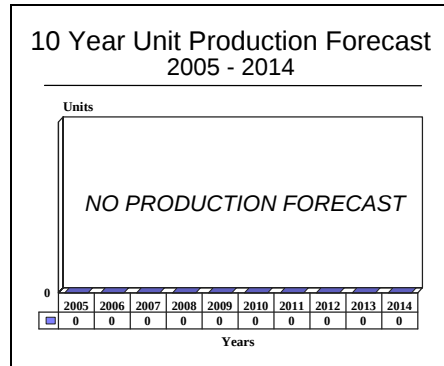


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Blue Kestrel - Archived 10/2006



Outlook

- No further production seen at this time
- Maintenance and spares activity only
- International sales possible but not very likely
- This report will be archived next year, October 2006

Orientation

Description. Blue Kestrel is a multimode, I-band, medium-weight naval helicopter/maritime patrol aircraft surface-surveillance radar for anti-surface vessels, anti-submarine warfare, over-the-horizon targeting of surface-to-surface missiles, search-and-rescue work, and general navigation. It acts as part of an autonomous weapons system rather than as a remote sensor for shipborne ASW weapons. Several variants are now available.

Sponsor

United Kingdom Ministry of Defence (MoD)
Contracts Branch
St George's Court
14 New Oxford Street
London WC1A 1EJ
United Kingdom
Tel: + 44 171 632 6014

Status. Blue Kestrel 5000 and Blue Kestrel 6000 are in service. Blue Kestrel 6000 is the upgrade model of the Blue Kestrel 5000 variant. Blue Kestrel 7000 is believed to be the most recent variant produced.

Total Produced. An estimated 46 Blue Kestrel systems (all versions) are believed to have been produced as of January 2005. Of these, at least 12 are thought to be prototypes that were later reconfigured for operational service.

Application. Blue Kestrel is primarily used for anti-surface/submarine warfare.

Price Range. The estimated cost of a Blue Kestrel radar was \$2.5 million (1999 dollars) based on the known costs of comparable systems. The actual unit price is not known, as both BAE Systems and the U.K. Ministry of Defence have kept these figures confidential.

Contractors

Prime

SELEX Sensors and Airborne Systems	http://www.selex-sas.com , Christopher Martin Rd, Basildon, SS14 3EL Essex, United Kingdom, Tel: + 44 1268 522 822, Fax: + 44 1268 883 140, Prime
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Technical Data

Dimensions

Scanner type	Planar array
Azimuth scan	360-deg continuous
Polarization	Horizontal
Transmitter type	Traveling wave tube
Frequency	I-band
Pulse widths	Selectable

Dimensions (continued)

PRFs	Selectable
Transmission modes	Fixed frequency/frequency agile
Receiver type	High-gain, FET amplifier
Range scales	Six selectable
Signal channels	Radar, radar and transponder; transponder only
Processor type	Digital
Clutter handling	Constant false-alarm rate processing
Track-While-Scan	Multiple surface and airborne targets Kalman filter tracking algorithm
Databus	Mil-Std-1553B
Major interfaces	ARINC 419/429/407 RS 232/422 User defined interfaces
Video output	Logarithmic
Display channels	Two independent display channels
Video output	Format 625 line 50 Hz
Scan converter	High-resolution 512 x 512
Video integration	Pulse-to-pulse Selectable scan-to-scan
Display features	Video freeze, video reset Selectable tails on targets
Display orientation	North up Heading up Any bearing up Ground stabilized Platform stabilized
Display scales	Nine selectable
Power consumption	200 V, 400 Hz 3 phase 1.6 KVA max 28 V DC, 170 W mean 16A max
Environmental temperature range	
Operational	-40°C to +70°C ambient
Storage	-55°C to +90°C
Cooling (tx, rx, and proc)	Typically 6.6 kg/min untreated air at up to +45°C, with 2 KPa pressure drop
Altitude	Up to 10,000 ft unpressurized

	<u>Metric</u>	<u>U.S.</u>
Scanner height	630 mm	24.8 in
Transmitter width	388 mm	15.2 in
Transmitter length	475 mm	18.7 in
Transmitter height	202 mm	7.95 in
Receiver width	323 mm	12.7 in
Receiver length	446 mm	17.5 in
Receiver height	202 mm	7.95 in
Processor width	272 mm	10.7 in
Processor length	564 mm	22.2 in
Processor height	213 mm	8.4 in
Scanner weight	27.4 kg	60.25 lb
Transmitter weight	27.2 kg	60 lb
Receiver weight	15 kg	33 lb
Processor weight	23.9 kg	52.6 lb

Design Features. The Blue Kestrel radar has a 360-degree scan using a flat aperture antenna. Operation is in the I-band and features pulse compression and frequency agility. A traveling wave tube transmitter is employed. It is capable of multiple target track-while-scan. The design was influenced by the overriding need for a lightweight solution with low power consumption.

Blue Kestrel is integrated into a platform's tactical system via a dual MIL-STD-1553B databus.

During the initial phase of flight development, Blue Kestrel was flown with a prototype line-feed antenna. The second phase of test flights took place at Westland's Yeovil facility, and involved the definitive slotted planar array antenna.



Blue Kestrel radar dome visible on underside of helicopter

Source: United Kingdom Royal Navy

Variants/Upgrades

Blue Kestrel 5000. The basic Blue Kestrel system developed for the U.K. Royal Navy Merlin HM1 (the British designation of the EH101) ASW helicopter.

Blue Kestrel 6000. An enhanced version of the Blue Kestrel 5000, incorporating pulse Doppler technology developed as a result of experience with the Blue Vixen program.

Blue Kestrel 7000. The Blue Kestrel 7000 is a lightweight, modular, software-driven multimode surveillance radar specifically fitted to helicopter

platforms. The system features digital pulse compression, optimized digitally synthesized waveforms, and coherent target classification. Development of the 7000 series was begun in 1991, and ground trials occurred in 1993/94. Delivery of production units began in 2000.

Blue Kestrel II. In April 1989, GEC-Marconi Avionics (now part of BAE Systems) teamed with MacDonald Dettwiler Associates to bid for the radar requirement of the Canadian New Shipboard Aircraft. The team

offered the Blue Kestrel II radar. This radar incorporated low-risk growth provisions that were

regarded as natural extensions of the U.K. Royal Navy requirement.

Program Review

Background. Blue Kestrel started as a development of GEC-Marconi's Seaspray Mk 3, which was extensively produced for domestic and export installations. GEC-Marconi designed the Blue Kestrel to be suitable for installation on a wide range of platform types. The major platform for Blue Kestrel radar, especially the Blue Kestrel 7000, is the EHI Merlin HM1 ASW helicopter.

In October 1988, two preproduction "B" development models of the Blue Kestrel were delivered to Westland Helicopters, bringing the number of development units delivered to five. One of the sets was installed in a Sea King testbed for avionics integration flight trials, while the other was used in the EH101 Merlin's avionics ground rig. In October 1989, the first U.K. Royal Navy standard EH101 Merlin helicopter was flown. The U.K. Royal Navy placed an order for 44 Merlin HM1 (EH101) ASW helicopters in August 1991.

The Blue Kestrel 7000 made its debut in 1998. This system is a lightweight, modular, software-driven, multimode surveillance radar that is specifically fitted to helicopter platforms. The system features digital pulse compression, optimized digitally synthesized waveforms, and coherent target classification.

Work on the 7000 series enabled an interim Blue Kestrel upgrade (believed to be the Blue Kestrel 6000) of the 5000 series to be produced. This upgrade module was an inverse synthetic aperture radar (ISAR), and had the advantage of being a lightweight four-line replaceable unit, as well as a compact pulse compression antenna. It is believed that these upgrade packages became available in 1996/97.

The U.K. Royal Navy order for Blue Kestrel radars to equip its 44 HM1 ASW helicopters appears to have been completed by the end of year 2001.

Funding

Blue Kestrel development was funded as part of the overall avionics development expenditure on the EH101 Merlin HM1 project.

Recent Contracts

No recent contracts have been identified through public source documents.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1984	Blue Kestrel development contract award to Ferranti
	1986	EH101 prototype maiden flight
Oct	1988	First development Blue Kestrel delivery for trials
Oct	1989	First Merlin HM1 flight with Blue Kestrel
	1996	Blue Kestrel deliveries begun
	1998	Deliveries of production aircraft to U.K. Royal Navy
	2000	Deliveries of Blue Kestrel 7000
Dec	2001	Final deliveries of Blue Kestrel to U.K. Royal Navy

Worldwide Distribution

The **U.K. Royal Navy** is the only known user of the Blue Kestrel radar at this time.

Forecast Rationale

Blue Kestrel is a high-performance pulse Doppler radar system primarily used on naval helicopters for anti-submarine warfare. It can also be used on board maritime patrol aircraft. Manufactured by BAE Systems, Blue Kestrel appears to be used only by the U.K. Royal Navy on that service's Merlin HM1 (EH101) naval ASW helicopters.

U.K. procurement of Blue Kestrel has been completed and there appear to be no other buyers at this time although the system could probably do well on the international market.

The only likely market activity for Blue Kestrel now appears to be spares and maintenance of existing operational systems.

Ten-Year Outlook

The forecast chart has been omitted. This report will be archived next year in October 2006.

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