

Westland Sea King in detail

WINGS & WHEELS
PUBLICATIONS

Westland Sea King
and its export
variants

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J. Spurný, L. Kedzierski,
F. Kořán

PHOTO MANUAL FOR MODELERS



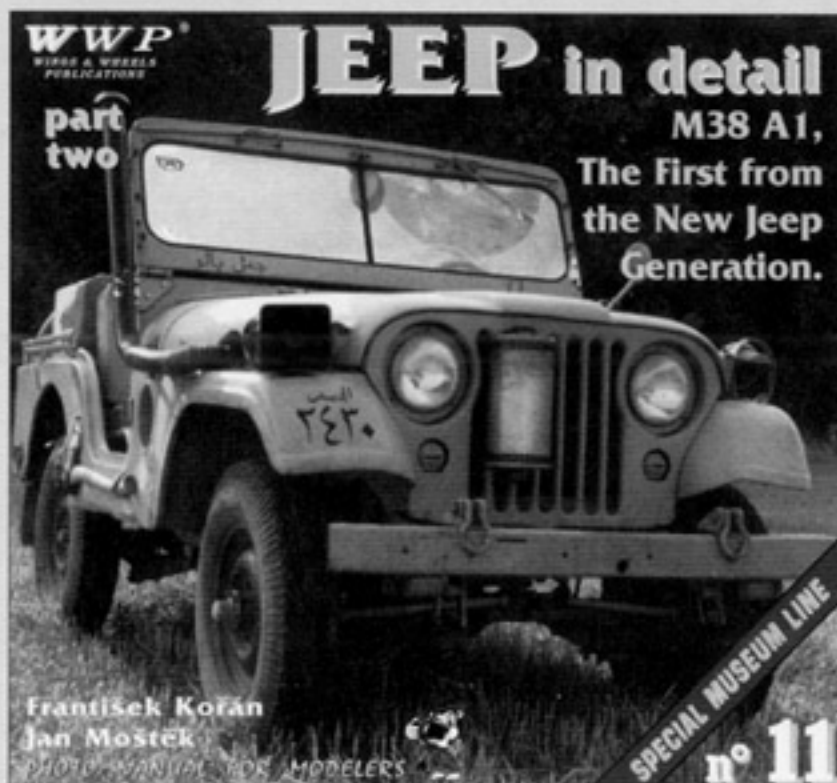
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PHOTO MANUAL FOR MODELERS



**NEXT ISSUE
IN RED LINE
FEBRUARY 2000**

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Westland Sea King in detail

1st edition WWP range published
by RAK - František Kořán
Prague, December 1999

Contact address: RAK, P. O. Box 35
170 06, Prague 7, Czech Republic
e-mail: wwp.rak@iol.cz

ISBN 80-902677-6-9

Reference and source material:

Super Profile: Sea King, Christopher Chant
Author's archives

Colour photos, unless otherwise stated, by Jaroslav Špaček
or authors in his archive (Simon Watson, Mark Attrill and Michael Mau)

All drawings by MA,

Text by Jaroslav Špaček and František Kořán, English text by Libor Šalanda,
Graphic design and Litho by RAK, František Kořán, Prague, Czech Republic
Press by FINIDR s.r.o., Český Těšín, Czech Republic

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Westland Sea King



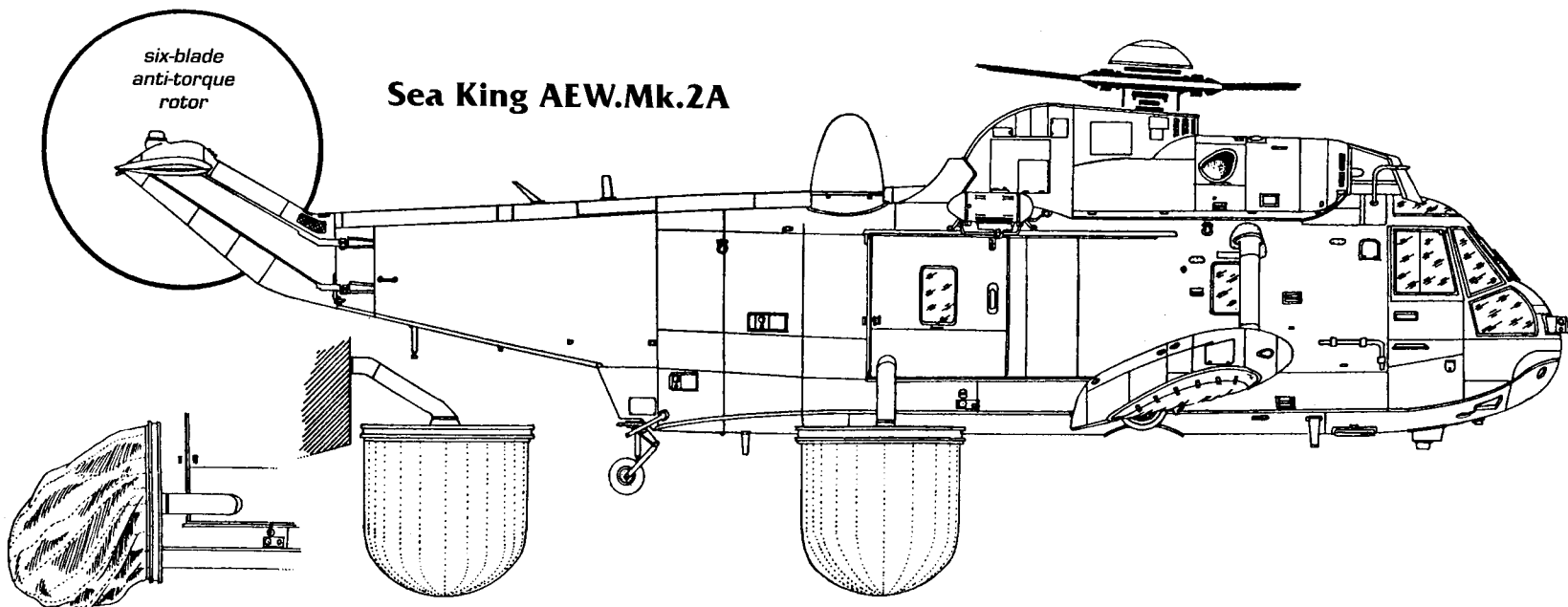
**Sea King in British, German,
Belgian and Australian
service**

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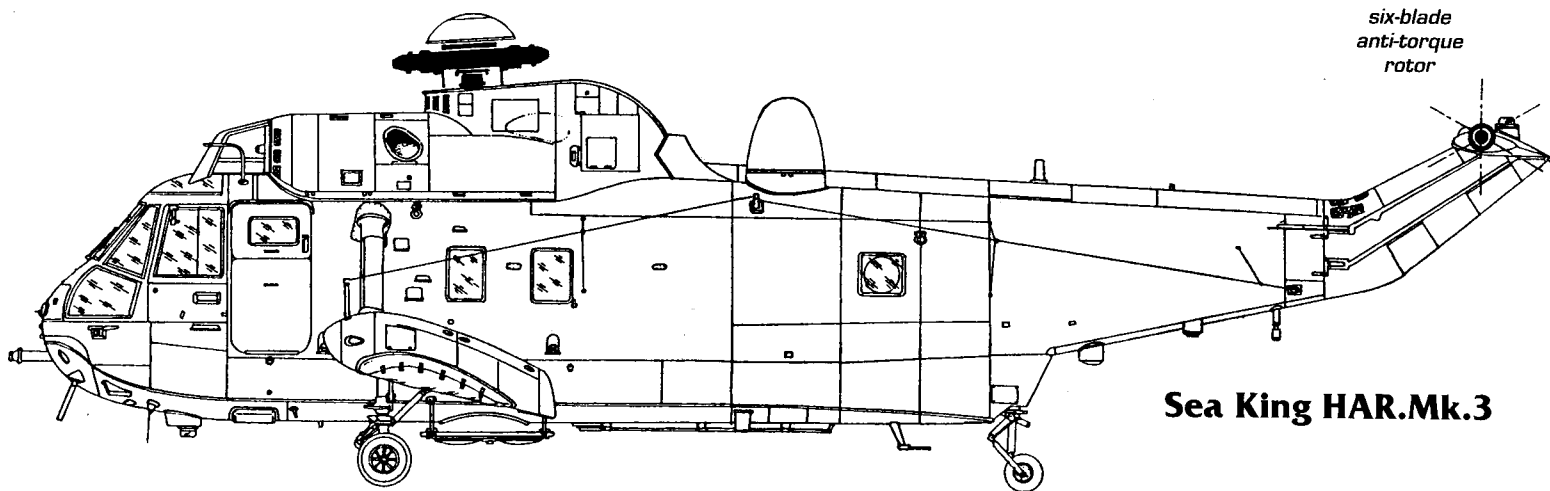
PHOTO MANUAL FOR MODELERS



Sea King AEW.Mk.2A



Sea King HAR.Mk.3

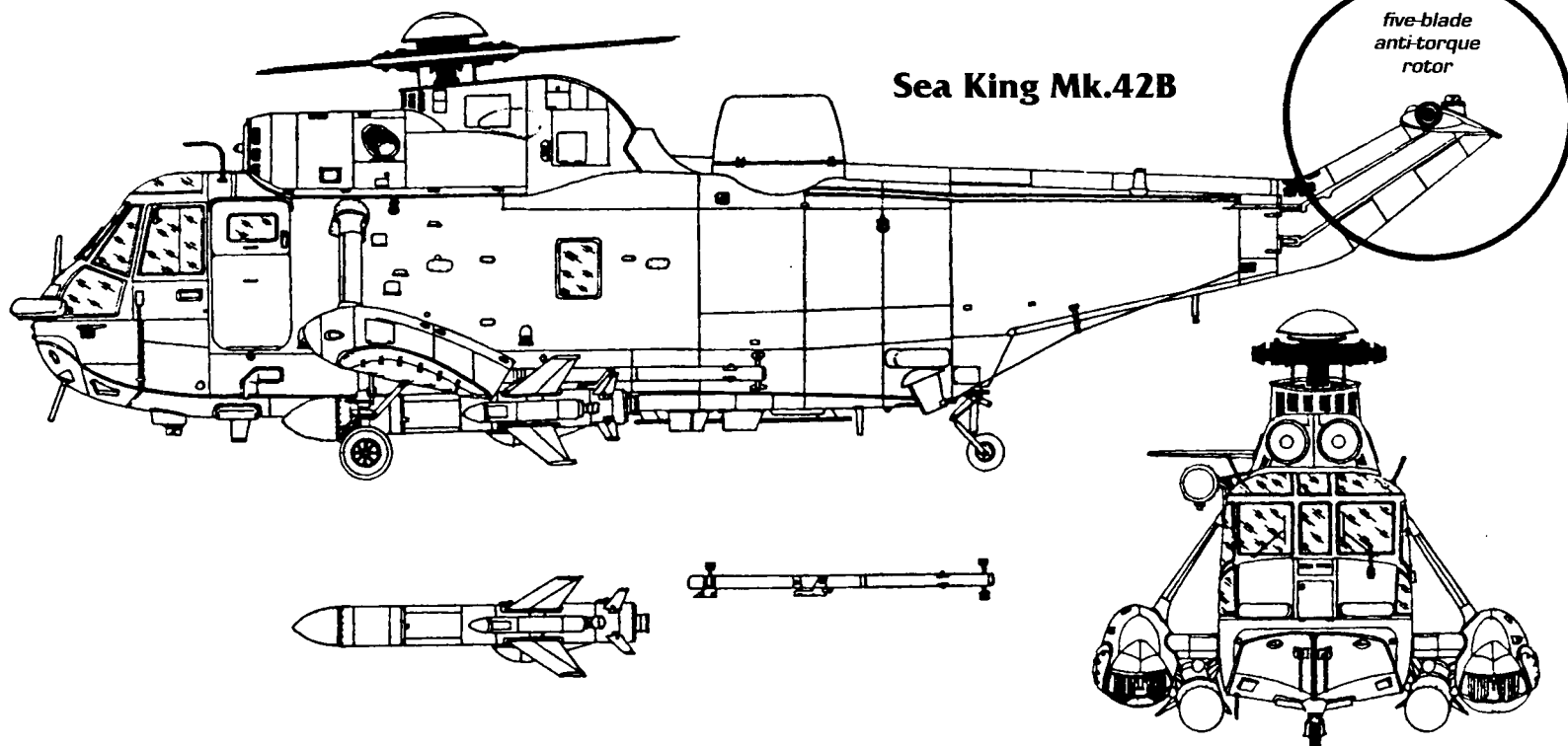


Licensed production of one of the most widespread helicopter type in Great Britain - the Sea King - forms a self-contained chapter in its history. The Sea Kings produced by the Westland company reached much better export success than their original American model. Thanks to their conformation to fulfil various requirements the Sea Kings were produced in a great number of versions. Numerous improvements led to situation that the Sea Kings born in England formed a new type in point of fact, with only airframe and rotor structure common with their older American brother or Japanese copies.

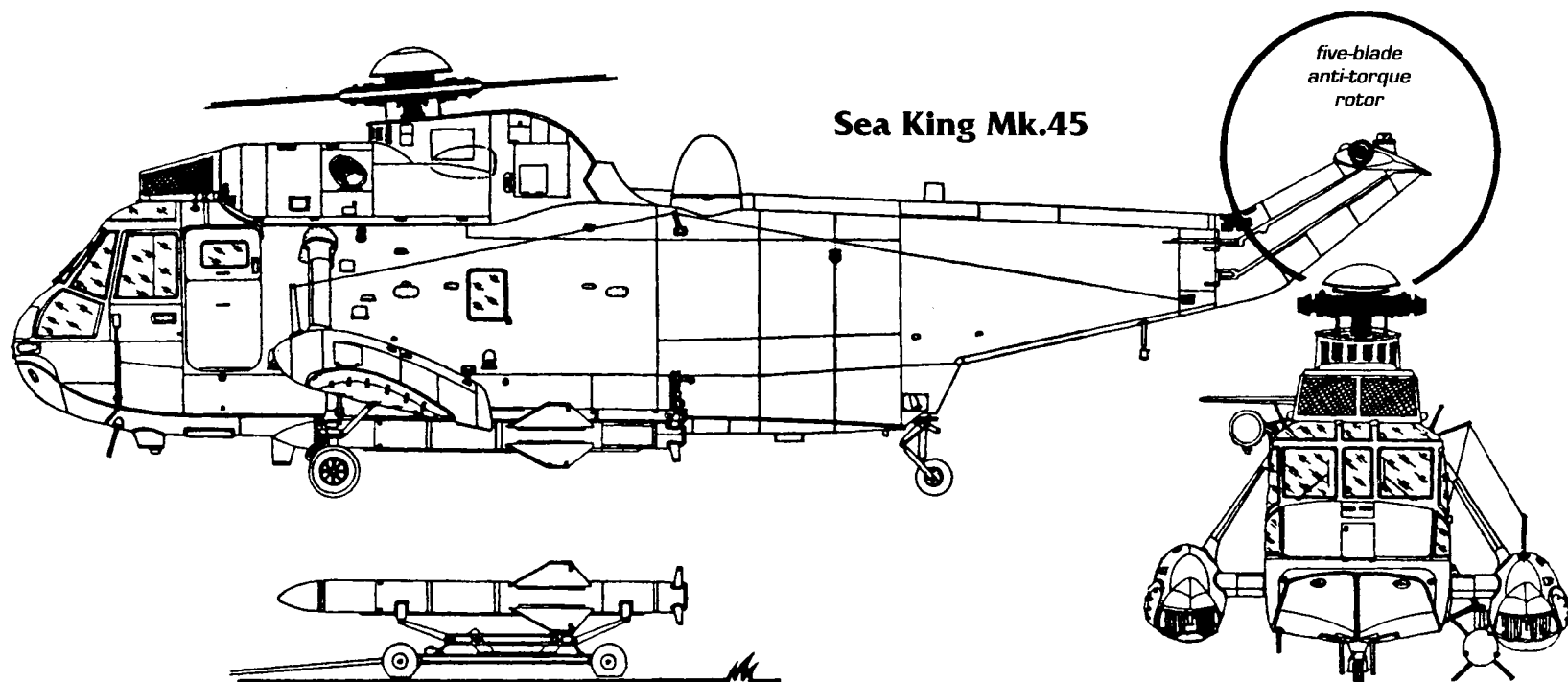
Alike as in the USA, also the Royal Navy in Great Britain speculated on replacement of anti-submarine helicopters Westland Whirlwind HAS.Mk. 7 (licensed Sikorsky S-55), usually operating in couple. Incorporation of Westland Wessex HAS.Mk. 3 into the Royal Navy was found as a solution of this problem. However short range and endurance was a disadvantage of this type. Therefore the Royal Navy seriously evaluated incorporation of American type Sikorsky SH-3D into armament of its anti-submarine forces. The Sikorsky company made every effort to incorporate the Sea Kings to the armament of the Royal Navy, but especially due to engagement of British companies the final agreement on licensed production of the type in the Westland plant in Yeovil was signed. The licence agreement was for production of the basic airframe and rotor head of the SH-3D.

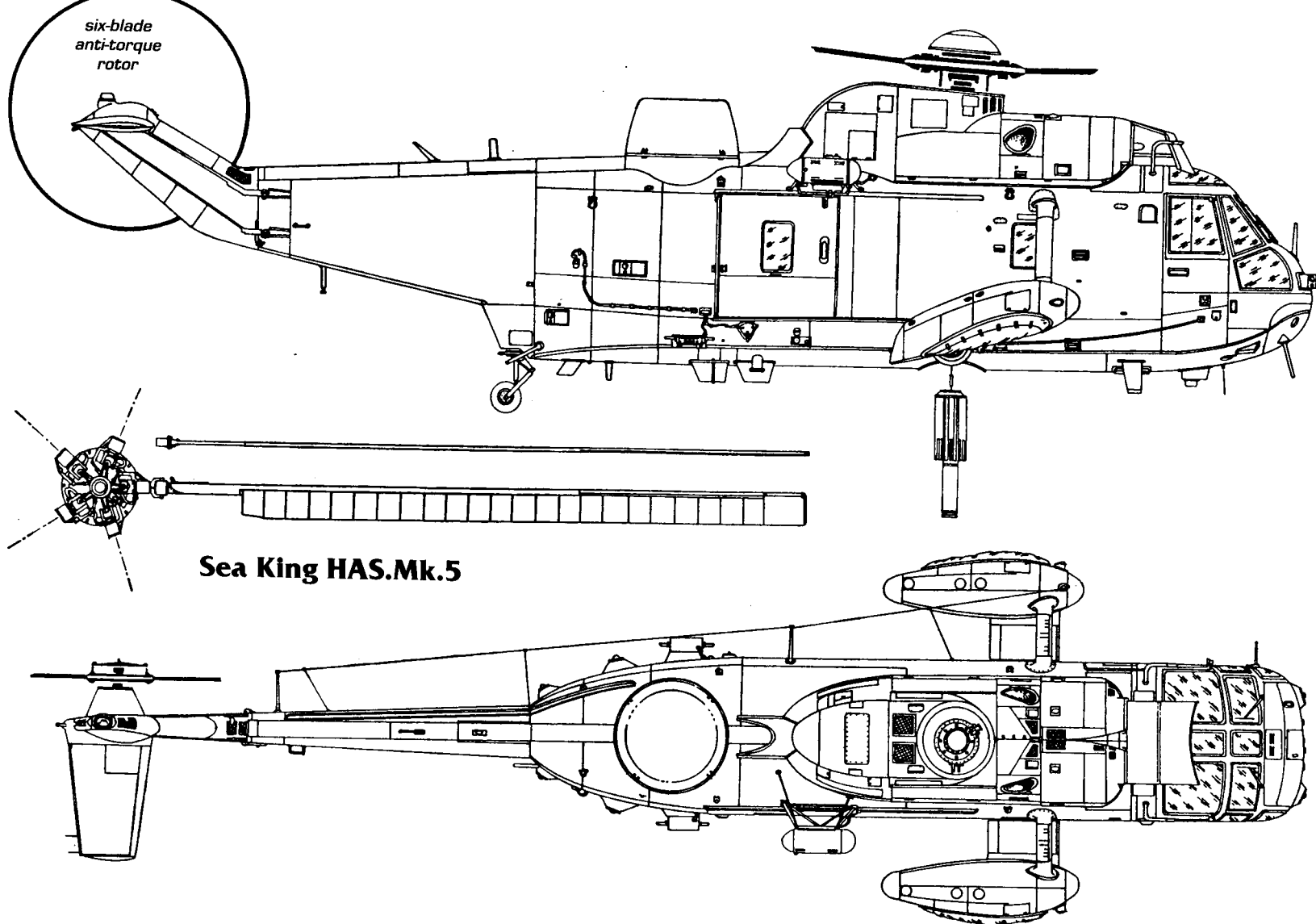
A contract for delivery of 60 machines in value of 24 millions pounds was signed on June 27, 1966. The first four machines, termed as S-61D-2 by the producer, were produced in the USA, but only the first of them, with the fixed British serial number XV370, was assembled there. After its shipment to England the machine was flown from the Avonmouth port to Yeovil on October 11, 1966. Next three prototypes were delivered dismantled in boxes to be assembled here. The remaining 56 pieces of the total of 60 ordered machines were produced at Westlandjs in Yeovil and they were military termed as Sea King HAS.Mk. 1.

Sea King Mk.42B



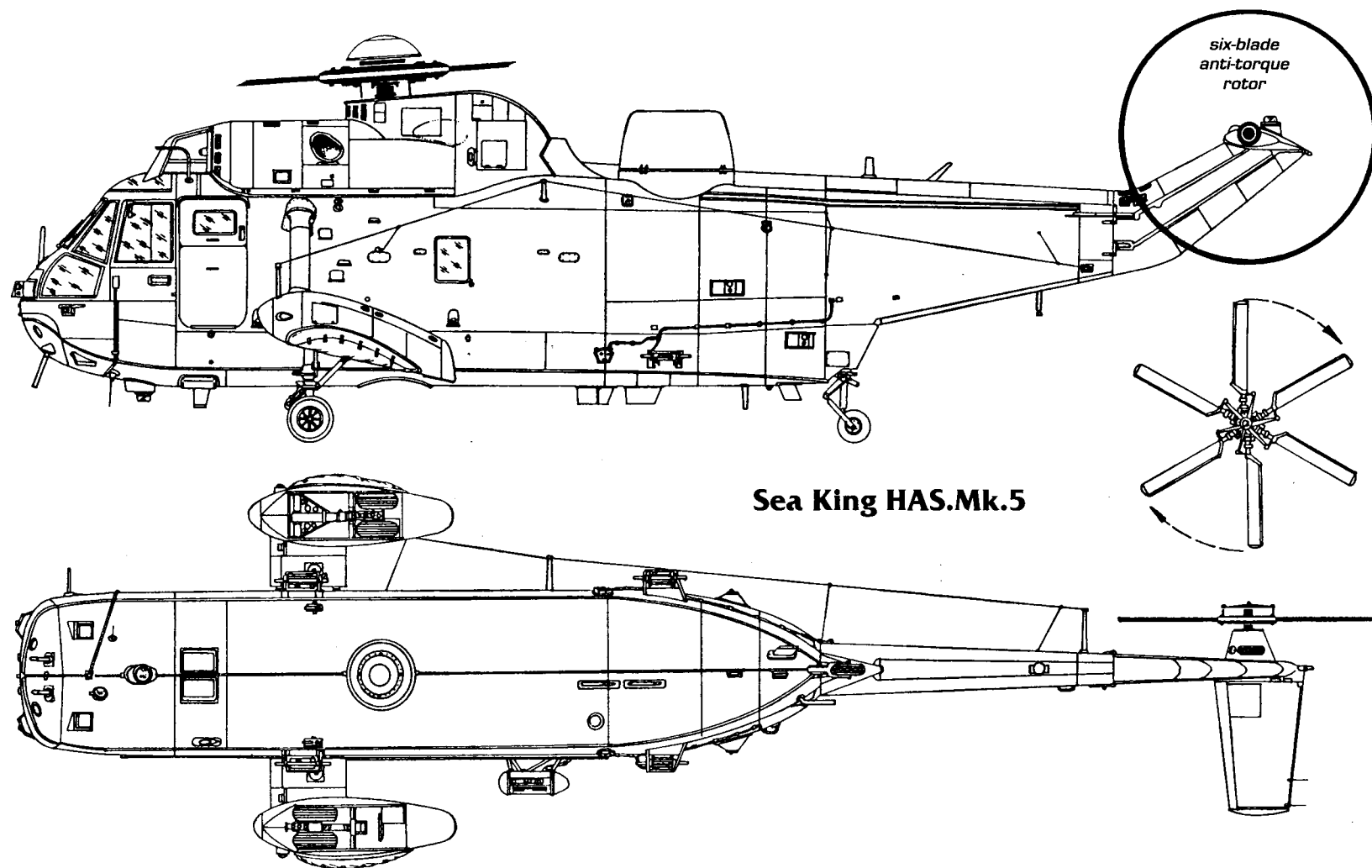
Sea King Mk.45



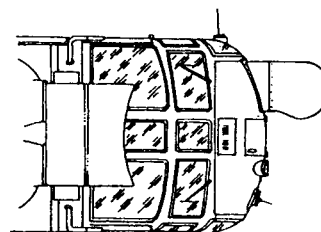
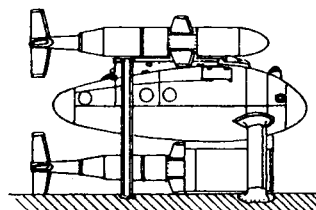
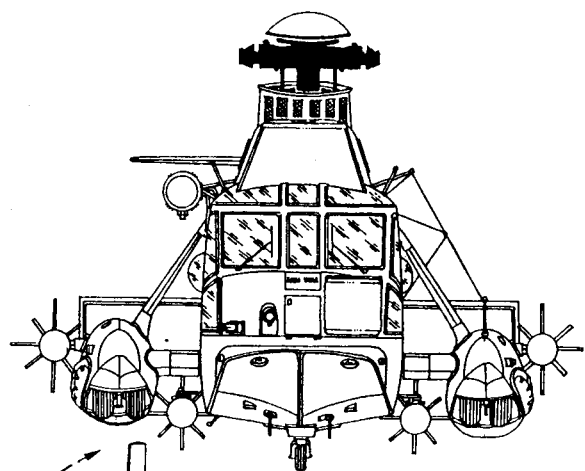
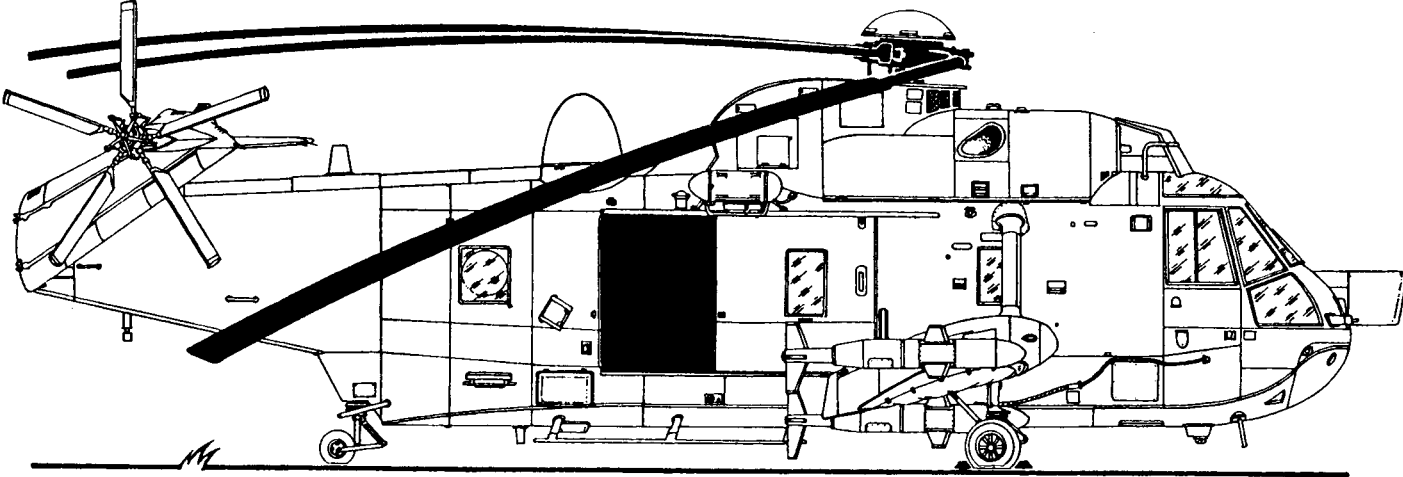


Sea King HAS.Mk.5

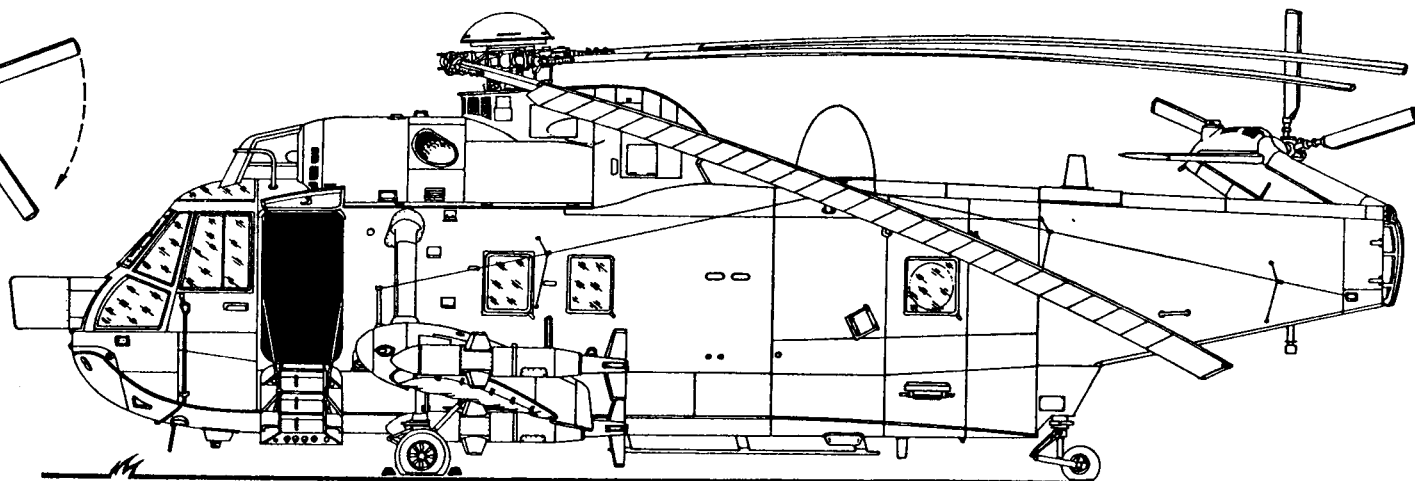
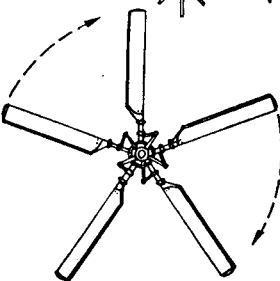
The basis of the British version HAS.Mk. 1 issued directly from the American SH-3D. The helicopter was propelled by two Rolls-Royce Gnome H1400 turbo-shaft engines, that were licensed T 58-GE-10 engines produced in Britain. The British engines were rated at 1 050 kW for take-off, with a possibility of short-term increase up to 1 125 kW. Better reliability and parameters were provided by Hawker Siddeley/Rolls-Royce electronic regulating and controlling system. In contrast to American tactical dependence of anti-submarine helicopters on surface crafts, the British navy school pushed these helicopters to be independent as much as possible, so that to be able to carry out required tasks independently. Due to this reason the first pilot sitting on the right is not usually in command of a crew during combat flights, but it is a senior operator of special equipment, who serves as anti-submarine officer and tactical co-ordinator in the same time. Not only commanding a crew of a helicopter belongs under his authority, he also commands other combat means including surface crafts that are used in particular searching and attacking operations. Due to this reason there is a great difference in interior equipment of fuselage cargo compartment in comparison with American machines. An automatic tactical display system, that provides combined information from radar and sonar to operators, forms an important part of instrument equipment of the cargo compartment. A Doppler radar Marconi AD 580 and submersible sonar Plessey 195 serve for determination of tactical situation. Interception radar Ecko AW 391 (later known as MEL ARI.5995 or MEL lightweight), mounted as a standard equipment, gives British Sea Kings undisputed advantage in comparison with American machines. Its aerial is located under a conical radome on the fuselage back behind the power plant fairing. For stabilizing the helicopter during hovering with submerged sonar



an automatic control system Louis Newmark Mk.31 was developed. This system uses data from the Doppler radar and radio-altimeter and it provides stable hovering of the helicopter 12 meters above the sea level. For providing of hovering directly above a rescued object the Mark 1 is equipped with an auxiliary control stick. This control stick is located in the cabin door and it enables the crane operator to correct the helicopter position above the place of disaster in all directions up to the speed of 18 kms/h. The Sea King HAS.Mk. 1 was equipped with an on-board crane with a lifting capacity of 272 kgs and with a rescue winch with a lifting capacity of 2 720 kgs. A possibility exists to use the same armament as for SH-3, that means four Mk.44 or Mk.46 torpedoes and deep-sea charges. The British deep-sea version of a WE 177 nuclear bomb also belongs to an armament of HAS.Mk. 1. Certainly the British Sea Kings have completely different radio equipment produced solely by British producers. If there is a sonar on board of HAS.Mk. 1 it is possible to transfer up to 11 fully armed soldiers in case of totally „swept“ cabin. The prototype of HAS.Mk. 1XV642 made its first flight on May 7, 1969. Serial deliveries were commenced on the end of July 1969, the first machines were delivered to the 700„S“ training squadron in Culdrose. The majority of HAS.Mk. 1 machines (probably 45) were later modernized to standard of HAS.Mk. 2. Modernized Sea King version HAS.Mk.2 was a result of development of Mk.50 version for Australia (will be described hereinafter). The helicopter was propelled by more efficient engines Gnome H1400-1 rated at 1 200 kW. Due to increased engine power also the main reduction gear unit and transmission shafting system had to be reinforced. Increased engine power provided excellent performance of HAS.Mk.2 in high temperatures and higher altitudes. Directional controllability of the helicopter, especially at take-off weights close to maximum weights, was improved by a newly developed six-blade anti-torque rotor. Like new American versions also the HAS.Mk.2 was equipped with a new plate deflector against entering ice pieces, being created during icing conditions, and other impurities into engines. Also much more modern avionics was used, including a Racal Decca 71 Doppler radar and Plessey 2069 sonar. Only 18 pieces of HAS.Mk.2 machines were newly built, the others were modernized from older HAS.Mk.1 ones just at the Westland company or at RNAY in Fleetlands (these were later on unofficially termed as HAS.Mk.2A). The first HAS.Mk.2 completed its test flights on June 18, 1976, and the 706th Sqn. was the first squadron rearmed with this new version. Some of the machines used by the 814th Sqn. were adapted for bearing the passive acoustic buoys Dowty SSG SO4 mini-Jezebel. Nine HAS.Mk.2 machines were adapted to the AEW.Mk.2 standard, the remaining ones were rebuilt to HAS.Mk.5 version.



Sea King Mk.41



Commando Mk.3 (Sea King Mk.74)



During British - Argentinean war for Falkland, lack of radar air reconnaissance by proper forces of the fleet severely came to light and this among others conducted to loss of the HMS Sheffield frigate. Just a few weeks after this event a new radar fore-warning system Thorn EMI ARI 5980/3 was developed. The two Sea Kings (XV650 and XV704), after being equipped with this new radar, that is also used by Nimrod aircraft, changed to a new version AEW.Mk.2A. This radar is able to detect a flying target of a fighter aircraft size at a distance of 200 kms approximately and it has increased ability for observing targets flying in low altitudes. Next it is optimized for detecting slowly flown air targets and surface targets up to the size of a submarine periscope. Its stabilized aerial rotates in the range of 360° and it is located in a special kevlar housing on the fuselage left side. This drum like housing with a diameter of 1,8 m is tilted to vertical position during flight so that the inside rotating aerial should not be shadowed by the fuselage. Before landing the housing is tilted to horizontal position. Due to mounting of this radar the maximum speed of the helicopter was decreased to 166 kms/h. The original Ecko AW 391 radar remained in the equipment for evaluation of tactical and navigational situation. The sonar was evaluated as a useless one and there is no one in the equipment of the AEW.Mk.2, but there are several new items of special equipment - X band operating jammer, especially aimed to dangerous AM-39 Exocet anti-ship guided rockets, Racal MIR-2 Orange Crop radio-electronic jammer, Cossor IFF 3570 „friend-or-foe“ identification device and Ferranti FIN 1110 inertial navigation system. Test flights were realized from the HMS Illustrious, where the both helicopters were incorporated into the 824th Sqn. Since the very August 27, both the machines provided air protection of the marine area within the radius of 320 kms round the Falkland Islands. The 849th squadron had been again formed on November 9, 1984, and it received nine pieces of AEW.Mk.2A, besides of two developmental machines. The machine numbered as XV704 was later on again modified to an anti-submarine standard. A crew has usually three members. The only pilot is completed by two operators of special equipment. One of them sits on the left pilot seat during take-off, landing and flight operation in low heights over water level. During fighting activity the both operators sit at PPI (Plan Position Indicator) and A-scope monitors, that are able to provide them with all information about air and surface targets. Three sets of this radar system were sold to Spain in the year 1984, where were used for conversion of three SH-3H helicopters for serving as warning machines.

The HAS.Mk.5 version is the most considerable modernization of anti-submarine Sea Kings of the Westland company. Mounting a new digital searching radar MEL Sea Searcher was an important modernizing item. This radar operates in X band, it features with double range and better resolution in comparison with the original Ecko AW 391 radar. The new radar is able to operate in both the regime of primary and secondary display. Lower but more robust radome of this radar is the main distinguishing feature of the HAS.Mk.5 version. The Plessey 2069 sonar is completed with SSQ 904 or SSQ 954 acoustic buoys. Thanks to modern acoustic evaluation system GEC-Marconi AQS 902 LAPADS, this Sea King version is able to monitor acoustic information not only from own acoustic buoys but also from buoys dropped from Nimrod aircraft. Some HAS.Mk.5 machines were equipped with a detector of magnetic anomalies AN/AQS-81, like the American SH-3H machines. The first HAS.Mk.5 was modified from the HAS.Mk.2 and it completed its test flights on August 1, 1980, so that to be handed over to the Royal Navy in company with the second converted machine (without a Super Searcher radar for the meantime) on October 2, 1980. The Royal Navy received not only 30 newly built machines, but also 55 HAS.Mk.5 machines rebuilt from the older versions HAS.Mk.1, HAS.Mk.2 and 2A. The 820th squadron became the first combat squadron using the new version since June 1981. The HAS.Mk.5 Sea Kings took active part both in the Falkland conflict and Desert Shield and Desert Storm operations. Two helicopters of the 826th squadron flew without a sonar for lower weight and greater useful space in the cargo compartment. These machines were also modified as follows: mounting the GPS navigation equipment, AN/ALQ-157 infrared jammer, M-130 deceptive targets throwing device, FLIR systems for night vision, warning systems for radar and laser irradiation and door mounted moving machine-guns. Demining was the main task of these Sea Kings in the Gulf. Before outbreak of war these two helicopters took part on discovering of 30% of anchored mines, while destroying 17 of them, and they discovered next 44 mines during the war.

Top left - a machine in an atypical colouring, right - HAS.Mk.6 belonging to the tiger 814th squadron during training the rescue action. Bottom - machines before and after landing. Top on the opposite side - homing the machine to a static stand by a crew member after landing. Eindhoven 1993



The HAS.Mk.6 version became the most modern Sea King version in the Royal Navy arsenal. This version has some particular items characteristic for the highly modernized Advanced Sea King. Composite main rotor blades, new integrated tactical system and emergency lubrication system of the main reduction gear unit are only some of them. The anti-submarine equipment was considerably innovated and it will be able for full communication with digital systems of the EH-101 Merlin type, that is now being incorporated into the Royal Navy. A digital advanced sonar equipment GEC Avionics AQS-902G-DS is

HAS.Mk.6



one of these systems. It evaluates data received from acoustic buoys and digital sonar Plessey/GEC Avionics 2069. This sonar can be immersed down to the depth of 213 metres, in comparison with 75 metres of the older type. Acoustic information along with data received from the MEL Super Searcher radar are being displayed on one colour CRT screen and therefore workload of the crew is significantly reduced. A wider sword aerial of an enciphering communication VHF/UHF system AD3400 located on the bottom side of the fuselage is the only external feature making difference of HAS.Mk.6 from older versions. Also a detector of magnetic anomalies, equipment serving for radio-electronic fighting and „friend-or-foe“ identification device were modernized. All the crews were pleased by a new STASS system (Short Term Air Supply System), that significantly increases possibility of surviving in case of helicopter sinking into the sea. The STASS comprises of a small overpressure cylinder, filled with a mixture of oxygen and nitrogen, connected with breathing apparatus and it prolongs a chance for the rescuing crew to escape from the helicopter. The gas mixture used in this device decreases hazard of decompression sickness. Fact is that there is no problem for the Sea King to dive as quickly as 180 metres per minute.

At first 25 older HAS.Mk.5 machines were modified to the standard of HAS.Mk.6, and the first of them completed its test flights on December 15, 1987. Later on a requirement for the new version was increased up to 73 machines and five of them, ordered in October 1989 and delivered in the first half of the year 1990, were newly built. The training 824th squadron was the first squadron armed with HAS.Mk.6 machines, next was the combat 819th squadron. Today the Sea Kings HAS.Mk.6 serve in the 706th, 810th, 814th and 820th squadrons.

Walk Around



Bottom - note inclination of the blades of the six-blade anti-torque rotor and stabilizer geometry.



Walk Around

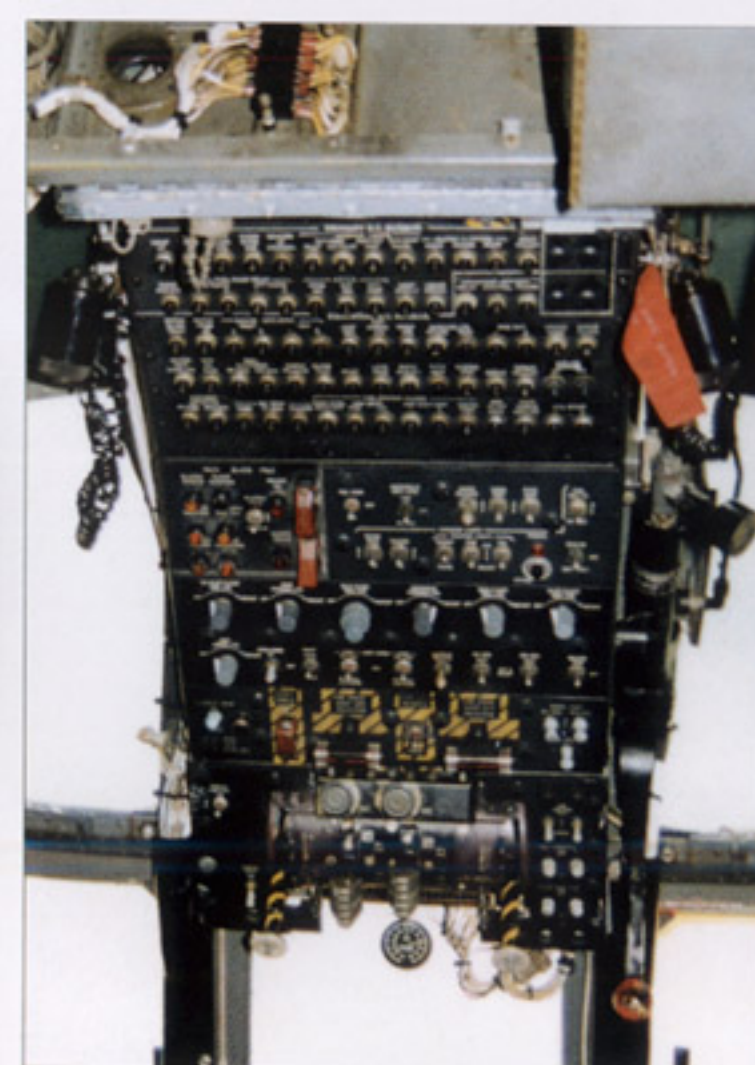
Right - detail of the undercarriage well, forward look, right - a winch above the fuselage cargo compartment door.





photo Jan Martin





Top - central overhead panel, left - various variants of instrument panels, bottom - panel between the pilot's seats.

Interior details

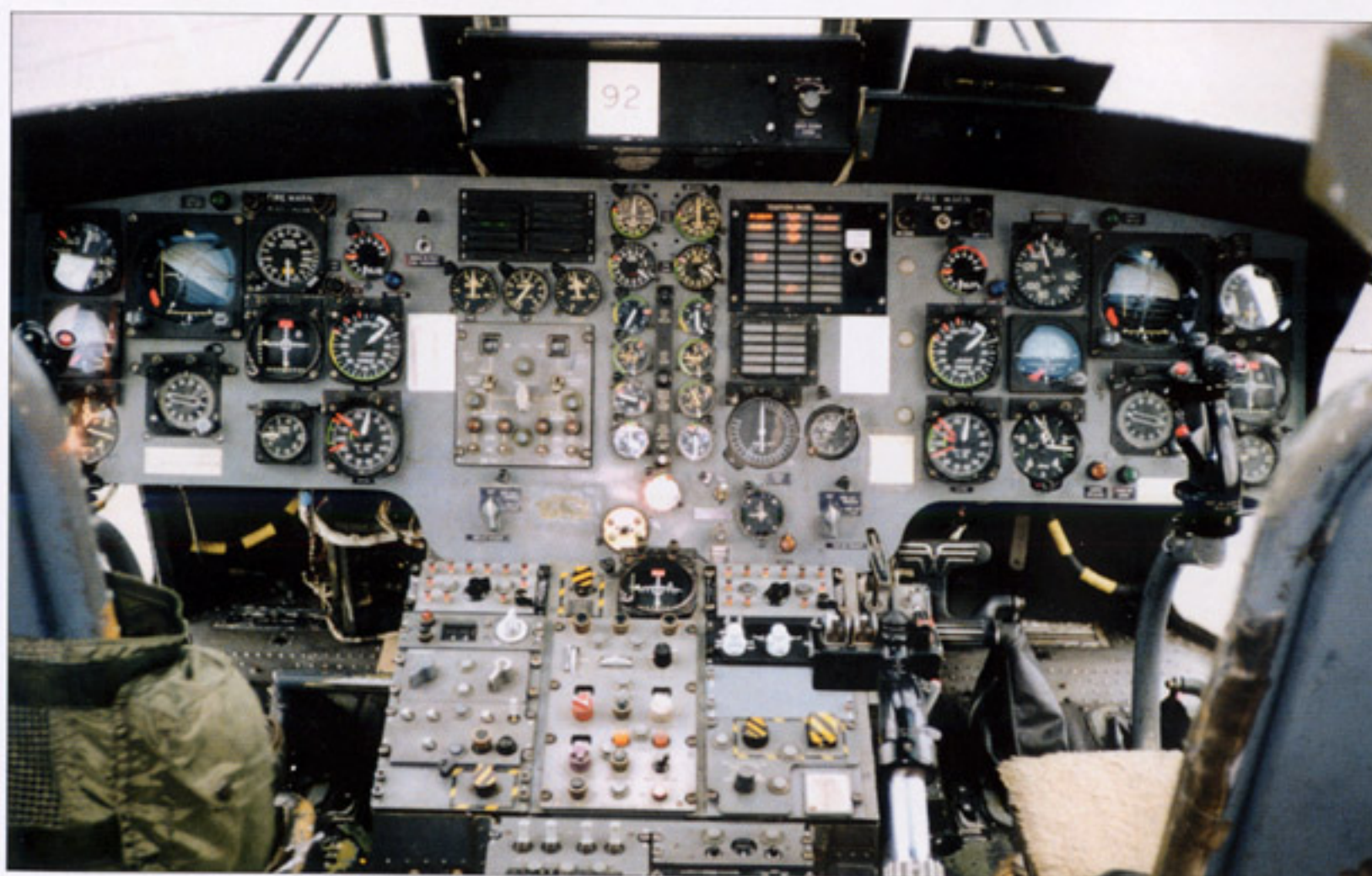
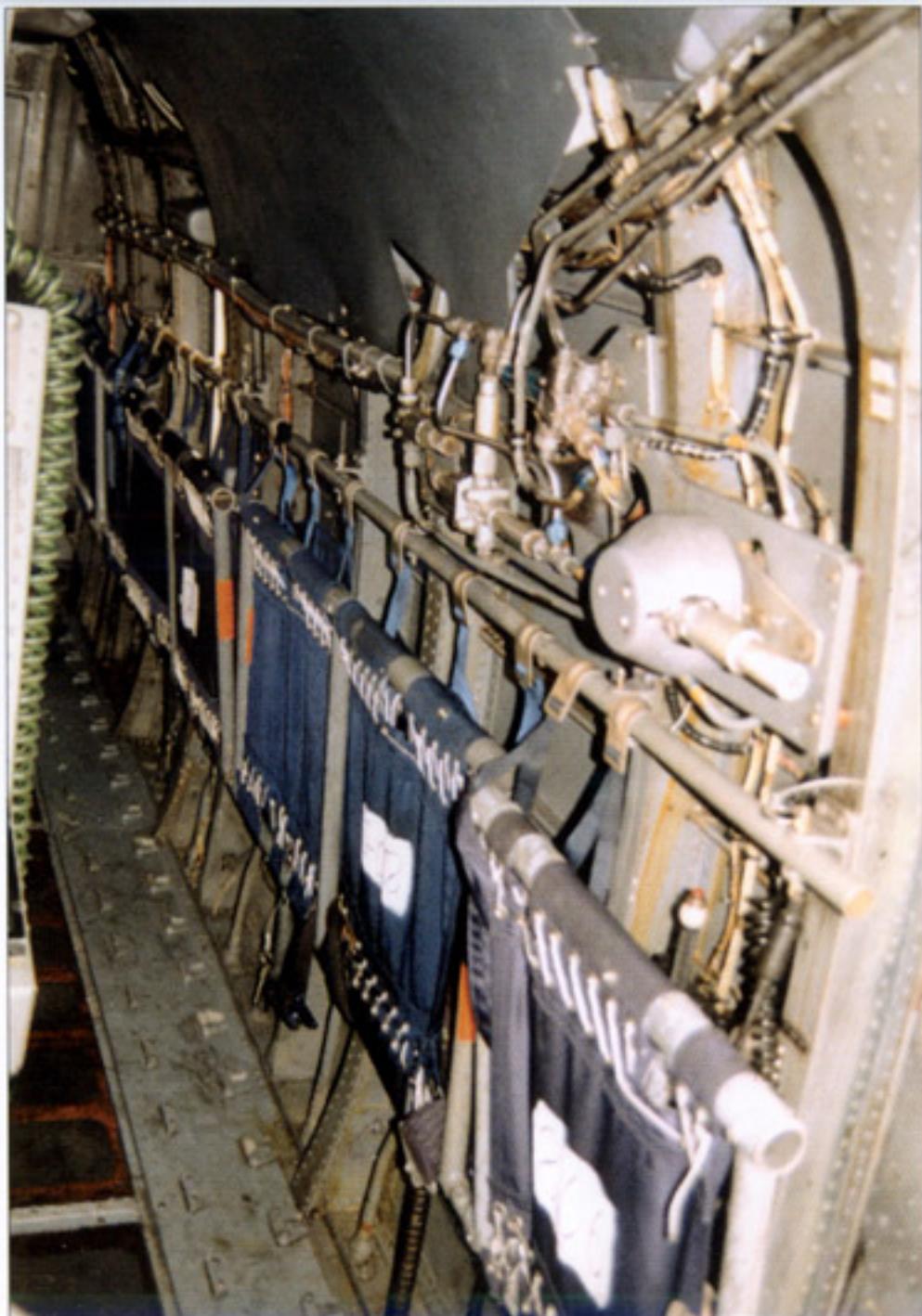


photo Jan Martinac



Top left - folded seats on the right side of the fuselage in the narrow passage along the compartment for operators of special equipment.



Bottom - view through the cargo doors to the fuselage left side.



Bottom right - right fuselage side, backward look.



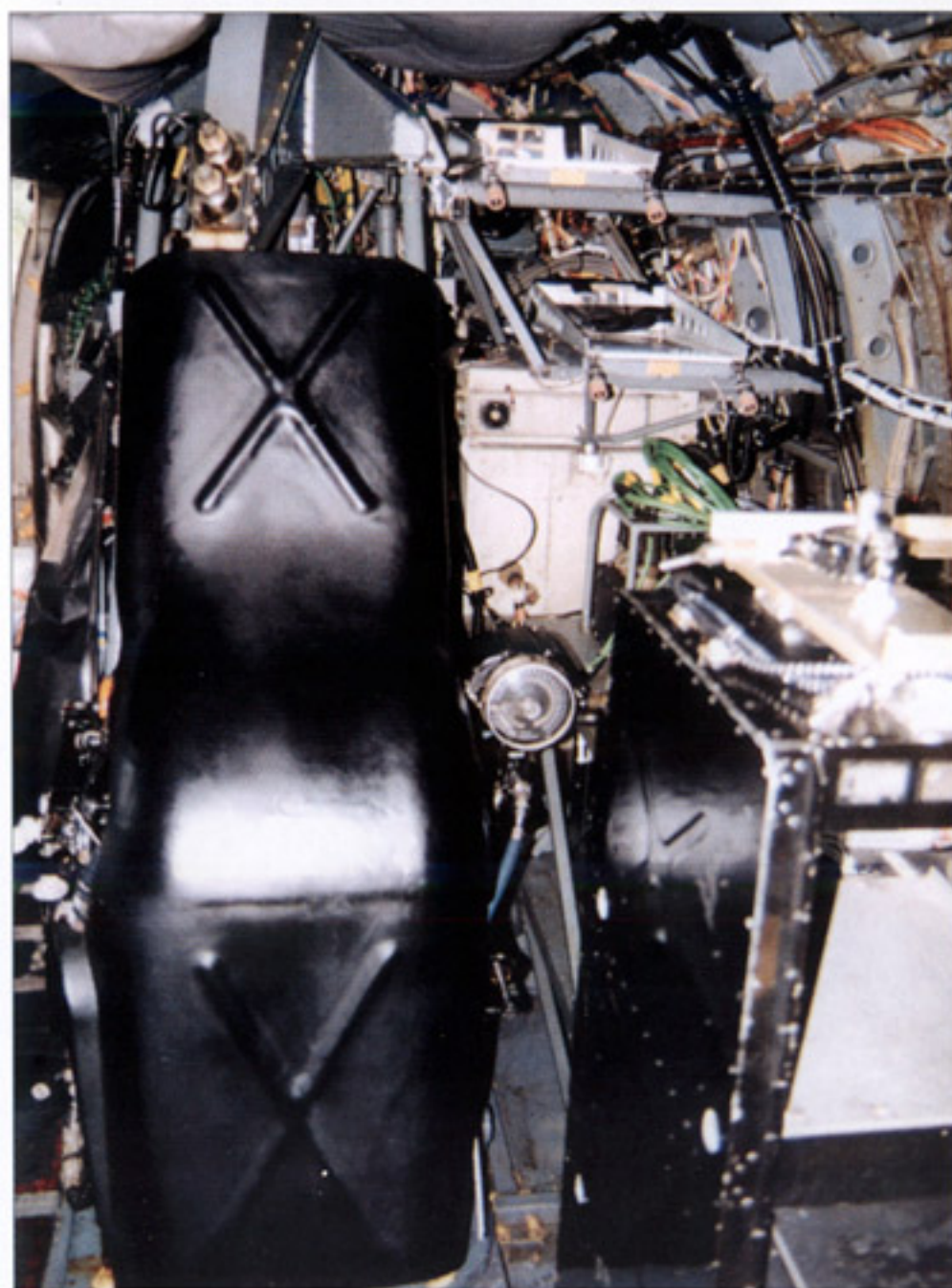
Right - ceiling and back bulkhead of the cargo compartment behind the operator's compartment.



Anti-submarine Equipment



Above - HAS.Mk.5 Anti-submarine Equipment

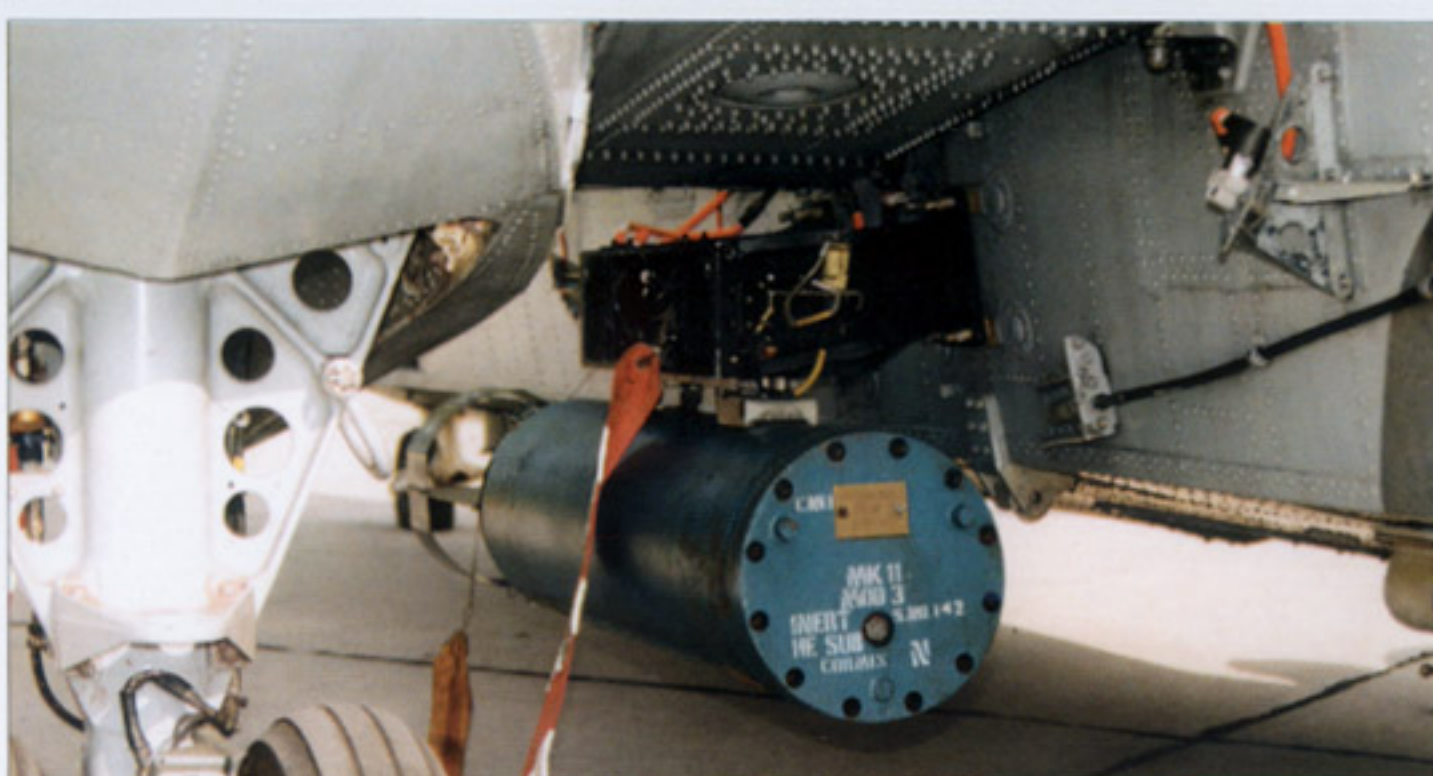


Look to the compartment of operators of the anti-submarine equipment in the fuselage left side.

Bottom left - backward look to the area between the operator's place of work and the cockpit.

Right - details of the radar and sonar terminals and monitors.



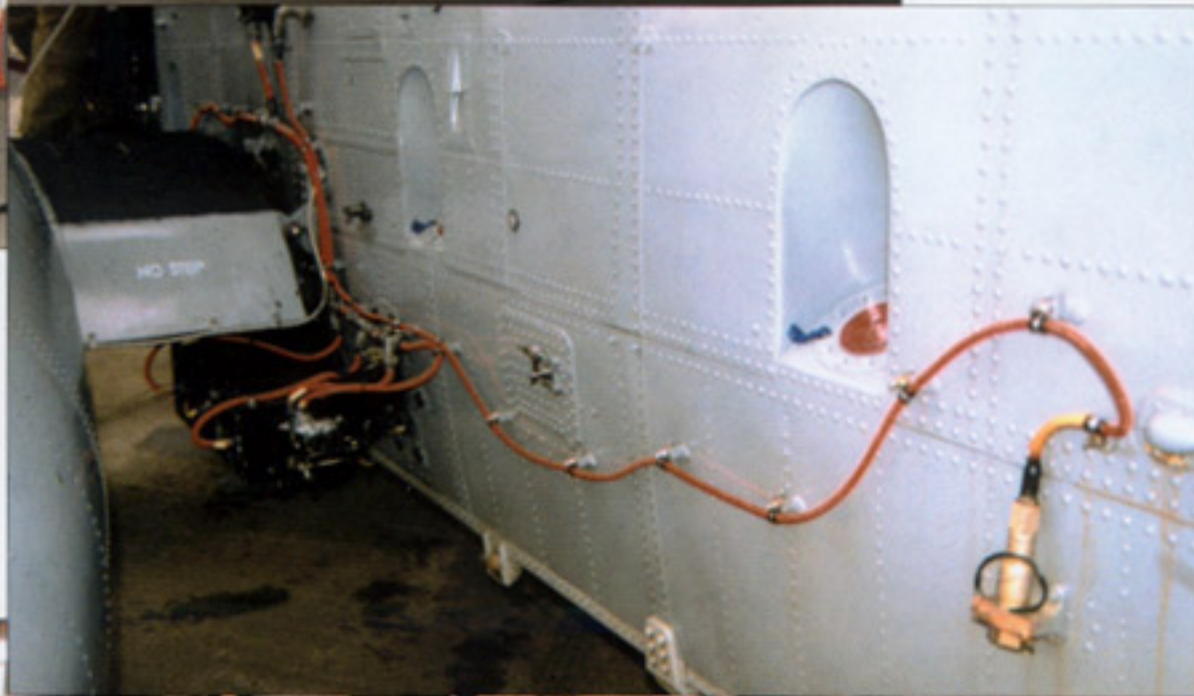


Left - a deep-sea mine in attachment.



Right - two looks on the attached torpedo.

Bottom - the Sting Ray torpedoes and deep-sea mines, right - external wiring to the launcher.



Bombs and Torpedoes



Westland Sea King HAR.Mk.5

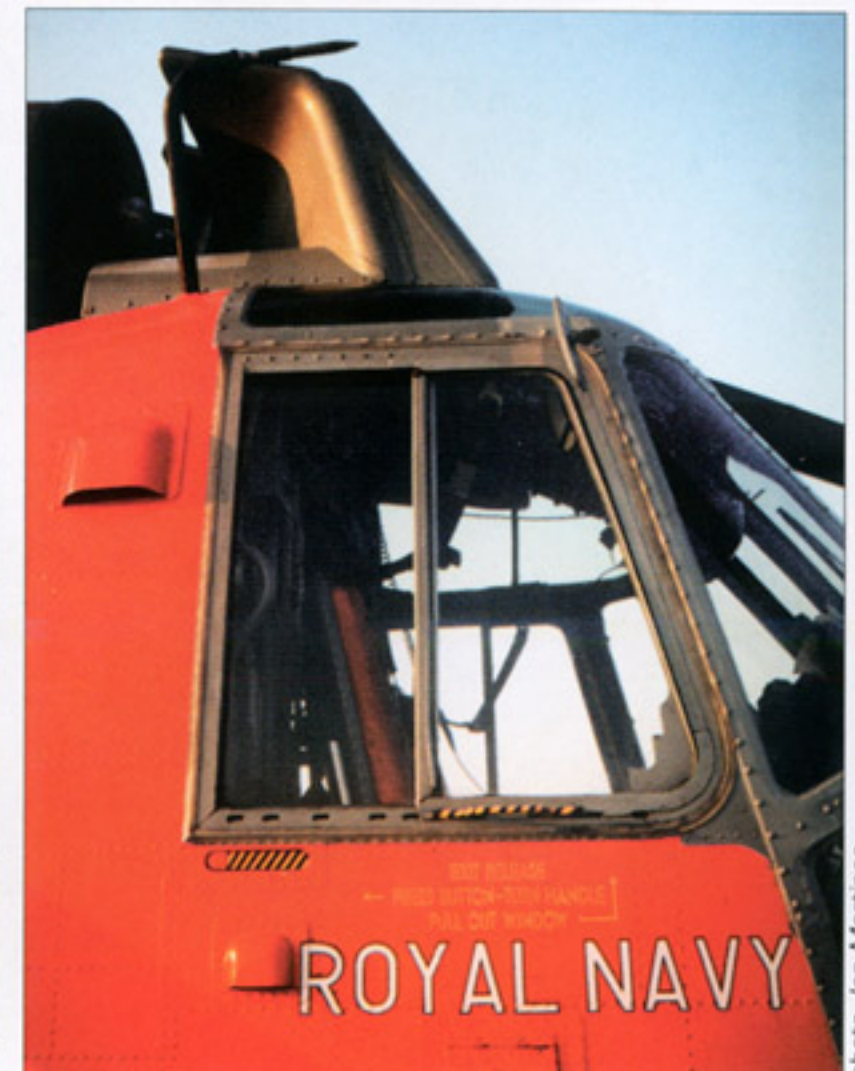


photo Jan Martinec

Walk Around



photo Jan Martinec

After grounding the Wessex HU.Mk.5 rescue machines in the year 1988 the Royal Navy was looking for a suitable substitute for its 771st squadron operating in the rescue system from the Culdrose base. Of course, there was nothing more simple than removing the anti-submarine equipment from the HAS.Mk.5 version. Several pieces of the HAR.Mk.5 version arose from this modification. This version is an outstanding one among other rescue Sea Kings due to remaining Super Searcher radar on the back of the fuselage.

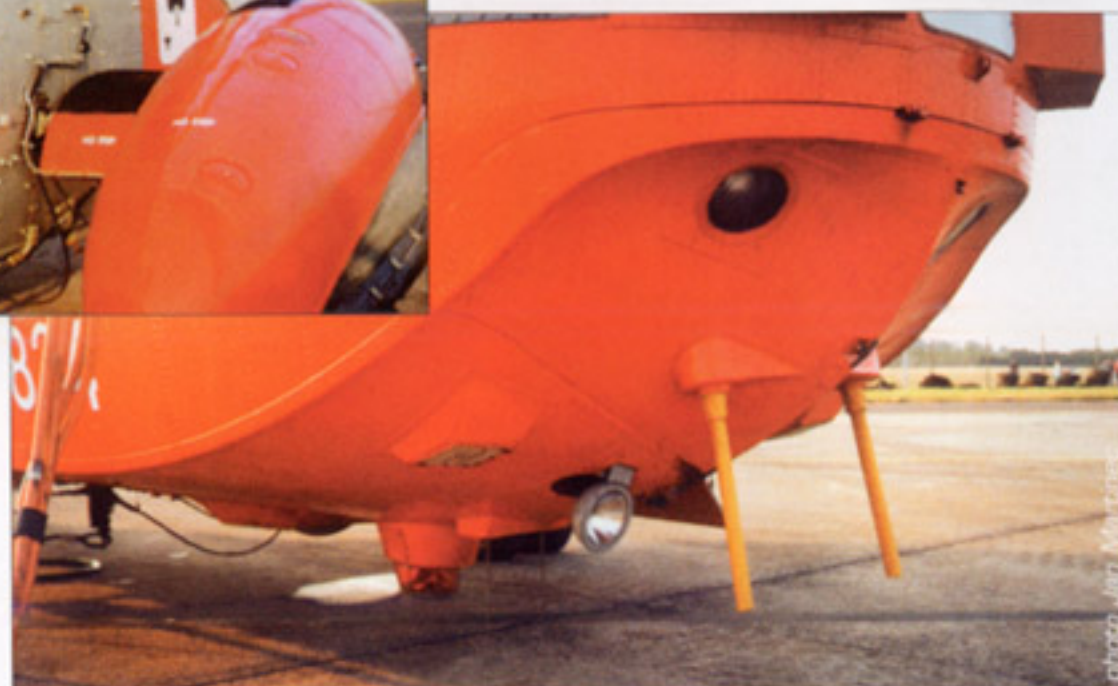


The Rescue Har.Mk.5 from the RNAS Culdrose base.

photo Jan Martinec



Left - nose details,
bottom right - instrument panel,
top - inner side of the left cockpit
door.



Opposite page, bottom line, from the
left - right side of the passage from
the cockpit to the fuselage, place of work
of the operators of the special equipment
and narrow passage in the fuselage right
side along this place of work.



Interior Details



photo Jan Martinec

Top - rescue stretcher,
right - forward part of the passage behind the cockpit.



photo Jan Martinec



photo Jan Martinec



photo Jan Martinec



photo Jan Martinec





photo Jan Martinec



photo Jan Martinec



photo Jan Martinec



Details of the nose, six-blade anti-torque rotor and tail.

Opposite page - detail of the rotor head, bottom centre - construction of the winch attachment, right - details of the radar.



photo Jan Martinec

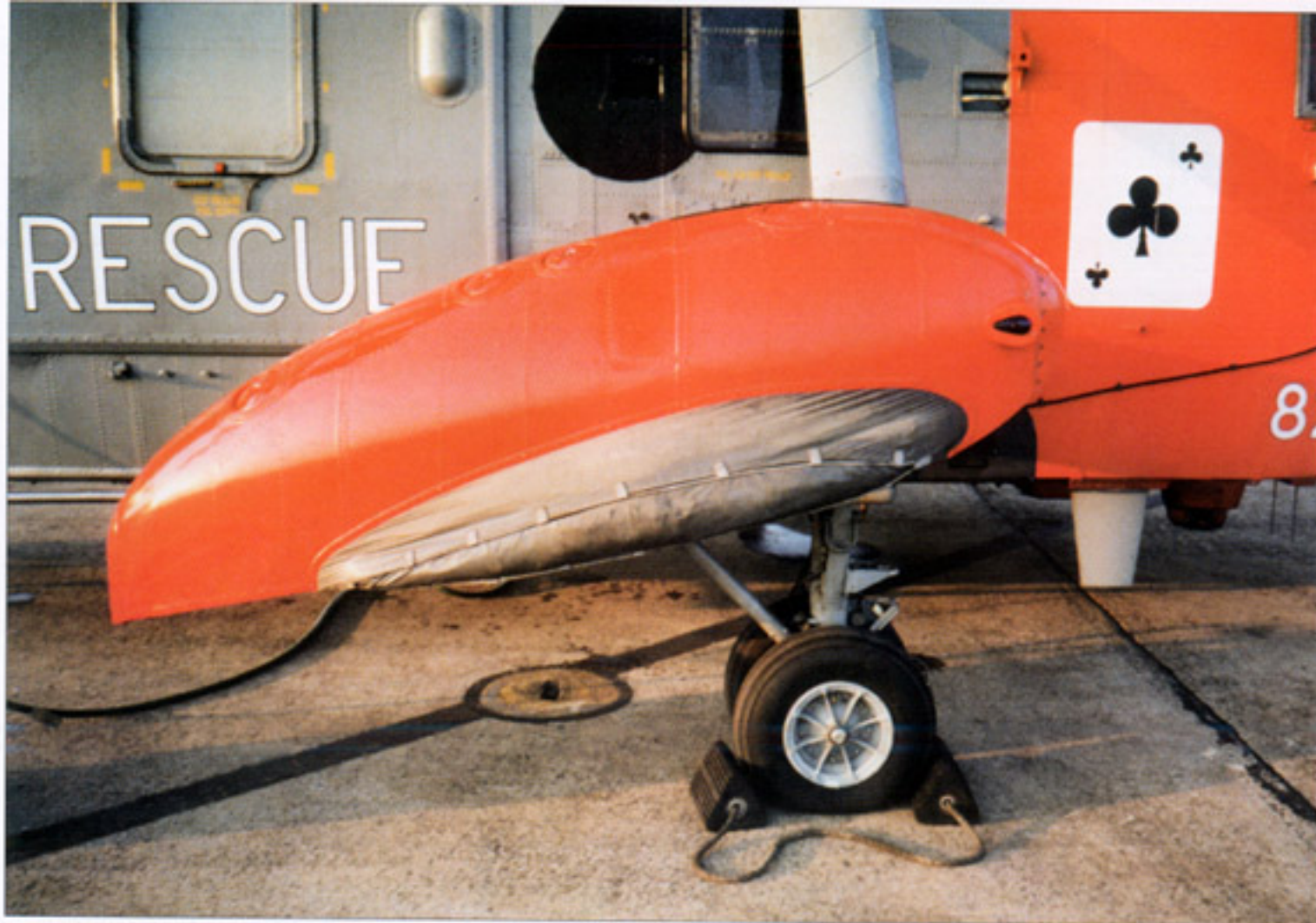


photo Jan Martinec

Exterior Details



all photos on this page by Jan Martinec



Details of the float nacelles with the main landing gear, bottom centre - a tail wheel.





Rescue Training



A HAR.Mk.5 from the 202nd Squadron during training a rescue action, Lossiemouth, July 1997.



AEW.Mk.2



Top - an AEW.Mk.2 from the 849th NAS, Gdynia, June 1997, bottom - a Searchwater kevlar radome. Right - operation on an aircraft carrier.



Walk Around

Overall view on the Royal Navy machines, bottom - nicely perceptible radar in working position.





Westland Sea King HC.Mk.4



At the end of the seventies the Royal Navy needed to replace their Wessex machines used for transportation of troops and special units. In this time the Westland company had experience with the Sea King ground version termed as Commando, produced for foreign customers.

On the basis of experience with the Commando the sea King version HC.Mk.4, derived from HAS.Mk.2 version, was designed for the British navy. Unlike the Commando, systems for tilting the rear part of the fuselage and rotor blades remained. The cargo cabin was lengthened to be the same as rescue versions. Using the fixed landing gear was the most obvious modification. For ditching the helicopter was equipped with emergency inflatable devices hidden in cylindrical cases mounted on the main gear legs.



*Detail of the nose
tipping light,
right - machines
operating in UNO
missions.*



*On both pages - phases
of group take-off,
left - transport
of heavy armament
for support of put
off units.*



Test flights of the first Sea King HC.Mk.4 (ZA 290) were completed on September 26, 1979, and not later than on November 26, the machine was allocated to the 848th squadron. Total of 42 HC.Mk.4 machines were produced, while the first series of ten pieces were delivered in the year 1981. The Sea Kings HC.Mk.4 were ones of the first British helicopters where introducing of NVG helmets for night vision were commenced. These helicopters can be often visible in all the „hot“ areas where the British troops are engaged. After the Falkland Islands they took part in operations in Persian Gulf, northern Iraq and over Bosnia. Within the framework of preparation for fights in the Granby operation (British presence in the Gulf) some of the HC.Mk.4 machines were modernized by mounting infrared jammers AN/ALQ 157, multiple-throwing device M 130 for throwing deceptive targets, satellite navigation systems NAVSTAR GPS and other modern avionics.

**Westland
Sea King
HC.Mk.4
for Bosna**





Opposite side centre - a crew of the 845th squadron in front of its machine before departure for Bosnia.

Other pictures - one machine before and after landing in Banja Luka, Bosnia, 1994.

Note the APME Centrisep filters in front of engine inlets, that replaced original desk deflectors.





Top - a HC.Mk.4 on an improvised static stand in Bosnia, bottom - details of anti-rocket defence of the machine.





Walk Around

The armament is formed by GPMG door mounted machine-guns of 7,62 mm calibre. On some of the machines the desk deflector in front of the engines air inlet was replaced by AP-ME Centrisep filters, like as in case of export Command machines.

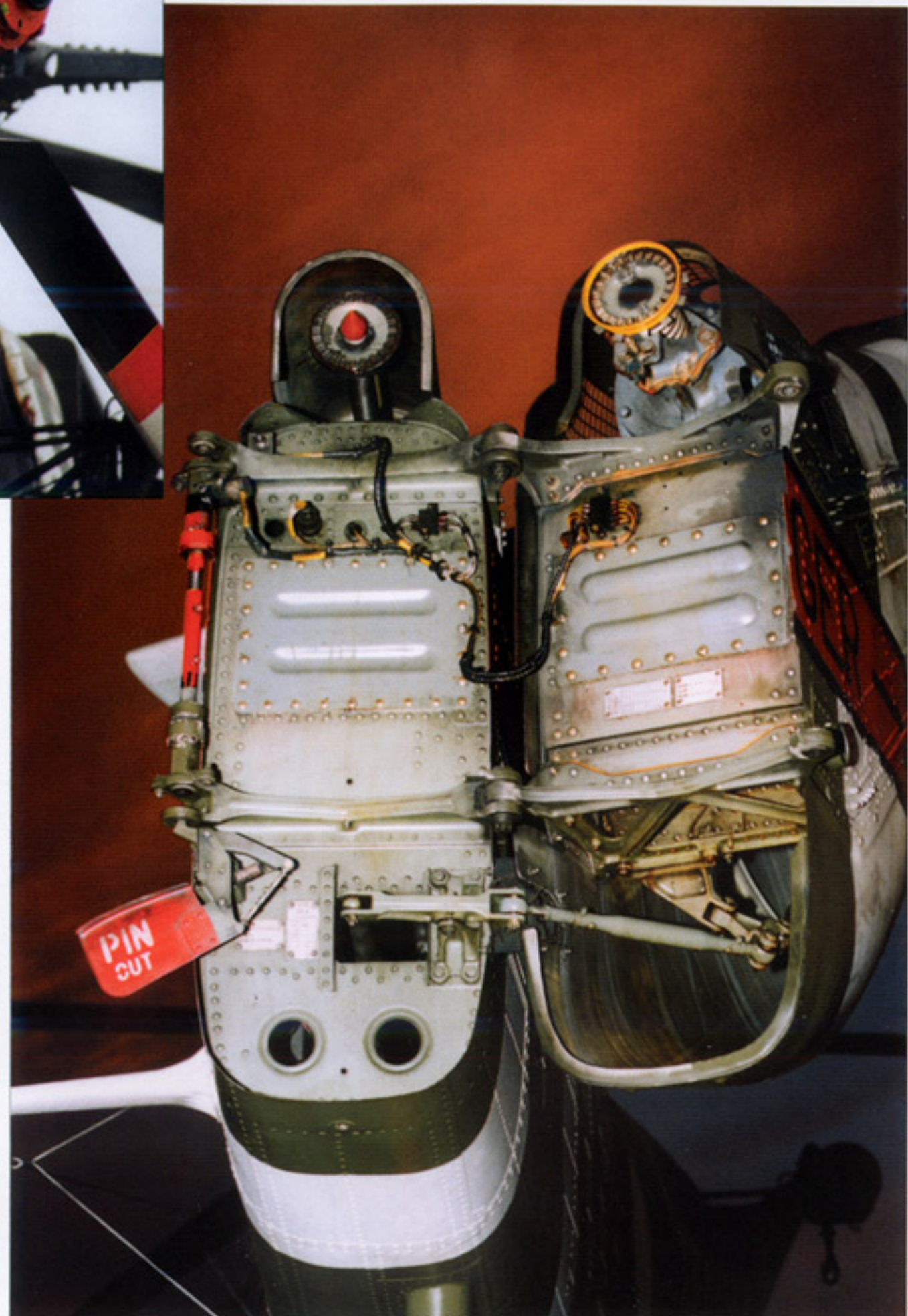


The helicopters were equipped by armoured seats and sophisticated avionics for operations over Bosnia. After being hit by infantry fire arms over Bosnia some next parts of the cargo cabin of the Sea Kings were additionally armoured. For increasing the proper defence ability of these helicopters door mounted heavy machine-guns of 12,7 mm calibre with RING gun-sights, compatible with NAG helmets, were mounted. High firing accuracy even under night condition was reached by this equipment. The Sea Kings HC.Mk.4 were or are used by the following squadrons: 845th (Bosnia), 846th (Falkland Islands), 848th (Persian Gulf). Two HC.Mk.4 machines were modified to HC.Mk.4X version and they are used for testing new types of helicopter avionics.

Tail Details



Top and bottom - details of the head of the anti-torque rotor, right - folding mechanism of the tail.



all photos on both pages by Josef Spurný



*Field maintenance just after landing, Bosnia.
Details of the locking device
of the folding tail.*



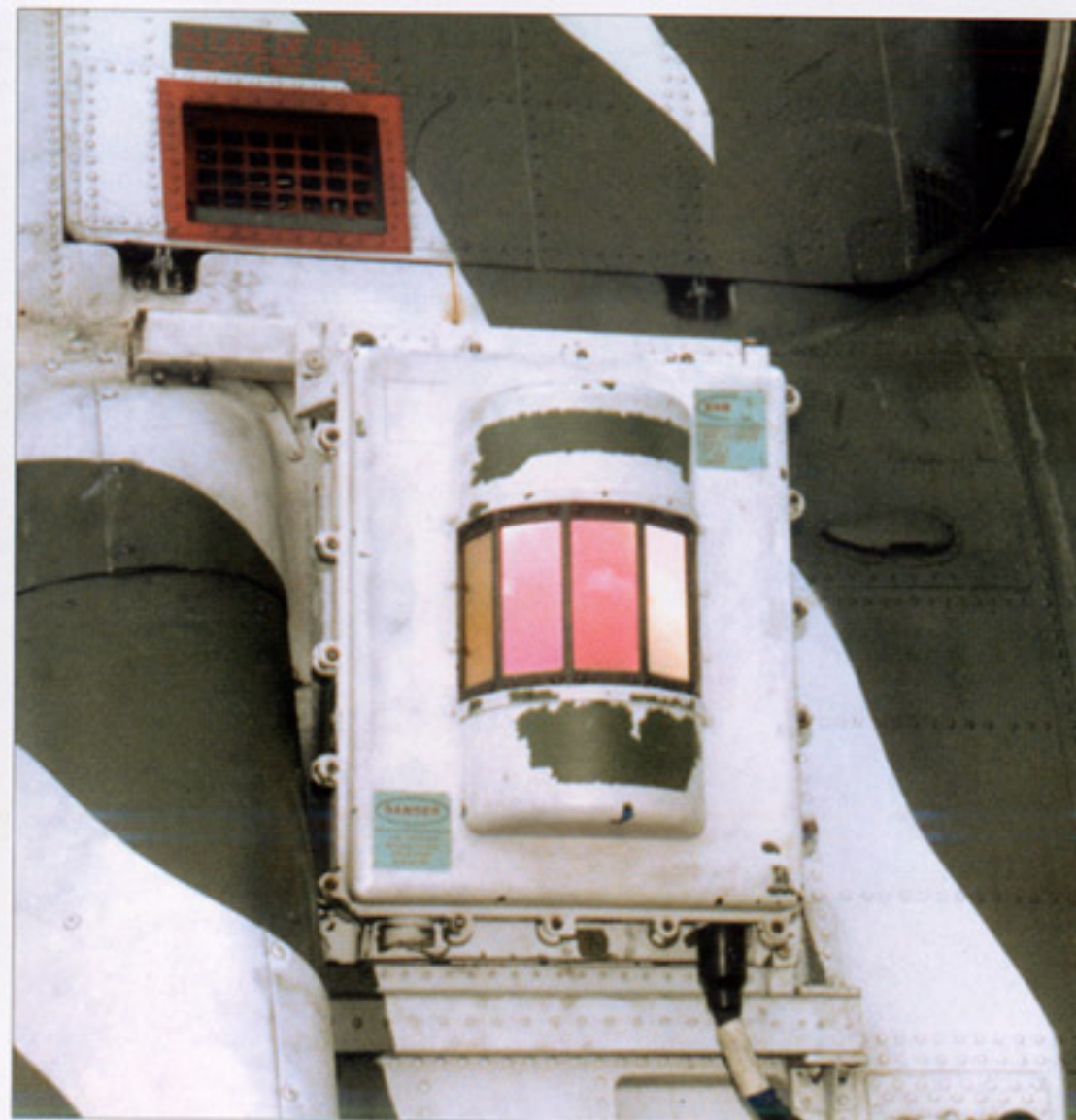
*Right - details of the gearing
and transmission shaft
of the anti-torque rotor.*



Exterior details



photo Josef Spurný



Right - domed window in the cargo compartment for better outlook, especially in below the machine.

Top right - the AN/ALQ 157 infrared jammer.

photo Josef Spurný



photo Josef Spurný

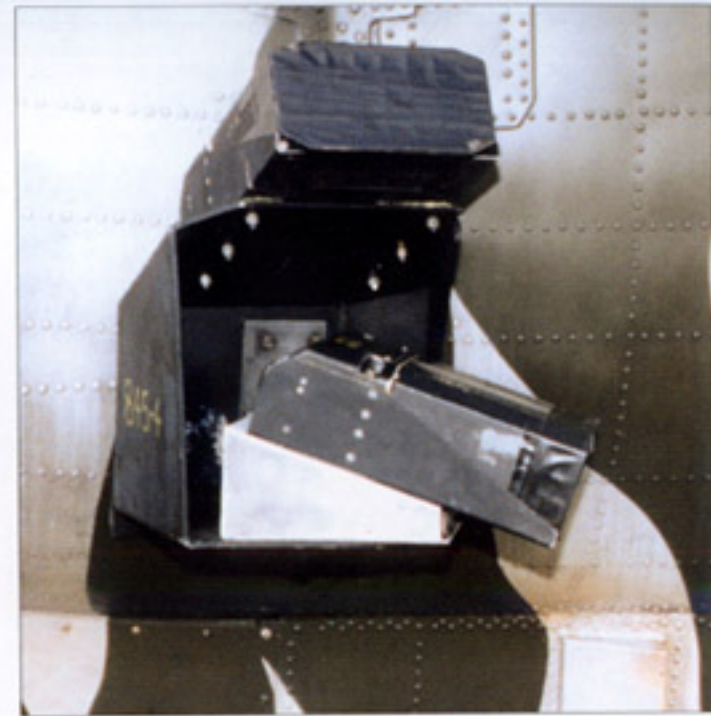
Left centre - turned light.



photo Josef Spurný



Left below - the AN/ALQ 157 infrared jammer, now on the left side of the machine. Unlike other smaller helicopter types, e.g. AH-1S or AH-64A, these jammers cover 180 degrees from one side of the fuselage each.

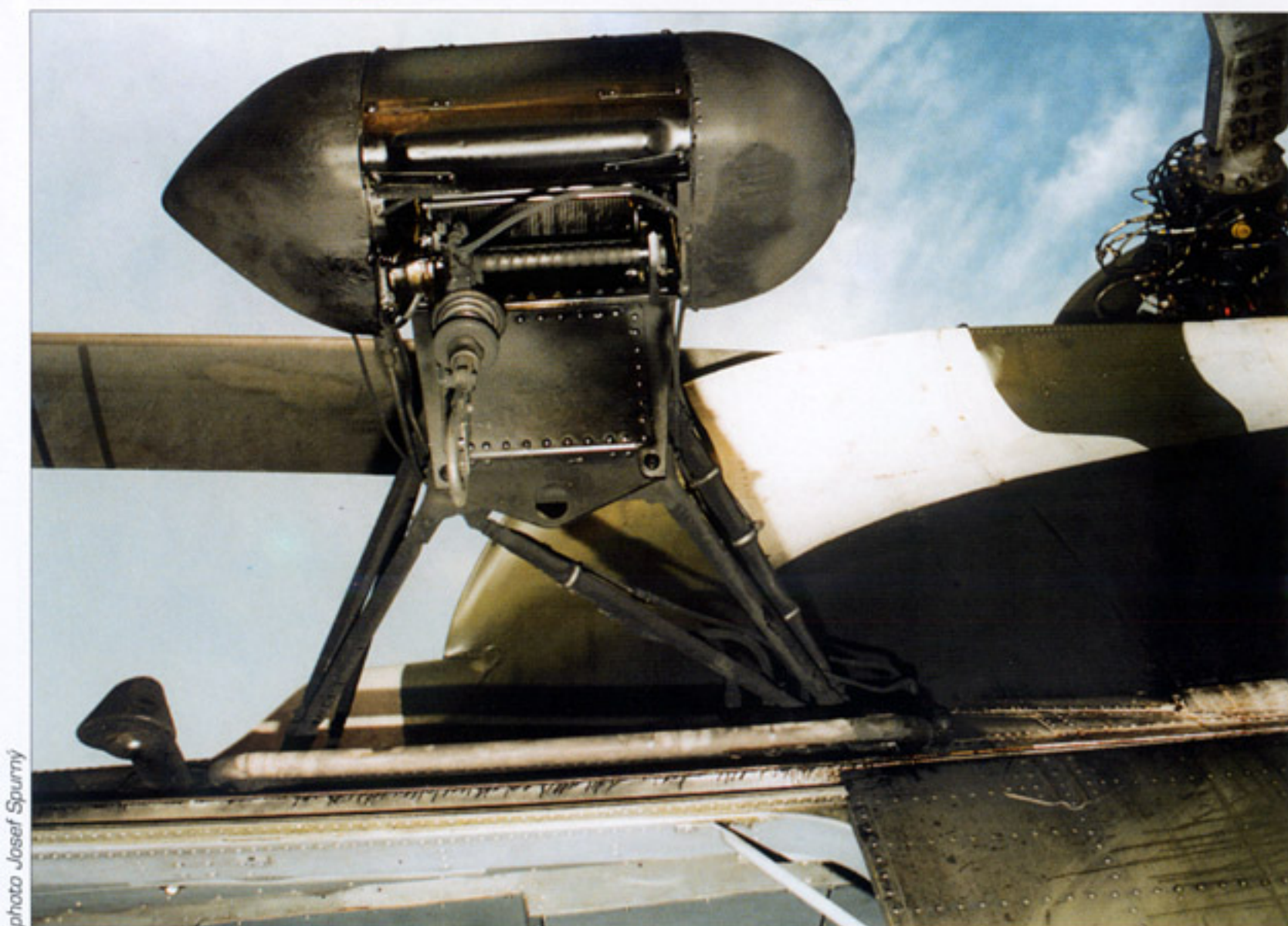


Top - there are two M 130 throwing devices for throwing deceptive targets above the tail wheel, note direction of throwing. Perceptible fairings of an emergency inflatable devices for ditching on auxiliary wings that bear the landing gear.





Troop Compartment Details





Sea King HC. Mk.4 for SFOR

Opposite page
top left - rescue stretcher
on the fuselage left side
in the cargo compartment.
Bottom left - look inside
a winch above the rear door.
Right - two different views
of the 7,62 mm calibre GPMG
machine guns location.



After finishing their IFOR
service the HC. Mk.4
machines were allocated also
to the SFOR units, here they
are before their departure
for Balkan.
Note that there are neither
infra jammers nor throwing
devices for throwing deceptive
targets.





On September 24, 1975, a contract for delivery of 15 Sea Kings in rescue version HAR.Mk.3 was closed. The aft bulkhead was shifted backward so that cargo cabin inner space could be increased. For fulfilling rescue task this version was equipped with a crane, it had increased fuel capacity and one „observer's“ domed window was added to both rear sides of the fuselage. Propulsion is provided, like of HAS.Mk.2 version, by two engines Gnome H1400-1, also the six-blade anti-torque rotor and navigation equipment are the same. Moreover a Pie Olympic VHF radio transceiver, for communication with police and special rescue teams, is available on board. The automatic control system Louis Newmark Mk.31 was replaced by an autostabilizing system Smiths Industries 212SUE/1. The first HAR.Mk.3 had taken off on September, 1977, and it was introduced into regular service with RAF in next February. The RAF Sea King Training Unit and the 202nd squadron were the first units supplied with this type. The sixteenth produced machine was originally ordered by the Empire Test Pilot's School in Boscombe Down, but finally was taken over by the 78th squadron. Next three HAR.Mk.3 machines were ordered in the year 1983 and, after their delivery in the year 1985, they were sent off to a separated flight of the 202nd Sqn. (later on the 1564th Flight and finally part of the 78th Sqn.) to Falkland Islands. Six machines used by the 78th Sqn. have supplementary avionics equipment, providing in addition to other functions pilots activity with NVG helmets for night vision. Precise navigation is enabled by the Navstar satellite navigation system - GPS. Automatic voice alerting device AVAD is also a part of equipment of this machine. This device warns the crew especially of dangerous flight regimes and situations. Proper passive protection of these helicopters is ensured by radar irradiation warning system ARI 18228. Six new Sea Kings termed as HAR.Mk.3A, that were determined as a substitution of the last Wessex machines, serving at the 22nd RAF Sqn., were ordered in February 1992. They differ from the older version in using the digital colour searching radar Thorn-EMI ARI 5955/2, automatic controlling system Smiths-Newmark SN 500, GPS Cossor STR 2000 and other modern avionics equipment.





Sea

Westland King Mk.48

Five Sea Kings MK.48 are incorporated into the 40th SAR Sqn. of the Belgian Air Force located in the nearby Koksijde. Operating in SAR services is their basic task and therefore they corresponds to the British model HAR.Mk.3. The Sea Kings were delivered to Koksijde in the year 1976. In the year 1980 the Belgian machines were provided with composite blades of the main rotor and later on their avionics was modernized. From the year 1995 all the five helicopters were „made younger“ in co-operation of Westland and SABCA companies. As a part of this modernization mounting the Bendix RDR 1500B weather radar, Racal RNS 252 inertial navigation system, GPS CMA 3012 navigation system and FLIR 2000F infrared system below the nose was provided.



photo Jan Martinec



This Mk.48 was taken down during the only visit on the helicopter air festival in Prostějov, Czech Republic, in September 1994.
 Preceding side bottom left - the machine after modernization mentioned in the main text on the page 40.





photo Lukasz Kedzierski



Sea King Mk.42

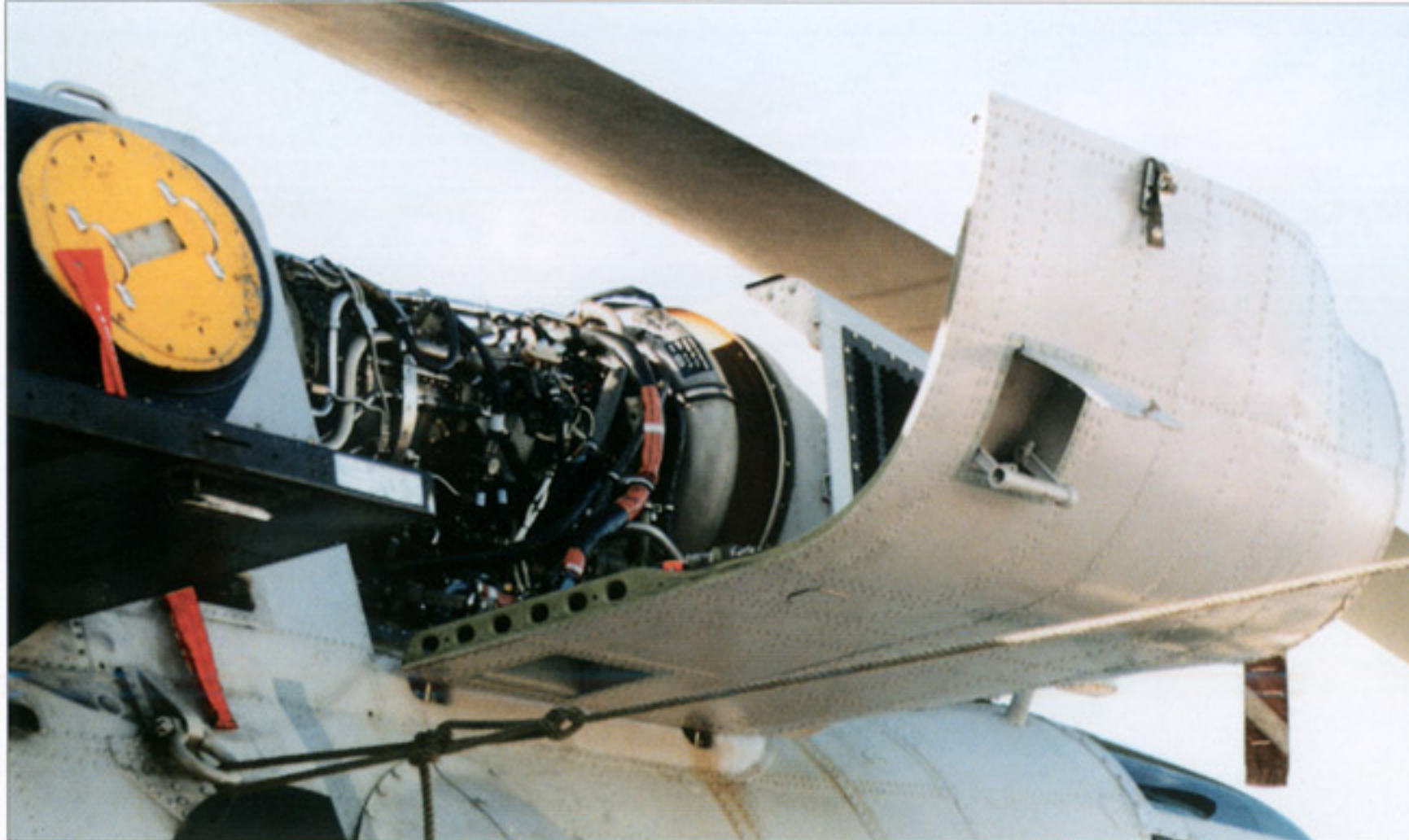
Australia ordered 10 Sea Kings in the year 1972. These were the first machines with reinforced transmission shafting system, that was able to transfer higher power of Gnome H1400-1 engines, and with the six-blade anti-torque rotor. Unlike the British HAS.Mk.1/2 machines, the Australian ones were equipped with an American sonar AN/ASQ-13A, that was more suitable for co-operation with Lockheed Orion anti-submarine aircraft. A system for refuelling during hovering over board was the next „American” speciality. The first Mk.50 had completed its test flights in July 1974 and the machines were delivered to Australia in the year 1976. They were incorporated into the reorganized HS-817 unit. Next two machines termed as Mk.50A were ordered in the year 1981 and they were delivered in the year 1983. They differ from the older machines only in the prolonged cabin. Today only seven Mk.50/52 machines, with replaced metal blades of the main rotor for the composite ones in the year 1990, remain in service at the Royal Australian Navy. All the other Sea Kings were discarded from anti-submarine operations, where they were replaced by more modern Sikorsky S-70B-2 helicopters, and they fulfil SAR, transportation and similar tasks.

Westland Sea King Mk.42

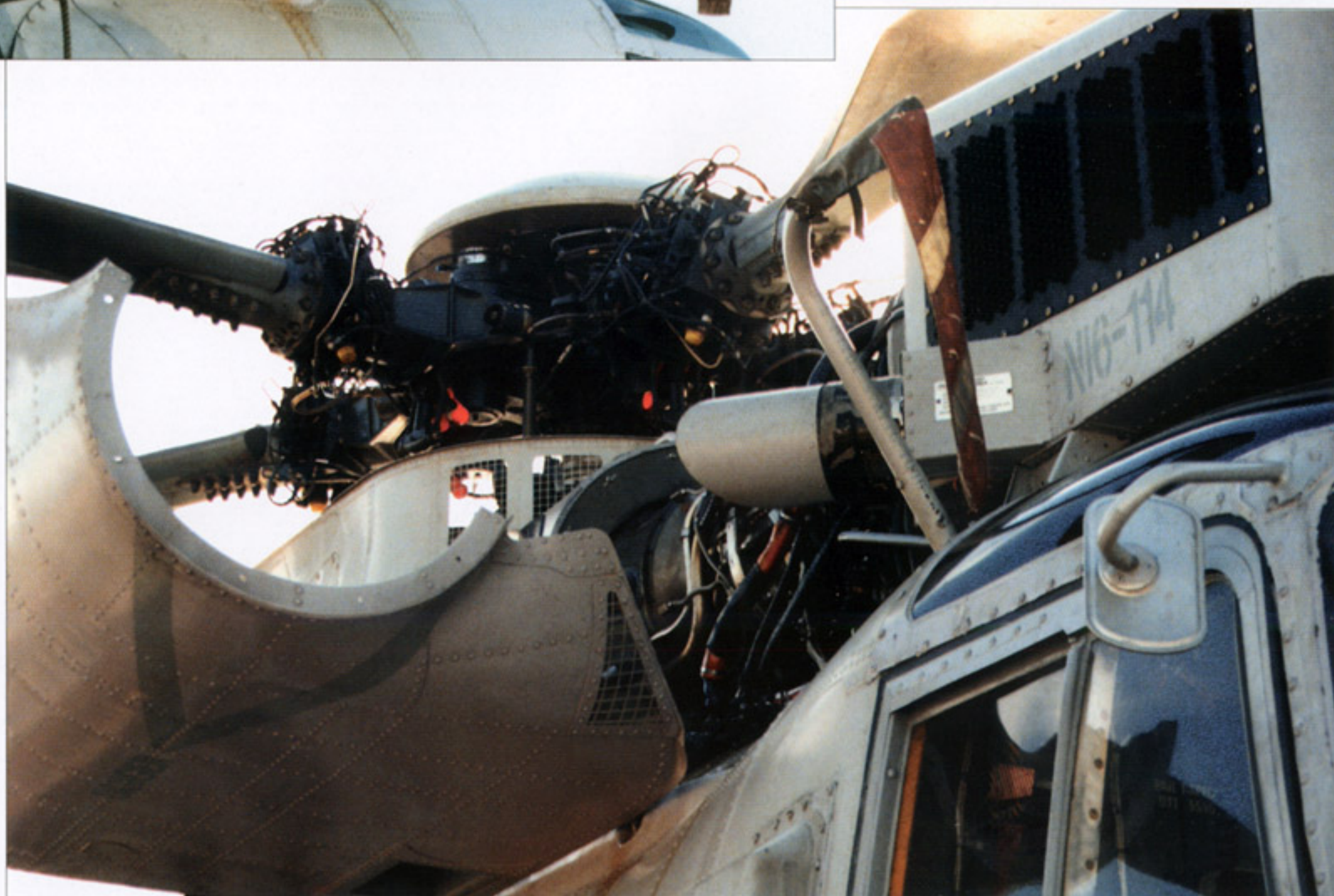


Opposite side top - the Mk.42 in an older colour finish, still without protective desk deflectors in front of engine inlets. Overall pictures of the machine with the number were taken down on the Pt. Cook base in Melbourne, in May 1998.

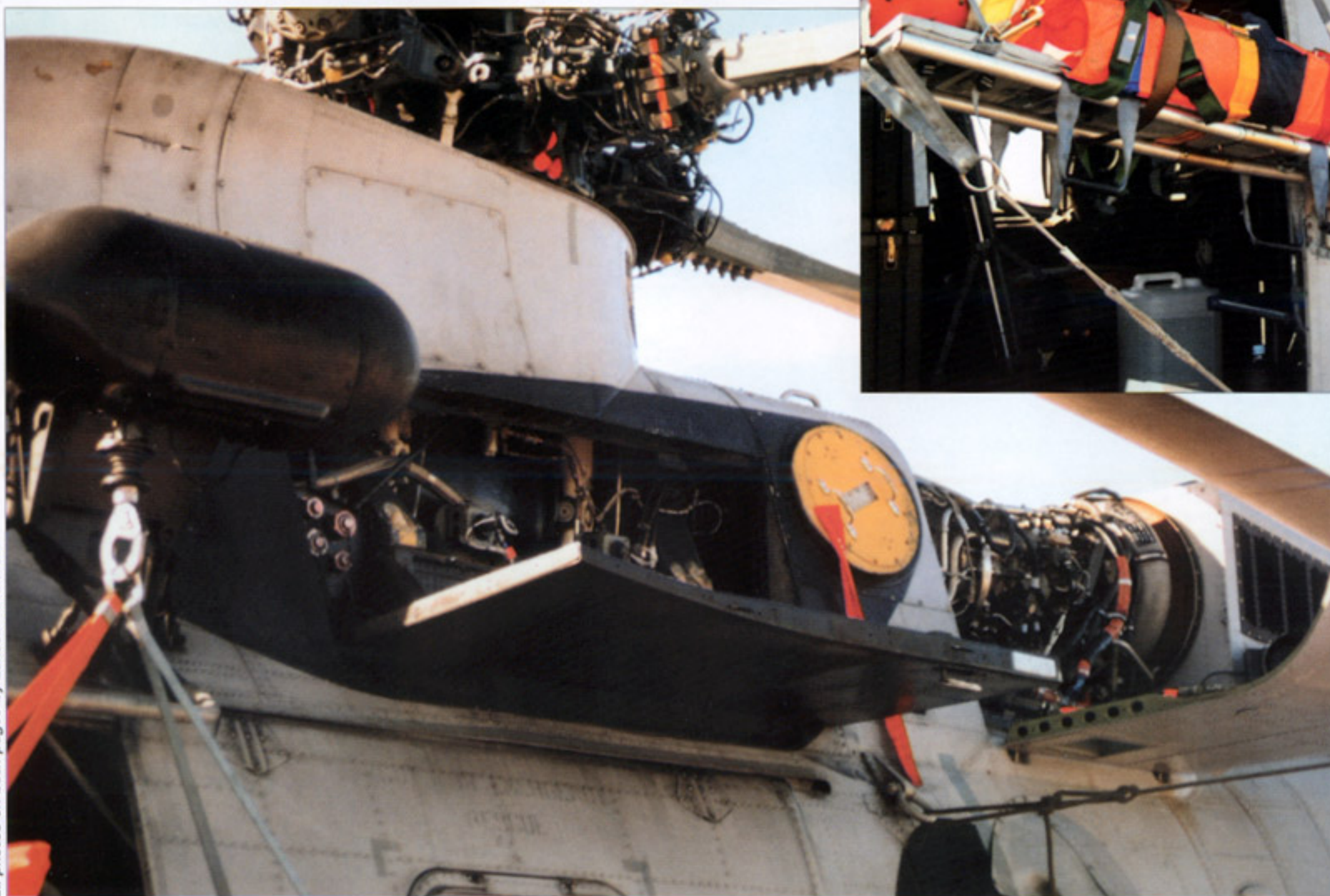




*Detail of a foot-hold below the threshold of the cargo compartment door.
Detail of the main rotor head and engine.*



The photographs on this two-page spread were taken down at the International Airshow Down Under 1999 in Avalon, Australia.



Top left - external wiring for throwing devices and launchers.

Bottom left - look to open engine and reduction gear unit fairings on the right side of the fuselage.

Right - demonstration of stretcher suspension on the winch.

Norway ordered 10 Sea Kings in the year 1970. They needed them for providing SAR services along the coast and in inaccessible mountain areas. The version termed as Mk.43 corresponds to the German Mk.41 machines, using more simple avionics is the only difference. All the ten Sea Kings were being delivered to Norway from November



1972 to October 1973 and they were incorporated into the armament of the 330th squadron, while operating from bases in Bodo, Banak, Orlando and Sole. In the year 1978 one machine, later on termed as Mk.43A, was ordered and delivered as a substitute for the lost machines. It differs from its older brothers in mounting the reinforced transmission shafting system and six-blade anti-torque rotor, the avionics remain the same. All the Norwegian machines were gradually modernized to the Mk.43B standard by the Westland company. Following are the characteristic distinctive marks: replacing the ARI.5995 radar by more modern MEL Sea Searcher radar, six-blade anti-torque rotor, Bendix/King weather radar in the radome on the left nose part and ball-shaped case of the FLIR 2000 infrared system below the weather radar radome. Norway completed its Sea King fleet up to the total number of 12 machines by one newly built Mk.43B produced in the year 1992 and next two in the year 1995.



The Westland company reached also significant export success with its licensed product. No doubt that India is one of the most important users of the British Sea Kings. This helicopter is noticeably spread in this country, 41 machines were delivered here. Even in the year 1969 India ordered the first six machines of the Mk.42 version. There were no significant differences from the HAS.Mk.1 standard, there were only more efficient cabin ventilation system and different avionics due to hot climate. The ARI.5995 radar remained as a part of armament. The first Indian Sea King completed its tests flights on October 14, 1970, and the Royal Indian Navy received its machines in the year 1971. The new machines, delivered to the INAS 330 unit, in no time took part in fights with neighbouring Pakistan. Next six Mk.42 machines were delivered in the years 1973/74 and they were introduced into the newly established unit - INAS 336.

Next delivery of three machines termed as Mk.42A was realized in the year 1980. They were equipped with Gnome H1400-1 engines, like the British equivalent HAS.Mk.2. Now they are incorporated in common with the seven remaining machines of the Mk.42 version into the armament of the INAS 330 in the Cochin base.

India became the first user of the new, highly modernized version termed as Advanced Sea King Mk.42B. Twelve machines, ordered in the year 1983, differ in mounting the Gnome H1400-IT engines, rated at 1 092 kW. These engines have better power output especially in higher temperatures and higher altitudes. Due to necessity of transmission of higher power the transmission shafting system was strengthened. The main rotor received all-composite blades and also the tail anti-torque five-blade rotor is a new one, with a power of 10% higher than the older six-blade one. The avionics equipment is almost the same as for the HAS.Mk.5 version. The MEL Sea Searcher radar is completed with an Alcatel HS-12 submersible sonar co-operating with the AQS 902 processor. Against surface crafts, there is a possibility to attach the Sea Eagle anti-craft missiles with the range of 110 kms. The first machine of this version made its first flight on May 17, 1985. After this the original order was extended by next eight machines. Delivery of the whole series of 20 machines was realized by sea in the years 1989/90 and the INAS 336 unit in Cochin became the home base for them. The Mk.42B machines, however, mostly operates from the Viraat and Vikrant carriers or from smaller frigates of the Godavri class, as the case may be.

A version termed as Mk.42C (sometimes incorrectly termed as Commando Mk.42C) was derived from the modernized Advanced Sea King especially for SAR service and fulfilling transportation tasks. Despite some smaller changes its avionics is similar to the British HAS.Mk.3 version, just only a Bendix weather radar was attached to the nose. Due to missing of the two domed windows on the rear part of the fuselage, it is not known whether the Mk.42C version has a lengthened cabin like the majority of rescue versions. The first Mk.42C had completed its test flights at the production plant on September 25, 1986, delivery of the six serial helicopters was realized also by sea in the years 1987/88, that means a little bit earlier than the Indian Navy received its Mk.42B machines. The „C“ machines are incorporated into the INAS 339 unit and they operates individually from boards of both Indian carriers, both on the eastern and western coasts.



In the year 1974 Saudi Arabia paid for six Sea Kings of Mk.47 version for Egypt. The machines corresponded to the British version HAS.Mk.2. Egypt received its Sea Kings in the year 1976. They are based in Alexandria and in addition to ASW missions they also fulfil SAR tasks.

Egypt also ordered five machines Commando Mk.1 (Sea King Mk.70). This version was a sort of a hybrid between the Sea King and Commando. It was

characterized with totally removed anti-submarine equipment, enlarged cabin with two more windows and greater fuel tanks like the Mk.41 version, but it still kept the undercarriage with floats, five-blade anti-torque rotor and folding blades of the main rotor. Egypt received its Commandos in the year 1974. The new Commando Mk.2 (Sea King Mk.72) was provided with new Gnome H1400-1 engines with anti-dust filters at air inlets and with the six-blade anti-torque rotor. There are no folding blades of the main rotor and next weight cut was received by simplifying the construction of the tail longeron, that is not tilting, and by mounting the fixed gear without floats (the undercarriage was provided only with emergency inflatable floats in cylindrical cases above the wheels). Due to the undercarriage adjustment there is a possibility of attaching various armaments like missiles AS.12, Exocet, Martel or Kormoran, rocket blocks, air bombs, cases with cannons or machine-guns and external fuel tanks as the case may be. It was possible to place seats for 26 soldiers into the cabin. These seats were inflatable ones, of a special construction, that decreases their weight and provided better deformation protection of transported persons in case of crash. Also their buoyancy has a significant importance in case of submersion. It is said that 26 seats lift submerged Commando by 1 360 kgs. The customers, however, mostly prefer classic seats of metal construction with fabric covering - up to 28 seats of this construction can be in the Commando, but in case of emergency it possible to transport up to 34 armed soldiers. The window, typical for enlarged cabin, remained only on the left side of the fuselage. The effort of the Westland company was topped by the order for 19 Commandos MK.2 for Egypt. The whole contract was again financed by Saudi Arabia. The two Commandos were in Mk.2B version for transportation of VIP passengers. These machines were provided with sound-proof cabin with 10 luxurious seats, small kitchen and indispensable WC. The first Mk.2 took off on January 16, 1975. The user received its machines within the interval of February 1975 and June 1976. Egypt is also the only user of the Commando version Mk.2E (Sea King Mk.73) determined for radio-electronic fighting. External changes are characterized by mounting several aerials

of Selenia/Elettronica IHS-6 radio-electronic system. It comprises of RGH-5 subsystem, that enables to locate and identify sources of electromagnetic radiation in a 1 - 18 GHz band, and TQN-2 jamming subsystem. It is able to compare received data with data stored in the memory and trace up to 50 targets in four bands at a time. The TQN-2 system enables automatic firing of deceptive dipoles for proper passive defence.



During fights with India in the year 1971, Pakistan quickly comprehended importance of anti-submarine helicopters and therefore they ordered six Sea Kings of MK.45 version the very next year. The first of them completed its test flights in August 1974, but Pakistan received its helicopters as late as within the interval of October 1975 and November 1977. The Mk.45 fully corresponds to the Indian Mk.42, later on five of them were adapted for attachment of two AM 39 Exocet anti-craft missiles. The Pakistani Sea Kings are in the armament of the 111th squadron in the Sharea Faisal base, but they operates also from boards of destroyers and frigates. They are often used for SAR tasks.

Westland Sea King Mk.41

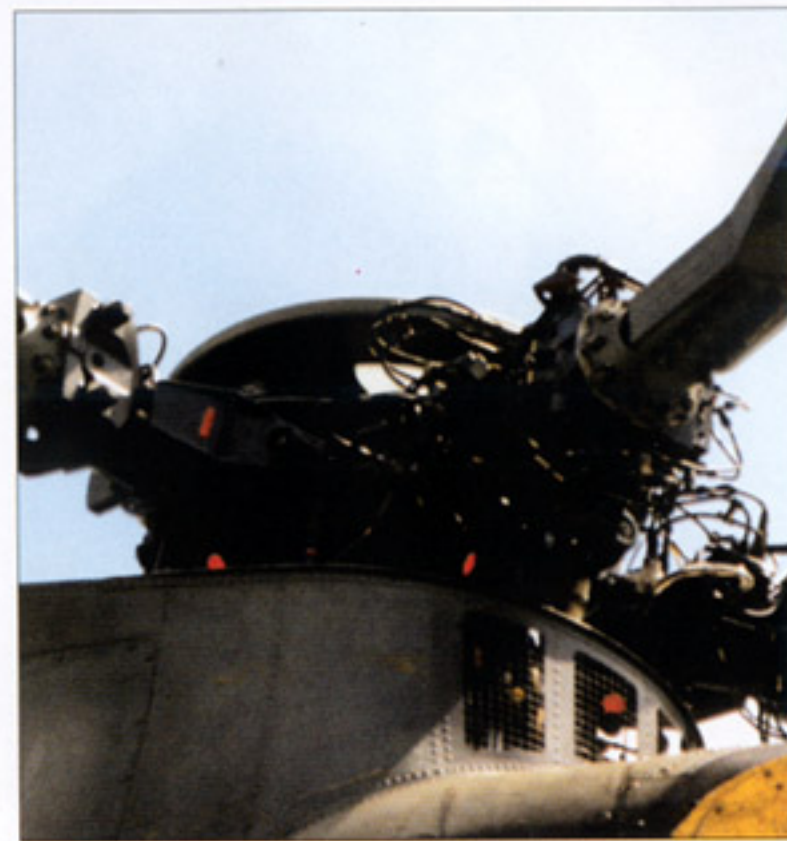


Right - MK.41 Marineflieger, the two ones in the midst are before modernization,

On the opposite page there are the Mk.41 machines armed with four Sea Skua anti-craft missiles.



down - already modernized one, differing at first glance in the nose radome.



German navy airforce - Marineflieger - became the second foreign customer of the Westland company. They ordered 22 Sea Kings for replacing their old amphibian Grumman Albatros aircraft serving for SAR tasks. The machines determined for the Federal Republic of Germany were termed as Mk.41 and they derived from the HAS.Mk.1 version. They became the first derivative determined just for fulfilling the SAR tasks. The anti-submarine equipment was missing, but the MEL ARI.5955 radar remained as a part of armament. By simple shifting of the cabin rear bulkhead the cabin was lengthened by 1,7 m without the necessity of lengthening the fuselage. One domed window was inserted to the both sides of the fuselage in its lengthened part. Next window was placed behind the strut bearing the left float. According to the customer's requirements heating of the cabin was improved, the machines were delivered with German avionics and Decca Mk.19 navigation system. Enlarged fuel tanks held 3 636 litres of fuel. The first MK.41 machine had taken off on March 6, 1972, delivery to the Marineflieger was being realized from April 1973 to September 1974. The remaining twenty helicopters were significantly modernized by the local MBB company in the year 1988. After creating a possibility to attach BAE Sea Skua anti-aircraft missiles the Sea Kings acquired ability to operate against surface targets. Missile homing was provided by the Ferranti Seaspray radar, with an aerial located in an atypically shaped housing on the left side of the nose. It is possible to attach up to 4 Sea Skua missiles to the racks. Passive defence is provided by the M 130 deceptive targets throwing device and the An/ALR-66 warning system. The avionics was modernized step by step.



Walk Around

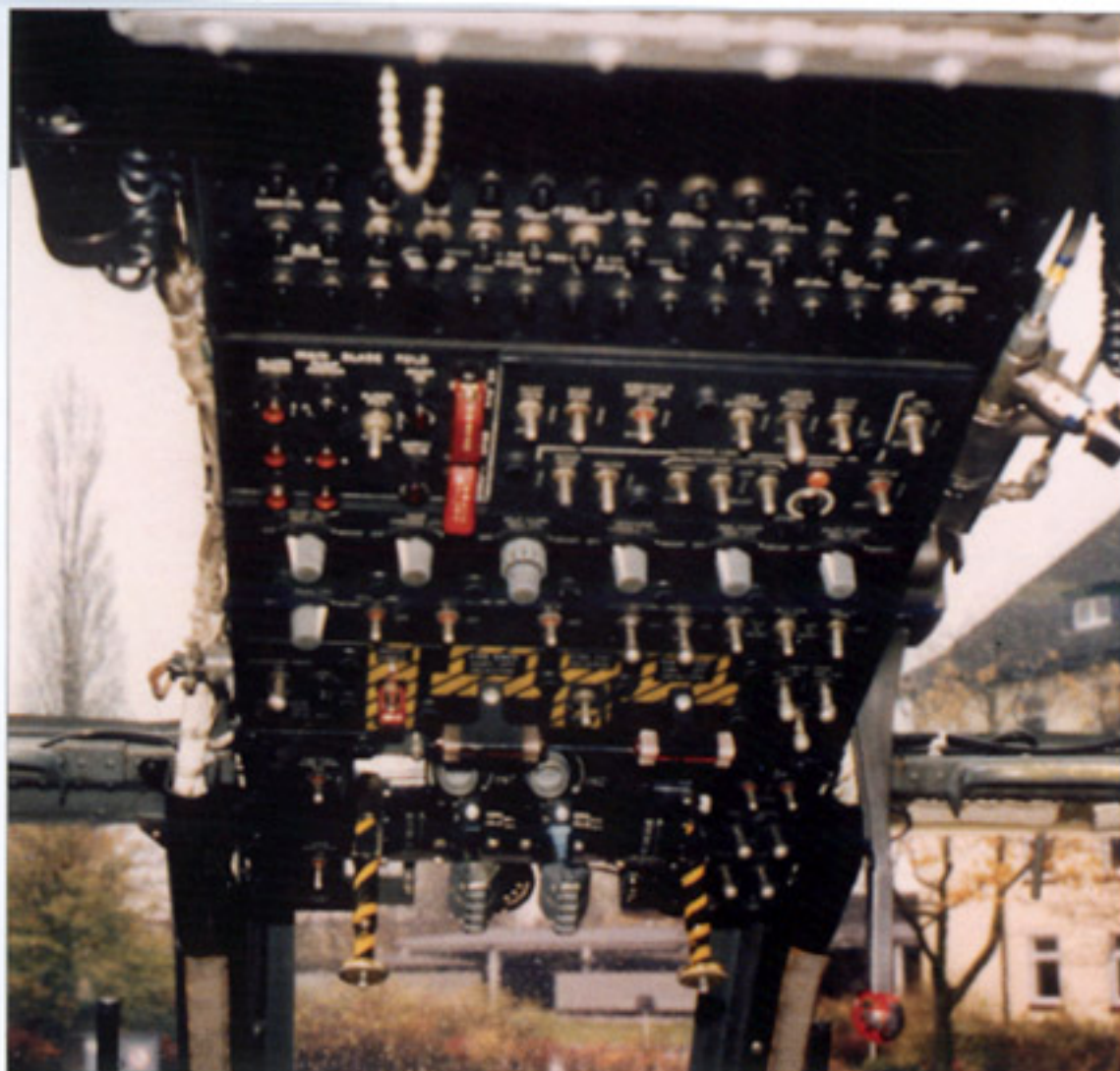


Details of exterior of the Mk.41.



photo M. Senft





Interior Details



Top left - overhead panel, right - details of the control column and instruments panel, bottom left - equipment located on the strut in the passage to the rear part.

photo M. Khal



photo M. Khol



**Mk.41
SAR**

*Detail of the place of work
of the weapon systems operator,
passage in the fuselage and details
of the Sea Skua rockets attachment.*



photo M. Serift

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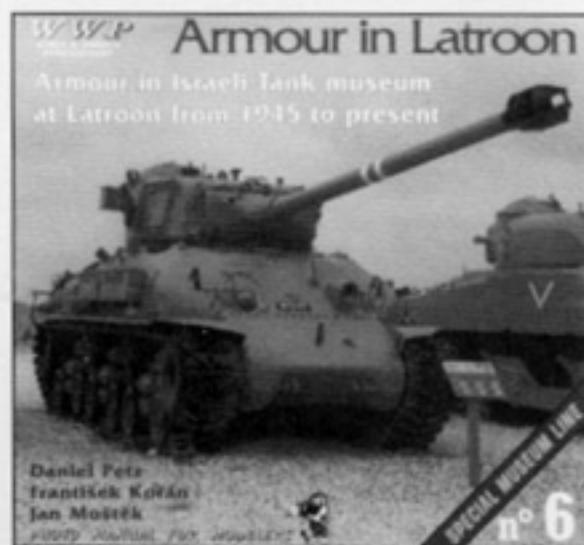




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