

ARCHIVED REPORT

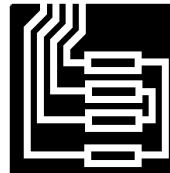
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Eurocopter Bo.105 Series - Archived 12/97

Outlook

- Spanish army in rotor blade upgrade; several armament mods on offer for scout/recon versions
- Little additional upgrade/modernization potential seen

Note: Icons indicate area(s) of current retrofit/modernization activity



Orientation

Description. Twin-engine, five-seat, single-rotor light helicopter.

Developer/Primary Manufacturer. Eurocopter SA, Paris, France, which resulted from a 1992 merger of Aerospatiale and Deutsche Aerospace/MBB helicopter operations. Production of the Bo.105 is centered at Donauworth, Germany, and at Eurocopter Canada facilities in Fort Erie, Ontario, Canada.

Licensed Production. PT Industri Pesawat Terbang Nusantara; Bandung, Indonesia.

Licensed Assembly. Construcciones Aeronauticas SA

(CASA); Madrid, Spain. Philippine Aerospace Development Corp; Manila, Philippines.

Current Status. In production.

Total Produced. Approximately 1,348 Bo.105 helicopters of all versions delivered through 1995.

Application. Light helicopter used in a variety of military and civil roles.

Price Range. Bo.105CBS, \$1.75-\$2.35 million; Bo.105LSA-3, \$1.94-\$2.575 million; both in 1996 US dollars.

Technical Data

Bo.105CB

Dimensions	Metric	US
Length		
inc main and tail rotors	11.86 m	38.9 ft
excluding rotors	8.56 m	28.08 ft
Height ^(a)	3.0 m	9.84 ft
Width over skis, unladen	2.53 m	8.3 ft
Main rotor diameter	9.84 m	32.28 ft
Weight		
Empty, basic version	1,256 kg	2,769 lb
Max gross weight	2,400 kg	5,291 lb

Performance(b)

Max cruise speed at S/L	270 km/hr	145 knots
Max operating altitude	5,182 m	16,997 ft
Ferry range ^(c)	1,000 km	540 nm

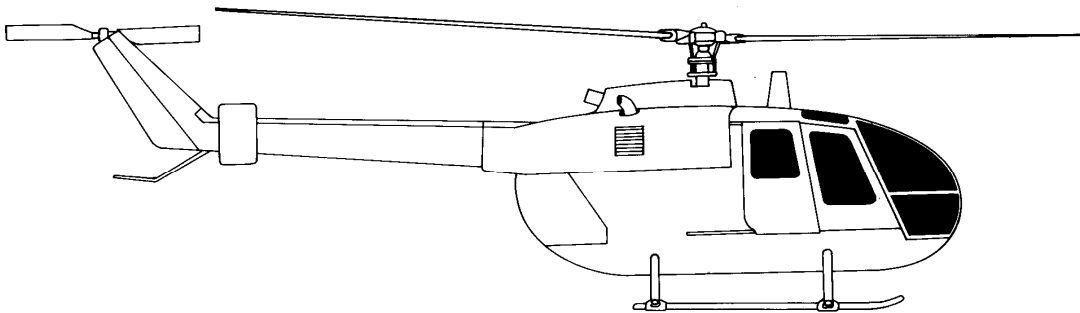
Propulsion

Bo.105CB/CBS/ PAH-1/VBH	(2)	Allison Model 250-C20B two-shaft free turbine turboshaft engines, 313 kW (420 shp) each at takeoff, 298 kW (400 shp) each max continuous.
Bo.105LS	(2)	Allison 250-C28C turboshaft engines, 373 kW (500 shp) each at takeoff, 368 kW (493 shp) each max continuous.

^(a)To top of main rotor head

^(b)At maximum gross weight (ISA)

^(c)With two long-range fuel tanks of 200 liters each at sea level



EUROCOPTER Bo.105

Source: Forecast International

Program Review

Background. The German firm of Bolkow (which merged into Messerschmitt-Bolkow-Blohm, and has since become Eurocopter Germany) initiated design studies of a light utility helicopter in 1962, under a West German government contract. Construction of three prototypes was started in 1964, and all had flown by December 1967. Two of these were powered by Allison 250-C18 engines, while the third used MAN-Turbo 6022s. There followed two pre-production aircraft which were completed in the spring of 1969, and West German and US certification (with the 250-C18) was obtained in October 1970 and March 1971, respectively. Deliveries of 100 VBH obser-

vation/liaison variants began for the West German Army in 1979, and deliveries of 212 PAH-1 antitank versions began in 1980. Deliveries of both versions were completed in 1984.

In late 1987, the West German Ministry of Defense awarded MBB a contract for a mid-life improvement program for the West German Army's PAH-1 anti-tank helicopters. This effort, an interim measure until the introduction of the Eurocopter PAH-2 in the late 1990s, was completed in 1994. Further planned modifications have been canceled due to post-unification budgetary constraints.

Variants

Bo.105CB. Standard production model since 1975. Seats five. Incorporates one forward-opening hinged and jettisonable door and one sliding door on each side of

cabin. A 1.3 cu m (45.9 cu ft) cargo area is accessible through two rear-loading clamshell doors.

In ambulance role, two standard stretchers can be accommodated side by side. Powered by 250-C20

engines. Rotor system is based on a rigid titanium hub with feathering hinges only, and four hingeless flexible glass fiber blades.

Bo.105CBS. Features increased seating or cargo capacity and 0.25-m (10-inch) longer fuselage. Available in five-seat or six-seat configurations.

Bo.105M. Also known as VBH. Used by German army liaison and light observation duties. Replaced Alouette IIs. A total of 100 units were ordered, and deliveries began in 1979. The 100th unit was delivered in mid-1984.

Bo.105P. Anti-tank variant, also known as PAH-1. Used by German army. West Germany authorized procurement

of 212 PAH-1 helicopters. Features a stabilized sight and outriggers that carry a total of six Euromissile HOT missiles. The first series production aircraft was ready for delivery on schedule in September 1979, but systems integration led to considerable delay, and the first production PAH-1 was not handed over until December 1980. The 212th unit was delivered in mid-1984.

Bo.105LS. Hot and high version. Currently produced in Canada by Eurocopter Canada Ltd. First flown in October 1981. Powered by 250-C28C turboshafts, each rated at 410 kilowatts (550 shp) for 2.5 minutes, and 373 kilowatts (500 shp) for five-minute takeoff.

Funding

Not applicable.

Milestones

	1962	Design initiated
Feb	1967	First flight of initial prototype
Oct	1970	West German certification obtained
	1979	Initial VBH deliveries
Dec	1980	Initial PAH-1 deliveries
Apr	1985	Bo.105LS certificated
Mid	1985	Canadian coproduction begun
	1990	Phase I of PAH-1 upgrade begun
Jan	1992	Phase II of PAH-1 upgrade canceled

Worldwide Distribution

(As of July 31, 1996)

<u>Region</u>	<u>Country</u>	<u>Total</u>	<u>Variant</u>	<u>Ave. Age (Yrs)</u>
<u>Africa</u>	Lesotho	1	Bo.105C	16
	Nigeria	4	Bo.105C	20
		20	Bo.105D	13
		4	Bo.105C	14
<u>Asia</u>	Brunei	6	Bo.105C	14
	Indonesia	41	NBo.105C	15 ^(a) ; inc. some in storage
	Philippines	14	Bo.105C	15
	Mexico	6	Bo.105	12
<u>Central America</u>		6	Bo.105CB	9
	Germany	96	Bo.105M	14
		203	Bo.105P	13
	Netherlands	27	Bo.105C	20
	Spain	71	Bo.105	12 ^(a)
	Sweden	20	Bo.105CB	9
		4	Bo.105CBS	8
<u>Middle East</u>	Bahrain	3	Bo.105	18
	Iraq	32	Bo.105C	8

	Jordan	2	Bo.105	9
	United Arab Emirates	6	Bo.105S	20
<u>South America</u>	Chile	19	Bo.105LS	8
	Colombia	6	Bo.105	8
	Peru	11	Bo.105C	12

^(a)estimated

Commercial/Government Operators

Approximately 560 commercial or government-operated Bo.105s are in service worldwide.

Opportunities

Eurocopter recently introduced a “Super Lifter” variant of the BO.105, designated CBS-5-EC, featuring a new main rotor blade system providing greater lift and a 220-pound payload increase. Hover ceiling and all-around performance are also improved; there has been no indication, however, that the upgrade will be offered as a retrofit to existing operators.

CASA is fitting new main rotor blades to the Spanish Army’s 105s serving in the anti-tank role and the Indonesian Navy’s 105s are receiving a French-designed maritime patrol electronics suite. For the most part, though, the retrofit potential of the BO.105 appears to have run its course.

AIRFRAME

Spanish Army Upgrade. At the beginning of 1995 it was announced that Construcciones Aeronauticas SA (CASA) of Spain would refit new main rotor blades and other, unspecified modifications, to 25 HOT-missile armed Bo.105s operated by the Spanish Army. That service operates approximately 70 Bo.105s, most of them license-built by CASA, but only those serving in the anti-tank role are to receive this upgrade.

Bo.105CBS Conversions. Two companies have offered upgrades of Bo.105CB models to the CBS configuration. This involves a 0.25-meter (10-inch) fuselage stretch for increased passenger and/or cargo capacity, plus an additional window aft of the rear door. Petroleum Helicopters has modified nearly 35 CBs, while Metro Aviation of Shreveport, LA, received an FAA Supplemental Type Certificate (STC) for these conversions in 1991.

We have seen no additional announcements of recent or planned conversions.

ELECTRONICS

AMOSCOS Upgrade. In 1994 IPTN of Indonesia signed a letter of intent to purchase the AMASCOS maritime patrol mission suite from Thomson-CSF of France; no subsequent award has been noted. The suite is to be

retrofitted to the Indonesian navy’s Bo.105s and to its fixed-wing NC-212 patrol aircraft.

AMOSCOS is to consist of the Ocean Master 100 radar, a CHLIO FLIR, and the Gemini nav system. Neither an estimated program cost nor a refit timetable has been announced.

OPHELIA. Eurocopter has flight tested the SFIM OPHELIA mast-mounted sight on the Bo.105. This system is designed for observation in the search and rescue, surveillance, and reconnaissance/combat roles. OPHELIA features a spherical turret housing a light infrared camera for thermal imagery, a television camera, and a laser rangefinder. It provides an unobstructed 360-degree view without extensive structural modifications to the helicopter. Modifications to the rotor head are minimal. In addition, no center of gravity problems are created. Installation of a sensor package with line-of-sight approximately 110.0 centimeters (43.3 inches) above the rotor plane permits observation from the helicopter while maintaining maximum cover. This provides a valuable advantage in anti-terrorist and other military engagements.

While Eurocopter tested OPHELIA with an eye towards application of the system on future helicopters, the Bo.105 serving as a platform testbed, it is possible that some operators may choose to install it on their Bo.105s. This system may be a candidate for aircraft for the Republic of Korea, should that country select the Bo.105 over Agusta’s A109 for a scout helicopter requirement.

ARMAMENT

Anti-Tank Missiles. Military operators may choose to fit their Bo.105 helicopters with the Emerson/Saab HELITOW airborne anti-tank missile system. This system allows conversion of helicopters from utility to anti-armor missions in 30 minutes. The system, with two missile launcher assemblies, weighs 146.0 kilograms (321.9 lb). With night vision, it weighs 159.0 kilograms (350.5 lb), and with missile thermal tracking, the weight is 168.0 kilograms (370.4 lb).

HELITOW uses digital technology. It consists of two major subsystems — a sight subsystem and a missile launch and guidance subsystem. The latter is composed of the missile command and launch unit, the control panel, the gunner's hand control, and two or four missile launcher assemblies (providing a configuration of four or eight TOW missiles, respectively).

The Swedish army's 20 Bo.105CBs are equipped with HELITOW. The Euromissile HOT 2 will provide the competition for future installations in non-German Army Bo.105s.

HBS 202. The Rheinmetall HBS 202 helicopter weapon system may be chosen by some military operators for their

Bo.105s. The system is designed to attack airborne or lightly armored ground targets. Its total weight in combat order is 346.0 kilograms (762.8 lb).

The HBS 202 is composed of: (1) the weapon mounting, which is attached under the aircraft's belly, and the weapon itself and its electro-hydraulic controls; (2) a 525-round container located in the cabin and connected to the gun by a flexible chute attached outside the cabin; and (3) a control panel. The weapon used in the system is a Rheinmetall Mk 20 Rh 202 automatic 20 mm x 139 NATO cannon. The gun is aimed by maneuvering the helicopter.

FI's Opportunity Outlook

Program	96	97	98	99	20	01	02	03	04	05	06	07	08	09	10
<u>AIRFRAME</u>															
Spanish Army Upgrade															
In Progress	+=====> 25 Bo.105 (Spain)														
Bo.105CBS Conversions															
Speculative	<=====> 10- 20 Bo.105CB (Int'l)														
Program	96	97	98	99	20	01	02	03	04	05	06	07	08	09	10
<u>ELECTRONICS</u>															
AMOSCOS Upgrade															
In Progress	+=====> 4 NBo.105C (Indonesia)														
OPHELIA															
Available	<=====> 25-50 Bo.105 (Int'l)														
Program	96	97	98	99	20	01	02	03	04	05	06	07	08	09	10
<u>ARMAMENT</u>															
Anti-Tank Missiles															
Speculative	<=====> 50+ Bo.105 (Int'l)														
HBS 202															
Speculative	<=====> 50+ Bo.105 (Int'l)														
Program	96	97	98	99	20	01	02	03	04	05	06	07	08	09	10