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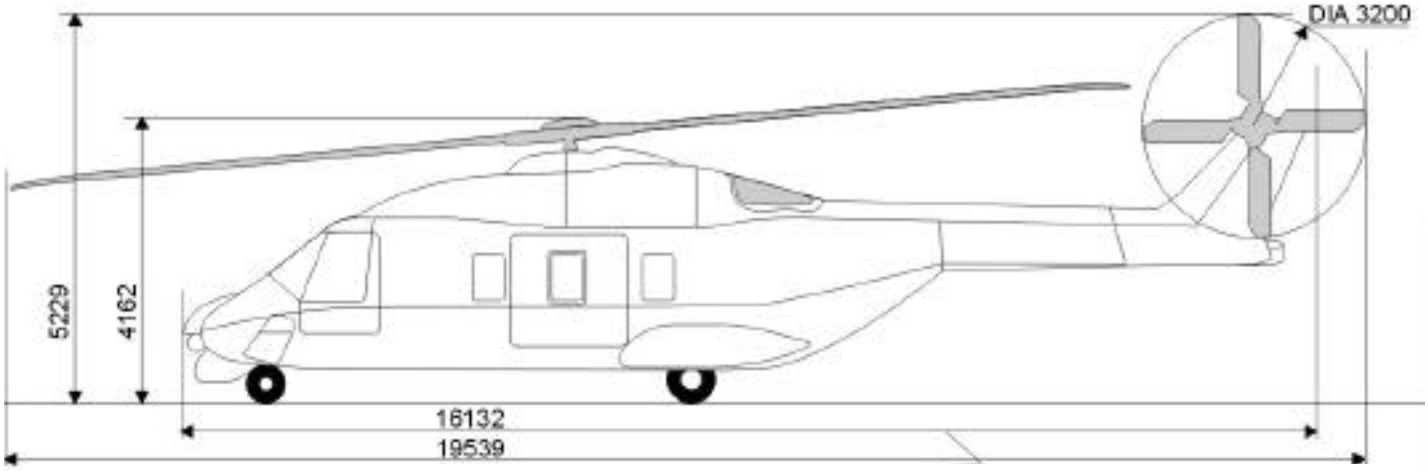
NH90, A SUCCESSFUL PROGRAMME

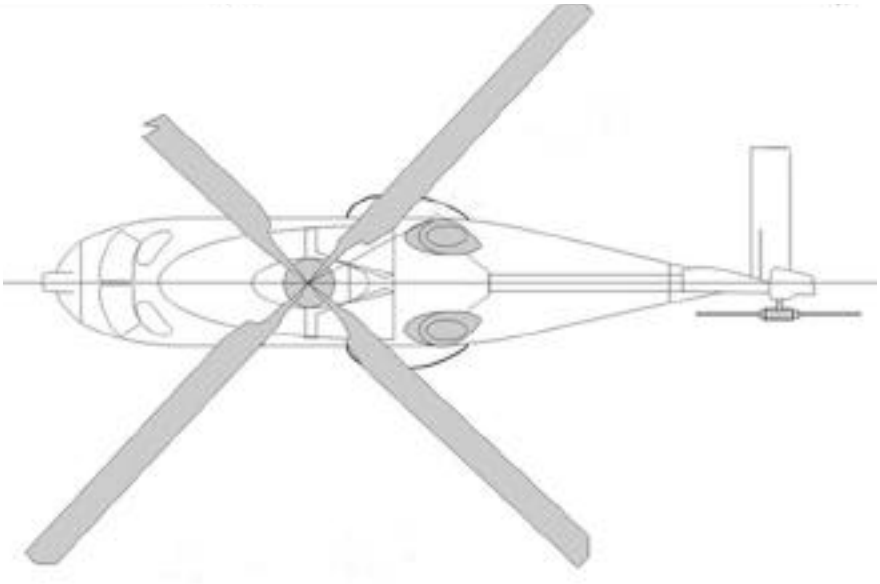
The NH90 is one of the best examples of what Europe can design, produce and export in the military helicopter field. The growing interest in this future-oriented aircraft is evidence of this success. In 1990, NATO issued a technical sheet for a multi-mission all-weather transport helicopter that would enter service by the end of the decade. To meet the challenge, four nations—France, Germany, Italy and the Netherlands—created a partnership the same year called NAHEMA, and signed an MoU expressing their common desire to design and produce such a helicopter. Later, Portugal also joined NAHEMA, on 21 June 2001. The various staffs involved in the project expressed the need for a new-generation helicopter, more powerful and versatile, and featuring cutting-edge electronic capabilities. With the creation, along with Agusta and Fokker, of the company NHIndustries in March 1992, Eurocopter was well prepared to meet NATO specifications as well as the needs of the four countries. Today, Eurocopter is the second biggest contributor to EADS' impressive results, after Airbus. In January 2006, this division of EADS announced a turnover of 3.2 billion euros, i.e. an increase of 15 per cent over 2004, while the order book totalled 3.5 billion euros, an increase of 8.8 per cent over 2004. Total orders reached 10 billion euros. When the NH90 was launched back in 1992, Eurocopter was already known for its significant expertise, notably in France and Germany, in areas such as composite materials, rotors and electric flight controls. The four NAHEMA nations financially involved in the programme committed the necessary funds to develop this unique helicopter, and in sharing the development costs made it possible to launch ambitious research programmes on sensitive and expensive technologies. Only a multinational European programme could take on such a challenge. Just three years later, on 18 December 1995, the NH90 carried out its maiden flight. And three years after that, NAHEMA decided to produce the first 151 units. The NH90 is a versatile aircraft, equipped with the most advanced sensors. It is the first helicopter fitted with electric flight controls and made with the latest composite materials. The NH90 features both radar and infrared stealth, thanks to its composite materials and integrated engines. Moreover, it is well protected by its all-composite crashworthy fuselage and low radar signature. The helicopter's all weather navigation and combat systems are capable of operating in any type of environment—maritime, arctic cold, tropical heat, etc.—and on all continents. It offers an excellent real-time interoperability in a digitised battlefield environment. The NH90's capabilities give Eurocopter a strong advantage over its competitors. Since its development, the NH90 has enjoyed many export successes, proof of excellence on the part of Eurocopter and its two partners, especially in Scandinavia, the Middle East, the South Pacific, Spain, and, more recently, Belgium. This success is also explained by the fact that Eurocopter opened the industrialisation process to customer countries. Scandinavian clients of the Nordic Standard Helicopter Programme (NSHP) are associated with the programme through Saab (Sweden) and Patria (Finland). Similarly, Australia will be in charge of assembling eight NH90s, and could further become a reference centre in the Pacific region—a prospect that recently triggered the interest of New Zealand, which decided to acquire eight to 10 aircraft.



A UNIQUE AND VERSATILE PLATFORM

A common platform in two main versions

The two versions of the NH90—NFH and TTH—share the same platform. The NH90 is equipped with the latest generation systems, both for its engines and its flight controls. It is designed in composite crashworthy fuselage with two large sliding doors (1.60 m X 1.50 m). The fuel tank is crash resistant as is the retractable landing gear. The main rotor is made of titanium with elastomeric bearings and four composite blades. In this configuration, the NH90 has a low radar signature.



The NH90 is the first series-built military helicopter with fly-by-wire flight controls. It has an integrated avionics system with a colour 8" X 8" multifunction display for flight mission systems and maintenance data presentation. In addition, it is fitted with an automatic monitoring and diagnostic system to maximise reliability and maintainability. It also has multiple redundancy for all vital systems and an advanced dynamics system with 30-min dry run time capability.

The NH90 is fitted with two Rolls Royce Turbomeca RTM322s (2,400 horsepower) or two GE Fiat Avo T700s (same power). These engines are connected to a FADEC electronic system, reducing tasks for the crew, who are free to concentrate on the mission. Besides, the NH90 will be qualified as single pilot in both VFR and IFR conditions. Its engines are equipped with an electrical emergency take-off system. They are highly reliable under adverse weather conditions and are integrated into the fuselage in order to improve stealth.

Performances

The rate of ascent of the NH90 is about 11 metres per second while its cruising speed is 290 km/h.

With a flying range higher than 700 km, a maximum speed of 325 km/h and a maximum altitude of 6,000 metres, the NH90 is a necessary tool for the complete range of military operations. Beyond transport, the NH90 carries out sensitive missions such as commando operations or Combat SAR. Its endurance exceeds five hours, a real asset for many missions such as, for example, anti-submarine warfare or sea rescue.

Main data

Main dimensions

Length, rotors turning: 19.56 m
Height, rotors turning: 5.23 m
Length fuselage maximum: 16.13 m
Width, overall: 4.52 m
Main rotor diameter: 16.30 m

Folded dimension

Lenght: 13.50 m
Height: 4.16 m
Width: 3.80 m

Weights

Maximum gross weight: 10,600 kg
Alternate gross weight: 11,000 kg
Cabin cargo capacity: > 2,500 kg
Cargo hook: 4,000 kg
Rescue hoist: 200 kg
External store: 400 kg (x 2)

Engine ratings

Maximum (30 minutes): 2,400 shp (x 2)
Maximum continuous: 2,230 shp (x 2)
OEI continuous (1 h): 2,417 shp
OEI maximum contingency (2.5 min): 2,622 shp
OEI emergency (30 s): 2,895 shp

Fuel capacity

7-cell internal system: 2,036 kg
External auxiliary fuel tank: 2 x 248 kg
Cabin ferry tank: 4 x400 kg

NH90 ASSETS

NH90 operational assets

The NH90 has been designed as a complete weapons system. Its specifications were defined by the NATO Industry Advisory Group in the 1980s. Hence, its weapons system meets the most advanced concepts of modern armies. This helicopter functions under the principle of redundancy of the navigation and sensors systems: if one stops working, the integrated test system immediately detects the problem and triggers another system, which then takes over. The design of this integrated system is one of the greatest developments among weapon and navigation systems equipping the latest-generation helicopters. To manage the various mission functions (radio, navigation, equipment...), NHIndustries designed an enhanced interface: the Display Keyboard Unit associated with multi-function displays. The armed forces (French, Italian, German and Dutch) teamed up to define the ergonomics of the cockpit, resulting in the most advanced man-machine interface. With this system, the NH90's crew can efficiently concentrate on the mission rather than on the functioning of the sensors.

The NH90 is capable of flying very close to the combat zone, by day and night under adverse weather conditions in any environment. The integrated display helmet worn by the crew displays all the important flight parameters as well as information from the thermal camera. Moreover, the crew can rely on a geographic map generator as well as an obstacle warning system. The NH90 has a complete set of passive and active protection measures against threats. All this equipment contributes to the success of missions, by helping the crew, which can spend more time on the mission itself. Another asset of the NH90: situated in the 10- to 11-tonne category, it is well adapted to the needs of armies, which generally prefer having a large fleet of mid-weight helicopters than fewer heavy ones. The former offers more flexibility.

Reduced maintenance costs

The NH90 is a low-cost maintenance helicopter. Compared to its competitor, it offers an attractive return on investment. Equipment costs have been reduced, thanks to the use of CATIA software to study assembly or disassembly of equipment, made easier and carried out by simple manoeuvres with common tools. Servicing duration has been decreased. On average, 2.5 hours are necessary for each flight hour. Integrated test systems used by the crew give an automatic and quick overview of the state of each part and equipment of the helicopter, and thus a faster detection of problems. If difficulties arise with an equipment during flight, the diagnostic system combined with the multiple redundancy of all vital systems carries out an automatic reconfiguration of the helicopter, without any intervention on the part of the crew.

Industrial share

The production of the NH90 is an industrial programme of reference for Europe. First, five E.U. countries, members of NAHEMA, have chosen the same helicopter. These five nations agreed to share the manufacturing work as well as the final assembly. Finland is also participating in the assembly. NHIndutries thus demonstrates its ability to coordinate an undertaking divided among many industries—Marignane (France), Vergiate (Italy), Donauworth (Germany) and Halli (Finland)—managing the industrialisation of a multinational programme.

The forward and the middle parts of the fuselage are built in Germany while Agusta Westland is manufacturing the rear, and the tail pylon is made by Fokker. All these elements are then assembled on a production line, fitted with electric equipment, hydraulic systems, flight controls… After that the cells are tested and finalised for delivery. Finally, the assembly lines must be able to integrate the specific types of equipment to the various versions. Already, all assembly lines are intensifying the rate of production in order to deliver to the 11 nations on time.

NH90 A JOINT FORCES TOOL

► Versions of the NSHP

Sweden, Finland and Norway have ordered the NH90 in different versions—derived from the TTH and NFH—as part of the "Nordic Standard Helicopter Programme" (NSHP). Developed on the TTH, the version to be delivered to Sweden will have a bigger central cabin (1.82 m high instead of 1.58 m on the TTH and NFH versions). A new computer will be developed by Saab that will make it possible to carry out missions of the TTH and NFH at the same time. The five Swedish NH90s in ASW version will be equipped with a specific sonar to operate in shallow water in the Baltic Sea. A defroster system and skis, already integrated on the NH90, will allow the helicopter to operate in the Nordic environment. Finland has ordered 20 TTTs. Sweden has ordered 18 NH90s (10 TTTs, 3 SARs and 5 ASWs) and seven in option. Finally, Norway has ordered 14 NH90s, whose design is based on the NHF. Eight will be in Coast Guard version and six in ASW. Those 14 NH90s will all be fitted with digital map generators, nationalised avionics, dual rescue winches, survival rafts and additional fuel tanks. The Norwegian order also includes an option for 10 additional NH90 SARs destined for the Ministry of Justice. Choice of the NH90, within the NSHP programme, is also a demonstration of the helicopter's ability to operate in polar conditions.

NH90: a versatile helicopter for naval missions

The naval version of the NH90, the NFH, will be capable of carrying out anti-ship and anti-submarine missions, operating alone or in collaboration with combat ships. It will also ensure logistic support for naval forces. Its crew will be made up of three men: a pilot, a tactical operator and a sensors operator. This is thanks to the enhanced handling qualities of the helicopter and the reduced workload by maximum integration of the flight control system, basic and mission avionics. The latter includes advanced mission flight aids and a high performance auto pilot. Operationally, the NFH will be used for the detection, classification, identification by type, tracking and attack of submarines or surface targets, including over the horizon targeting by day and night. It will be equipped with sonobuoys or dipping sonars, a tactical radar, magnetic anomaly detectors, a tactical forward looking, infrared electronic warfare system and anti-submarine and/or anti-surface weapons. It will be capable of implementing weapons such as MBDA's Marte Mk2 and Mu-90 torpedoes. It is also fitted with an ENR surveillance radar jointly produced by EADS, Thales and Fiar. The NFH is designed for day and night, adverse weather operations in severe ship motion environments. Thanks to its contained weight and dimensions, and particularly to the automatic blade and tail folding system, it can operate from small frigates. Two versions of the NFH will enter in service with the French navy: support version and combat version (sonar, data link, missiles and torpedoes).

NH90 TTH well adapted to all land operations

The TTH version is primarily designed for tactical transport of personnel (20 troops) and materials (more than 2,500 kg of cargo), heli-borne operations and SAR. Additional applications include medevac, special operations, electronic warfare, airborne command post, parachuting, VIP transport and flight training. This version is optimised for a low signature (acoustic, radar, infrared). It will be equipped with a night vision system and night vision goggles, helmet-mounted sight & display. Other features include weather radar, digital map, obstacle warning system, passive and active measures against threats, IFF (Identification, Friend or Foe), etc. As an option, the TTH can be equipped with a rear-loading ramp to accommodate a light transport vehicle. The TTH is designed for high manoeuvrability and survivability.

AN INTERNATIONAL PROGRAMME

NAHEMA's orders

On 30 June 2000, NAHEMA and NHIndustries signed the industrialisation and first batch production contract for 298 NH90s, among which 55 in option. On 21 June 2001, Portugal signed an MoU for admission as fifth participating nation in NAHEMA, including the purchase of 10 NH90s. As NAHEMA is planning to order a total of 605 helicopters (following the agreement signed in Berlin on 8 June 2000 regarding the production phase), firm orders reached 297 additional NH90s: 133 TTHs for the French army, 47 TTHs and 38 NFHs for Germany and 79 TTHs for Italy.

► NAHEMA's NH90 order backlog: 253 (plus 55 options)

French navy: 27 NFH
Italian army: 60 TTH
Italian navy: 46 NFH
Italian navy: 10 TTH
Italian air force: 1 TTH in option
German army: 50 TTH + 30 TTH in option
German air force: 30 TTH + 24 TTH in option
Dutch navy: 20 NFH
Portuguese army: 10 TTH

Other orders worldwide

Between September and November 2001 Sweden, Finland and Norway signed separate purchase contracts for 52 NH90s (including 17 in option) as part of the NSHP programme. On 29 August 2003, Greece signed a purchase contract for 16 NH90s and four in special operation version (14 in option). On 24 July 2003, Oman confirmed the acquisition of 20 NH90s (multi-role version), and on 31 August, the Australian defence minister announced the purchase of 12 helicopters. In 2005, New Zealand announced its intention to acquire eight to 10 NH90s, and Spain 45. Finally, Belgium said it would like to acquire 10 helicopters. In 2006, the NH90 has 357 firm orders, 122 in option and 63 intentions.

Flight test schedule

The maiden flight of the first NH90 TTHs to equip the German army took place on 4 May 2004. The first TTH of the Italian army as well as the first Finnish TTT carried out their maiden flights on 15 September 2004. The first NH90s fitted with a taller cabin, destined for Sweden, carried out its first flight on 18 March 2005. The first Greek aircraft made its maiden flight on 13 July 2005, and the same day, the second Finnish NH took off from Patria, in Halli, where it was assembled. By mid-October, the second Italian NH90, and later the second taller cabin version, carried out their first flights. Finally, on 15 December 2005, the first naval version (first NFH) took off. In 2005, the NH90 had already successfully passed operational qualification phases. From 17 to 30 September, the NH90 PT4 flew an operational evaluation with Gamstat, Airmobile group of the French army engineering branch. The main goals achieved were implementation of the mission's operational environment and night vision systems plus crew work sharing assessment. In the meantime, from 13 September to 5 October, the full Fly-by-Wire (FBW) NH90 PT3 successfully performed high altitude performance tests in Ecuador as part of the NH90 qualification file.

► Programme at a glance

The armed forces of four nations (France, Italy, Germany and the Netherlands) have a need for an innovative naval/tactical transport helicopter. The concept of the NH90 programme originates from the studies conducted by NATO Industrial Advisory Group "NIAG SG14." The four nations signed an MoU in December 1990 for the full development. In 1992, the four governments formed the international programme office NAHEMA (NATO Helicopter Management Agency). Agusta, Eurocopter and Fokker signed an inter-company agreement in March 1992 and established a joint venture, NHIndustries, to ensure the industrial programme management. NHIndustries is the prime contractor for design and development, industrialisation, production and logistic support of the NH90. NHIndustries is also responsible for marketing and sales. NAHEMA and NHI, both located in Aix en Provence (France), signed the NH90 design and development contract on 1 September 1992. The governments of France, Italy, Germany and the Netherlands gave their go-ahead for the production launch on 8 June 2000, during the ILA 2000 air show in Berlin, with a total order reaching 605 NH90s.

► Assembly lines

Four assembly lines are in full swing: two at Eurocopter (Marignane and Donauworth), one at Agusta Westland (Vergiate, near Milan, Italy) and one at Patria Finavitec (Halli, Finland). The Italian line will soon be in charge of the Italian, Norwegian and Dutch aircraft. The German location will produce TTHs to be used by the German and Portuguese armies. Finally, the Halli factory in Finland will carry out assembly of the NSHP programmes.

CONTRACTS AND EXPORT PROSPECTS

► Oman contract

On 24 July, Oman's Defence Ministry signed a contract concerning the acquisition of 20 NH90s. With the increased power of its engines, the NH90 will be capable of flying in the extreme conditions encountered in the Middle East. The contract also calls for customer support at several of the customer's bases and mission planning stations, as well as training for instructor pilots and technicians. The first NH90s will progressively enter service in Oman beginning in 2008.

► In Spain

On 20 May 2005 the Spanish government selected the NH90 helicopter for the modernisation of its armed forces: Spain will purchase a first batch of 45 NH90s. Eurocopter opened a new facility in Albacete in 2005, for the assembly of the Tiger HAD combat helicopter, to be delivered to the Spanish army. Henceforth these existing Eurocopter facilities (Getafe and Albacete), could be entrusted with an important industrial role in the aircraft's assembly.

► ... and Belgium

Following the proposition of the Belgian Ministry of Defence, council minister André Flahaut authorised on 9 December the launch of the acquisition process for 10 NH90 multi-role helicopters by joining the International Programme Organisation NAHEMO. The helicopters will have to provide the Belgian armed forces with comprehensive search and rescue (SAR), maritime and transport capabilities. They will also replace the ageing Sea Kings and Alouette 3s, based at Coxyde air base. Belgium is the 14th nation to have chosen the NH90.

NH90 in Australia...

On 31 August, Australia announced that the NH90 would be the only helicopter chosen for the country's AIR9000 programme. The army's wide range of needs has been perfectly met by the unique characteristics of the NH90; its ability to fly in sea conditions and its large cabin, which can hold up to 18 commandos in complete safety, were decisive factors. This contract is a major European success. On 2 June 2005, Australia signed the acquisition contract for 12 NH90 helicopters. The contract was signed in Canberra between the Australian Defence Materiel Organisation and Australian Aerospace, a local fully owned subsidiary of Eurocopter. According to the Australian AIR9000 programme, the 12 NH90s ordered are identified under the designation "MRH90," which stands for "Multi Role Helicopter." In addition, the offer made by Australian Aerospace, Eurocopter's Australian subsidiary, included a chapter entitled Local Industrial Cooperation. The contract will make it possible to inject more than AUD 300 million into the Australian industry, making full use of its expertise and local capabilities. Eurocopter offered to select Australian Aerospace as the prime contractor for the AIR9000 programme. Australian Aerospace will ensure the assembly, maintenance, both technical and logistical support, as well as the training of pilots and ground technicians of the Australian Defence Force's MRH90s. One of the goals of the AIR9000 programme is to develop the Australian industry based on specific strategies so that it becomes more independent. Once the first four MRHs are delivered, the Australians will assemble the first unit in Brisbane in December 2007. The fully equipped helicopter will then be delivered by September 2008. The MRH90 is aimed at fulfilling forces deployment in overseas operations, especially for special forces or as part of the fight against terrorism.

…and in New Zealand

In 2003, the New Zealand government issued a request for information (RFI), in order to plan the replacement of the ageing 16 Bell UH1 fleet, currently in service in the air force. On 31 March 2005, Wellington selected the NH90. The versatility of the NH90 was likely the major advantage of NHIndustries' aircraft, as the future New Zealand helicopter will have to carry out highly diversified missions. From troop deployment, SAR missions, EVASAN, the fight against terrorism, humanitarian missions... This acquisition project concerns between 8 and 10 NH90s. The first two helicopters will be ready to enter service within the RNZAF by 2009, while Australian Aerospace's facilities could be chosen for maintenance.

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