

ARCHIVED REPORT

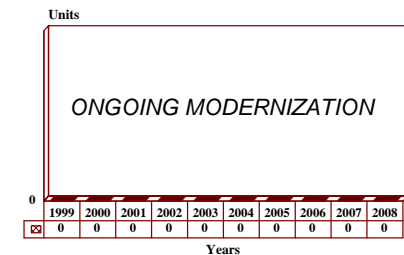
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Westland Sea King/Commando - Archived 10/2000

Outlook

- Royal Navy Sea King Mk 7 upgrade continues
- New production completed in 1996, line will not reopen

10 Year Unit Production Forecast
 1999-2008



Orientation

Description. Twin-engine, medium-lift, general-purpose military helicopters.

Sponsor. The United Kingdom Ministry of Defence.

Contractors. Westland plc/Westland Helicopters Group; Yeovil, Somerset, UK. Sea King and Commando helicopters are produced under license from UTC Sikorsky.

Status. Production completed in 1996; upgrades continue.

Total Produced. Through 1996, Westland delivered 328 Sea King/Commando helicopters; production completed.

Application. Land-based troop and cargo transport and assault. Sea-based duties include anti-submarine warfare, search and rescue, and AEW.

Price Range. Sea King Mk 43B, \$11 million; Mk 42C, \$10 million; both in 1996 US dollars.

Technical Data

Design Features. Single-main rotor helicopter with conventional fuselage and tail-rotor. Main rotor carries five composite blades on an all-titanium head. Sea King has amphibious hull and outboard sponsons also housing retractable landing gear.

| | <u>Metric</u> | <u>US</u> |
|-------------------------------|---------------|-----------|
| Dimensions | | |
| Length overall ^(a) | 22.15 m | 72.667 ft |
| Fuselage length | 17.01 m | 55.813 ft |
| Main rotor diameter | 18.90 m | 62 ft |
| Tail rotor diameter | 3.16 m | 10.333 ft |
| Height ^(b) | 4.72 m | 15.5 ft |

| | <u>Metric</u> | <u>US</u> |
|--------------------------------|---------------|-----------|
| Weight | | |
| Basic weight ^(c) | 5,896 kg | 13,000 lb |
| Max T-O, non-AEW | 9,526 kg | 21,000 lb |
| Max T-O, AEW | 9,752 kg | 21,500 lb |
| Capacities | | |
| Standard fuel (max) | 3,636 liters | 960 gal |
| Internal cargo capacity | 2,721 kg | 6,000 lb |
| Max external cargo | 2,948 kg | 6,500 lb |
| Performance | | |
| Cruise speed, S/L | 208 km | 122 kt |
| Max climb, S/L | 616 mpm | 2,020 fpm |
| Hover ceiling, | | |
| IGE | 1,525 m | 5,000 ft |
| OGE | 975 m | 3,200 ft |
| Range, max fuel ^(d) | 1,230 km | 664 nm |
| Ferry range ^(e) | 1,507 km | 814 nm |

Propulsion

Sea King Mk 4/42

- (2) Rolls-Royce plc Gnome H.1400-1/-1T twin-shaft, axial-flow free turbine turboshaft engines rated 1,237 kW (1,660 shp) each.

Seating

Sea King: Crew of four in ASW role; two crew and up to 22 litters in SAR role. Thirty troops for assault mission (Advanced Sea King).

Commando: Up to 30 troops (Advanced Commando).

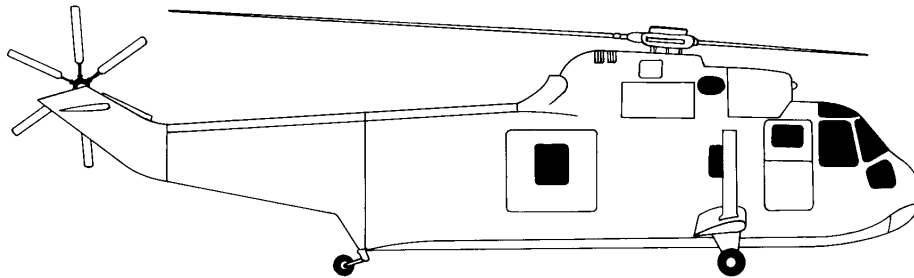
^(a)With rotors turning.

^(b)To top of rotor head.

^(c)Approximate, depending on version.

^(d)Max standard fuel.

^(e)With max standard and auxiliary fuel.



Westland/Sea King/Commando

Source: Forecast International

Variants/Upgrades

Commando. This is essentially a land-based Sea King variant, lacking the latter's amphibious capability. The Commando offers substantially improved hot/high performance as compared with its progenitor, a feature which prompted orders from Egypt (28) and Qatar (12). The United Kingdom also operates 33 Commando helicopters, although these are actually Sea Kings without the normal ASW electronics and equipment fit.

The Commando can be fitted with a variety of weapons, including a single pod-mounted, forward-firing 20 mm cannon on each landing gear strut, or twin 7.62 mm machine guns in a single pod. The helicopter can also carry 226 kilogram (500 pound) bombs and several types of air-to-surface missiles, such as the AS.12, the infrared or TV-guided MARTEL, the Exocet, or the Kormoran.

Sea King HAR. Mk 3. This version is used by the RAF for search-and-rescue (SAR) duties. Aside from two crew, the aircraft can carry 19 persons, six stretchers, or two stretchers and 11 seated survivors. The RAF ordered and received 19 by the end of 1985, and the UK MoD ordered an additional six (Mk 3As) in early 1992.

Sea King HAS. Mk 5. The Mk 5 is fitted with Decca 71 radar and Tactical Air Navigation System, JEZEBEL

passive sonobuoys, associated GEC Avionics LAPADS data processing equipment and Racal MIR-2 electronic support measures (ESM). Provision for later installation of the new MEL Sea Searcher radar has been made. In order to accommodate the extra equipment, the cabin area has been enlarged by moving the aft bulkhead nearly 1.829 meters (6 feet) rearward into the tail cone. The Royal Navy ordered 37 units, with final deliveries made in mid-1988.

Sea King HAS. Mk 6. Still another version of the original Sea King has been developed. The latest and most capable variant employs major ASW improvements, including further integration of all mission avionics, a sonar update, and the addition of a secure data/voice communications link. More importantly, a new CAE Avionics ASQ-504(V) magnetic anomaly detector is included. The Royal Navy contracted with Westland to retrofit Mk 5 helicopters to the new Mk 6 configuration, and this work was completed in 1991.

Sea King HAS. Mk 7. The final Sea King variant is very similar to the Mk 6 but has drive train improvements, including a new uprated transmission, all-composite tail rotor blades, and host of minor electronic system updates.

Program Review

Background. Continuing its long relationship with American helicopter builder Sikorsky, Westland began licensed Sea King production in 1966, combining the basic Sikorsky SH-3D airframe with a pair of Rolls-Royce Gnome engines rated at 1,237 kW each. The Gnome is essentially a Rolls-Royce-modified version of the GE T58 family used on all other members of the H-3/S-61 family of rotorcraft. The non-amphibious version named Commando was announced in mid-1971, and was flown in September 1973.

Royal Marine Order. In July 1978, Britain's Royal Navy announced it was procuring 15 Commandos for use by the Royal Marines in the troop transport and logistic support role. These aircraft have since been redesignated Sea King HC. Mk 4, and were configured for carrying 27 fully equipped troops or a 2,720 kilogram (6,000 pound) internal payload. External sling load limit is 3,401 kilograms (7,500 pounds). This model differs from the Commando Mk 2 in featuring folding rotor blades and tail pylon, and updated avionics. The latter includes Decca TANS with chart display and Decca 71 Doppler nav system. Initial deliveries took place in November 1979. However, in the wake of the Falklands fighting, an additional 22 units have been ordered for attrition purposes. The

Royal Aircraft Establishment at Farnborough ordered a pair of Mk 42B variants, and these were delivered in 1983.

Indian Order. Since 1983, the Indian navy placed orders for 20 Mk 42B Advanced Sea Kings. The Mk 42B features composite rotor blades, an uprated transmission, a 500 pound TOW increase, and provisions for carrying BAe Sea Eagle anti-ship missiles. In addition, India has ordered six Mk 42C models, which are basically similar to the Mk 4, but incorporate the dynamic improvements of the Mk 42B and are fitted with a nose-mounted radar. The Mk 42Cs are expected to serve in the utility transport and vertical replenishment roles. Deliveries of the advanced Mk 42 versions began in January 1987 and the first were formally accepted by India in January 1989. The holdup in formal acceptance was apparently due to performance short-falls in the GEC Avionics electronics. In August 1988, India also ordered four Mk 42Cs for Airborne Early Warning duties. The AEW Sea Kings have Thorn-EMI Searchwater radar, and Bendix/King weather radar and tactical navigation systems. All of these aircraft have been delivered.

UK Sea King Update. Westland recently upgraded 25 Royal Navy (UK) HAS. Mk 5 Sea Kings to the HAS.

Mk 6 configuration. Four more aircraft were new-production units. The conversion included new composite main rotor blades, an updated main transmission, 1,092 kW Gnome turboshafts, a strengthened mainframe, and new internal loomings to

support the integration of a new ASW system. Also involved is a sonar update. In addition, the existing GEC Avionics AQS-902 Lightweight Acoustic Processing and Display System (LAPADS) was extended to interface with the GEC-Plessey Type 195M dipping sonar in addition to processing signals from sonobuoys. The new system is designated AQS-902G-DS. The aircraft were also fitted with the CAE Electronics ASQ-504(V) AIMS Advanced Integrated Magnetic Anomaly Detector. The Mk 6 upgrades were completed in 1991.

Norwegian Sea King Update and Re-Order. The Royal Norwegian Air Force has contracted with Westland Helicopters, Yeovil, UK, to update nine Sea King Mk 43 search-and-rescue (SAR) helicopters to Mk 43B standard. The update includes the installation of a Racal Doppler-based navigation management system,

which includes Doppler 91 velocity sensors and R-Nav 2 navigation management systems. A new forward-looking infrared (FLIR) system and an Mk 32 Decca receiver are also to be installed. The installation of Doppler 91 and R-Nav 2 is specific to the Sea King in the SAR role. The Doppler 91 is designed for overwater operations, and is optimized for coupled transition down and auto-hover maneuvers. Racal's contract is valued at £1.5 million (\$2.95 million). The total project, including one new-production Sea King, is valued at 225 million Norwegian kroner (\$38.3 million). The new-build Sea King was delivered in June 1992, and the first updated aircraft was handed over several months later. In November 1993, Norway placed a follow-on order for two new-production Mk 43Bs, delivered in 1996.

Funding

Funded by the Ministry of Defence, UK. Annual line item figures are not available.

Recent Contracts

None noted.

Timetable

| <u>Month</u> | <u>Year</u> | <u>Major Development</u> |
|--------------|-------------|---|
| | 1959 | Licensed agreement concluded with Sikorsky |
| | 1966 | Licensed Sea King production begun |
| May | 1969 | Sea King HAS. Mk 1 first flight |
| | 1971 | Commando variant announced |
| Sep | 1973 | Commando first flight |
| Jan | 1975 | Commando Mk 2 first flight |
| Jun | 1976 | Sea King HAS. Mk 2 first flight |
| Jul | 1978 | Commando/Sea King Mk 4 order placed by Royal Navy |
| Nov | 1979 | Initial Sea King Mk 4 deliveries |
| Dec | 1989 | Sea King HAS. Mk 6 first flight |
| Jan | 1990 | Initial acceptance of Mk 42B Sea King by India |
| Early | 1992 | MoD places six-unit order for RAF |
| Late | 1993 | Norwegian air force orders two Mk 43B variants |
| | 1996 | Final deliveries |

Worldwide Distribution

(As of June 1, 1999)

| | |
|------------------|-----|
| Australia | 7 |
| Belgium | 5 |
| Egypt | 33 |
| Germany | 22 |
| India | 36 |
| Norway | 12 |
| Pakistan | 6 |
| Qatar | 12 |
| UK | 127 |

Forecast Rationale

The Sea King will continue to be the subject of upgrade and modernization projects in the coming years but the production line, which shut down in 1996 following a 30-year run, will not be restarted.

Ten-Year Outlook

No further production.

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