the Falklands conflict was a factor that led the British armed forces to select a type of NVG for widespread deployment.

Options under consideration included procuring the US AVS-6 Aviators Night Vision System (ANVIS), or taking out a license to produce the AVS-6 domestically. Adopting the US system was determined to lack feasibility for several reasons. For one, compatibility requirements ruled out placing the battery box on the back of the pilot's helmet. The UK requirement also stipulated that the goggles should be removable with one hand but should not fall off by accident, which the AVS-6 failed to meet.

But the primary problem with the AVS-6 was the British requirement for a 45-degree field of view. The AVS-6 offered a 40-degree field of view but only if the

eyepieces were brought within 15 mm of the eyeball. Unfortunately, a combination of the standard British AR-5 respirator mask, helmet visor and other essential equipment prevented the eyepieces from being closer than 25 mm, restricting the field of view to 30 degrees.

Ferranti International used the results of these trials to design a new, modular, wide-angle NVG for use by helicopter pilots. Designated Nite-Op, the new equipment used a new optical system to provide the pilot with full 45-degree field of view while wearing full equipment. This was achieved by accepting a ten percent reduction in resolution and an increase in the size, mass and complexity of the eyepieces. The loss of resolution was more than recovered later by the adoption of new micro-channel image intensification plates. These offered an immediate 25 percent increase in resolution, higher gain and reduced optical noise at the lowest light levels.

Ferranti International received a final development and initial production contract for the Nite-Op NVG system in 1986, with the first sets delivered to the Royal Navy in 1990. Delivery of the 500 systems ordered were

apparently completed by the end of 1991, a production rate that correlates with the company's claim of an output of 40 systems per month. By 1993, 80 percent of the Royal Navy's helicopters were NVG-equipped.

In 1988, Ferranti International received a second contract for the development and production of Nightbird, a derivative of the Nite-Op NVG suitable for use by fighter aircrews. The primary difference between Nightbird and Nite-Op was the requirement to make the system safe for ejecting air crew by the addition of an auto-detachment system. Experience with older types of NVGs had shown that the binoculars tended to be torn off when an ejection was attempted, risking injury to the pilot's eyes, face, neck, and groin. The auto-

detachment feature was regarded as essential if NVGs were to be used on the Royal Air Force's jet fleet. Another important stipulation was to improve the avionics interface by providing an objective lens assembly compatible with a head-up display (HUD).

The Nightbird NVGs passed their operational evaluation in 1991 and approximately 500 sets were ordered by the Royal Air Force to equip pilots flying Tornado GR.1, Jaguar GR.1A and Harrier GR.7 aircraft. Nightbird was also type-qualified for use by pilots of Hawk, MiG-21, Viggen, Buccaneer S.2, F-16, A-4 and F-5 aircraft. Deliveries began in 1991. Both Nite-Op and Nightbird are now GEC-Marconi products.

Funding

Nightbird and its parent system, Nite-Op, are believed to have been developed under UK MoD funding.

Recent Contracts

No recent contracts have been identified.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Apr	1982	NVG equipment used by UK Royal Navy in Falklands conflict
May	1984	Comparative trials of NVG equipment started
	1986	Ferranti awarded Nite-Op development contract
	1988	Ferranti awarded Nightbird development contract
	1990	Nite-Op deliveries commenced
	1991	Nightbird deliveries commenced

Worldwide Distribution

The **UK** has been the sole confirmed procurer of Nightbird equipment.

Forecast Rationale

Public information regarding the Nightbird night vision system is scarce. Major production was likely completed during the mid-1990's. The UK is believed to have procured approximately 500 of the units for use in the Tornado, Jaguar and Harrier aircraft. The system was claimed compatible with the F-16 and BAe Hawk, but is not believed to have been employed with these platforms.

Recent advancements in night vision technology and enhanced Heads-Up Displays (HUDs) have likely rendered the Nightbird obsolete among advanced militaries. Future sales, if any should occur, are expected to be extremely limited in scope and directed toward nations with limited defense budgets.

Due to lack of public information regarding the Nightbird, the forecast chart has been omitted.

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