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**EUROPEAN PROGRAMS FOR MILITARY HELICOPTERS CREATION  
AT THE END OF THE 20th – THE BEGINNING OF THE 21st CENTURIES  
AND THEIR ROLE IN RENEWAL OF ARMY AVIATION**

**Abstract.** *The purpose of the research* is to analyze the international European programs fulfillment for new military helicopters creation, starting from the 80s of the 20th century. Additionally, importance of these programs for army aviation re-equipment of leading NATO countries as Germany, France, Italy and Spain, has been also defined. **The methodology of the research** was meant to utilize a chain of general scientific and special historical principles. There is analysis and synthesis that should be brought to attention among general scientific principles. Among the special methods, the focus should be on historical systematic and typological methods. **The scientific novelty of the research** consists in the fact that, for the first time in the Ukrainian historiography, it examines the main programs for the creation of military helicopters in Western Europe and their significance for the rearmament of the army aviation of NATO countries. **Conclusion.** During the last quarter of the 20th – the beginning of the 21st century, two international programs were fulfilled on helicopters creation for army aviation in Western Europe, namely – attack helicopter Tiger (French-German one) and a medium transport TTH (the last is a part of broader program NH 90 that is put into action by France, Germany, Italy, Spain and the Netherlands).

Though the process of new helicopters creation became prolonged in time – they were 10 or more years behind the deadline. That was the cause, first, by the end of the Cold War, that resulted in decreasing military expanses and the need to amend projects to adjust to new conditions of combat actions. Decrease in army and military expenses influenced the program capacities. For instance, the quantity of the helicopter Tiger production was twice less than planned at the beginning – this is including export to countries which are not program participants.

Fulfillment of programs under the research had a hidden meaning for army aviation re-equipment of the leading Western European countries. It is typically of Germany, where Tiger and TTH became almost the only samples of helicopters in army aviation units in the first line. France and Spain finished the process of re-equipment the units with Tiger helicopters. Though there were too few helicopters TTH ordered due to financial restrictions. That prevented from modernizing the whole helicopter pool. It is typical of Spain that had to extend in time the procurement of helicopters due to financial issues. Procurement of TTH in Italy enabled to re-equip transport helicopter units partially.

In general, the two examined Programs became of significant experience in mutual design of innovation assets for aviation manufactory and influenced further integration of European helicopter industry.

**Key words:** combat helicopter, transport helicopter, army aviation, aviation industry, NATO, Cold War.

## ЄВРОПЕЙСЬКІ ПРОГРАМИ СТВОРЕННЯ ВІЙСЬКОВИХ ГЕЛІКОПТЕРІВ КІНЦЯ ХХ – ПОЧАТКУ ХХІ ст. ТА ЇХ ЗНАЧЕННЯ ДЛЯ ОНОВЛЕННЯ ПАРКУ АРМІЙСЬКОЇ АВІАЦІЇ

**Анотація.** *Мета дослідження* полягає в аналізі ходу реалізації міжнародних європейських програм створення військових гелікоптерів починаючи з 80-х рр. ХХ ст. Також визначено значення цих програм для переозброєння армійської авіації провідних європейських країн НАТО – Німеччини, Франції, Італії та Іспанії. **Методологія дослідження** передбачала застосування низки загальнонаукових та спеціальних історичних принципів. Серед загальнонаукових методів треба згадати аналіз і синтез. Зі спеціальних методів відзначимо порівняльний і проблемно-хронологічний. **Наукова новизна дослідження** полягає в тому, що у ньому вперше в українській історіографії в історичному контексті розглянуті основні програми створення військових гелікоптерів в Західній Європі та досліджене їхнє значення для переозброєння армійської авіації країн НАТО. Упродовж останньої чверті ХХ – початку ХХІ ст. в Західній Європі реалізовані дві міжнародні програми створення гелікоптерів для армійської авіації – бойового Tiger (франко-німецька) і середнього транспортного ТТН (остання – частина ширшої програми NH 90, яка реалізується Францією, Німеччиною, Італією, Іспанією та Нідерландами). Однак процес створення нових гелікоптерів дуже затягнувся – відставання від прогнозованих термінів склало десять і більше років. Зумовлене це насамперед завершенням холодної війни, наслідком чого стало скорочення військових витрат і необхідність коригування проєктів для пристосування до нових умов ведення бойових дій. Скорочення армій і військових витрат відобразилось і на обсягах програм. Наприклад, гелікоптерів Tiger в кінцевому підсумку виготовили удвічі менше, ніж планувалось на момент початку програми – і це з урахуванням експорту до країн, які не є учасниками програми. Реалізація досліджених програм мала засадниче значення для переозброєння армійської авіації провідних західноєвропейських країн. Насамперед це характерно для Німеччини, де Tiger і ТТН стали практично єдиними типами гелікоптерів у частинах армійської авіації першої лінії. У Франції та Іспанії процес переозброєння підрозділів гелікоптерами Tiger вже завершився. Однак гелікоптерів ТТН з огляду на фінансові обмеження замовили надто мало. Це не давало змоги повністю оновити парк транспортних гелікоптерів. Особливо це характерно для Іспанії, яка змушена була через фінансові проблеми дуже розтягнути в часі закупівлю нових гелікоптерів. В Італії теж закупівлі ТТН дозволили тільки частково переозброїти підрозділи транспортних гелікоптерів. Назагал дві проаналізовані нами програми стали масштабним досвідом реалізації спільної розробки інноваційних виробів авіаційної промисловості і сприяли подальшій інтеграції європейського гелікоптеробудування.

**Ключові слова:** бойовий гелікоптер, транспортний гелікоптер, армійська авіація, авіаційна промисловість, НАТО, холодна війна.

**Problem Statement.** Aviation industry is one of the most technologically complicated field in industry. It requires huge investments, meaning not only financial but also intellectual. Technical progress of the second half of the 20th century led to more complicated aviation samples creation. Their design and manufacturing were far beyond the capabilities of companies and countries. This obstacle pushed them to unite efforts of plane and helicopter designers. Therefore, international cooperation in helicopter development became a key factor in reducing costs and technological risks (Humphrey, 1995; Droff, 2017).

The first successful attempt of mutual helicopter manufacturing was realized far in the 1960s, that was French-British Program for three types of helicopters creation. Though it was difficult to name it as a complete development: French Sud Aviation company (later assimilated in Aerospatiale) and the British Westland Company just simply divided the responsibilities. The first one was responsible for the light helicopter Gazelle production and the heavy one – Puma, while the second one was responsible for the medium helicopter Lynx. Later all three helicopters were integrated into units in France and the United Kingdom, and

were exported widely. Then the British Company Westland and Italian Company Agusta mutually put into action the program for heavy helicopter EH 101 (AW 101) production. But it remained to be a niche product not being widely spread.

Two mutual programs for helicopters production, initiated in 1980, played a vital role in integration for Western Europe aviation industry and re-equipment of NATO helicopters' pool. One of them was multilateral and implied a mid-multifunctional helicopter NH 90 production. The second of the two programs, French-German bilateral program, led to fire support helicopter Tiger creation. These two programs are of great importance not only in technical aspects, but in efforts unity in order to create new, lading samples of aviation assets. They both led to re-equipment of army aviation of leading countries in Western Europe. That is why, it makes the research of great interest not only for history of vehicles but for military history as well.

**Review of Sources and Recent Researches.** Two main groups of sources have been used in this research. The first of them is about the history of how the programs for helicopter production were put into force. These are the works of G. Chambost and K. G. Benz (Chambost, & Benz, 1984), O. Geissinger and S. Traldi (Geissinger, & Traldi, 1997), G. Humphrey (Humphrey, 1995), etc. The work of J. Droff should be singled out, that is dedicated to integration processes in European helicopter industry (Droff, 2017). The second group consists of works dedicated to the history of helicopters implementation and manning the units and their place in the place of army aviation (Grolleau, 2022; Kwasek, 2020; Wieliczko, 2021 etc.). By utilizing these both approaches we have been able to view the issues of the research from the wider perspective.

To achieve the goal of this research we have used a bunch of research methods. There is analysis and synthesis that should be brought to attention among general scientific principles. There is comparative and problem-chronological among special methods to be used.

**The purpose of the article** is to study the way the program for NH 90 and Tiger helicopters were fulfilled, identify issues and achievements, as well as to analyze their influence on army aviation assets and tactics modernization.

**Research Results.** In 1970 light assets, designed on the platform of multifunctional helicopters, were the main combat helicopters in European NATO countries. Typical assets were MBB Bö-105P (Germany) and Aerospatiale SA342L Gazelle (France). They were characterized by low survivability (due to the absence of armored protection) and weak armament (4-6 anti-tank guided missiles) that could be fired at enemies' tanks only. The first attempt to create an improved helicopter was done by European engineers in the mid of 1970<sup>th</sup>. That was owing to cooperation of the two companies – German VFW-Fokker and the British Westland – a new project for helicopter P277 appeared that looked much alike US Bell AH-1G. But the project was not put in action (Fischer, 2005, p. 25). Cooperation of German manufacturers with French one turned to be more effective. Both Germany and France had similar requirements for combat helicopters, designed to be used in the European theatre of operation: their primarily designation had to be to destroy the Soviet tanks with the help of long-range antitank guided missiles. However, France took part in numerous conflicts of low intensity (mainly in the territories of its former African colonies). For such operation they required a helicopter with not such sophisticated, but more ordinary armament – automatic gun and non-guided missiles. Thus, there were reasons for creation of unified helicopters with similar power unit, main and steering rotor, fuselage, but with different targeting assets and armament. This concept was the bulk for the new German-French combat helicopter production.

In 1984 the German company Messerschmitt-Bölkow-Blohm (MBB) and the French company Aerospatiale established a consortium Eurocopter, designated for new helicopters creation. A subsidiary company Eurocopter Tiger, established on September 18 1985, was responsible for the design of a new helicopter. It should be said that the engine MTR 390 for a new helicopter was produced together with a German company MTU, the French company Turbomeca and the British company Rolls Royce (Humphrey, 1995, p. 6).

Consortium of French, the British and German companies dealt with anti-tank guided missiles TRIGAT creation (Kwasek, 2020, pp. 50–51).

The final concept of a helicopter named Tiger was framed in 1987 (Humphrey, 1995, p. 5). According to it, there were three versions:

- UHU (Unterstützungshubschrauber) – antitank for Bundeswehr;
- HAC (Hélicoptère Anti Char) – antitank for French Army;
- HAP (Hélicoptère d’Appui Protection) – fire support helicopter for French Army.

The helicopter Tiger is built according to its classical for combat helicopter scheme – with one main rotor, two-seated, with crew tandem. Power unit – two turboshaft engines. Kevlar and carbon fibers are used in the fuselage construction, but wings of main rotor are made of composite materials. That enabled not only to decrease the helicopter weight, but also decrease its detection by radars. Modern on-board equipment supports helicopter combat usage in the daylight and at night. Main differences between samples of Tigers were in armament and the place of sight head. These are highlighted in Table 1 (as of the beginning the designing process; during the designing stage they were partially amended) (Fiszer, 2005, pp. 26–27).

Table 1

**Main differences of helicopter Tiger versions**

| <b>Sample</b>                   | <b>UHU</b>                 | <b>HAC</b>                 | <b>HAP</b>     |
|---------------------------------|----------------------------|----------------------------|----------------|
| Sight head placement            | over the hub of main rotor | over the hub of main rotor | over the cabin |
| Gun                             | -                          | -                          | 30-MM 30M791   |
| Anti-tank guided missile        | TRIGAT LR, HOT-3           | TRIGAT LR, HOT-3           | -              |
| Guided missile, class «air-air» | -                          | -                          | Mistral        |
| Non-guided missiles             | -                          | 68-MM SNEB                 | 68-MM SNEB     |

Germany planned to procure 212 UHU helicopters, but France – 140 HAC and 75 HAP. Thus the total need for the army of both countries was 427 helicopters. At the early stage of Tiger program fulfillment, it was planned that HAP sample will be in service in 1991, UHU – at the end of 1992, and HAC in 1995 (Chambost, & Benz, 1984, p. 575).

In reality the deadlines were not met. Some of the reasons were – time consuming approval of the details in the program by participants, as well as the end of the Cold War that led to decrease in defence budget and the necessity to revise a series of helicopter characteristics. After the collapse of the Warsaw Pact Organization and the demise of the Soviet Union, Bundeswehr had no real need in narrow-specified anti-tank helicopter. Instead a general-purpose helicopter was in need, capable of taking part in peacekeeping operations and low-intensity conflicts. Thus, UHU was modified into UHT (Unterstützungshubschrauber Tiger). Its armament was improved, having included guided missile Stinger of class “air-air”, 70mm non-guided missiles and overhead containers with 12.7mm machine guns (Fiszer, 2005, p. 27).

The French sample HAC was modified in 2001, from a simple anti-tank version it became a multifunctional HAD (Hélicoptère d'Appui Destruction). From its armament perspective, it was similar to HAP modification, but its engines are 14% more powerful. Owing to this, HAD is better to be used under hot climate conditions.

Despite on-board gun, non-guided missiles and Mistral missile (class "air-air"), HAD is equipped with anti-tank guided missiles – US AGM-114 Hellfire II (French Army helicopters) or Israel Spike ER (helicopters exported to Spain), (Kwasek, 2018, pp. 57–58). Another sample was Tiger ARH (Armed Reconnaissance Helicopter), ordered by Australia. It was equipped with anti-tank guided missiles AGM-114 Hellfire II, guided missiles of class "air-air" FIM-92 Stinger and 70mm non-guided missiles (Gordon, 2014, p. 82).

First prototype of Tiger made its first flight on April 27 1991. In total 7 samples were produced, two out of them were designated for ground static testing. The first serial helicopter of HAP version was ready in December 2000, but in version UHT – in August 2002 (Fiszer, 2005, pp. 28–29). Thus, they were behind the deadline for 10 years. In addition, first serial helicopters were used for testing continuation. The French and German Army Aviation submitted them only in spring 2005. Helicopters Tiger was manufactured at the factories in Marignane (France) and Donauwörth (Germany).

The restructuring of the European defense industry has significantly influenced the formation of multinational helicopter programs such as Tiger (Mawdsley, & Brzoska, 2004). In 2002 German government decreased the number of Tiger helicopters, being supposed to purchase, from 212 pcs to 110 pcs, later on – up to 80 pcs, and finally, up to 68 pcs. Though the mentioned above quantity occurred to be excessive and in 2013 UHT pool was decided to maintain with 57 samples (68 were manufactured, but 11 were immediately sent to the warehouse). The process of production and putting helicopters into service turned to be prolonged in time: the latest serial UHT was produced only in August 2018. So it took 16 years to produce 68 helicopters. UHT achieved their combat readiness in June 2010, but in March 2013 Bundeswehr had only 18 combat efficient helicopters of such type, and 9 more helicopters were used for training and testing purposes (Kwasek, 2020, pp. 53–54).

Alike reduction occurred in the French portion of the Program. The first contract, signed in June 1999, meant to supply 80 helicopters (70 HAP and 10 HAC) with the perspective to increase that number to 120 pcs (80 and 40 consequently). In December 2005 the order was revised – that included 60 helicopters (40 HAP and 20 HAD). In 2015 11 additional HAD samples were ordered and made a decision to modernize 36 HAP helicopters to this standard. 40 HAP pcs were delivered in 2005 – 2012, but the supply of 31 HAD helicopters happened within 2012 – 2020. So the average tempo of the French Tiger helicopters supply was not higher than the German ones. Modernization of HAP helicopters to HAD standard ended in 2023. After that French army aviation would have the unified pool of combat helicopter (Kwasek, 2020, pp. 50–52).

Beside France and Germany, Tiger helicopters were sold to two other countries. In 2004 – 2010 Australian Army got 22 samples in ARH version (Gordon, 2014, p. 80). In 2007 – 2020 Spain received 24 helicopters. Those samples were built at the Spanish factory of Eurocopter concern in Albacete. Six out of them were of HAP-E version, and 18 – of HAD-E version. As it was with French samples, owing to modernization of HAP-E helicopters, all Spanish Tigers were brought to one standard (Huertas, 2018, pp. 94–95). There were new orders then. Thus the Program for creation and manufacturing of combat Tiger helicopters ended after having produced 205 serial samples. It took almost 20 years. Anyway to put

helicopters into service took a lot of time – for example, in 2016 there were only 97 samples of this type in service in all four countries (Droff, 2017, p. 22).

Another international European Program was released simultaneously with combat helicopter Tiger creation that assumed creation of a multipurpose middle class helicopter. In Army Aviation of NATO countries and Air Forces it had to substitute Bell UH-1 helicopter (and its licensed versions) and Aerospatiale SA330; in Naval Aviation – Lynx and Sea King. The NH90 program became the first European helicopter project designed simultaneously for land and naval forces (Geissinger & Traldi, 1997). With this purpose it was meant to create two subtypes of helicopters – Tactical Transport Helicopter (TTH) and Navy NFH (NATO Frigate Helicopter). Both subtypes had 75% identical construction. Main differences were in composition of board assets and armament, as well as NFH adjustment for stationing on combat vessels. In contrast to bilateral Tiger Program, NATO Helicopter Program for the 1990s (abbreviated NH 90) was multilateral – first France, Germany, the United Kingdom, Italy and the Netherlands took part. That caused difficulties in approving requirements of various countries and led to program delay even at the very first stage of its implementation. First edition of requirement for NH 90 was prepared in 1984 and its final edition – only in 1992. In 1987 due to different perspectives with other participants, the UK left the Program. Finally, on August 13 1992 a consortium NHIndustries was established as a part of companies Eurocopter France, Eurocopter Deutschland, Agusta (Italy) and Fokker (the Netherlands) (Geissinger, & Traldi, 1997, pp. 160–163). On September 1 1992 the consortium received a contract for first helicopters supply. That time it was supposed to procure 716 helicopters: 210 pcs for France (150 TTH and 60 NFH), 272 pcs for Germany (234 TTH and 38 NFH), 214 pcs for Italy (150 TTH and 64 NFH) and 20 pcs for the Netherlands (all of NFH type) (Fischer, & Gruszczyński, 2017, p. 45).

A combination of technical innovations were put into NH90 helicopter construction, the main of which was control system fly-by-wire. Its application allowed decreasing weight and increasing helicopter reliability. NH90 became the first serial helicopter in the world, being equipped with such system. Avionics had an open architecture and it allowed integrating new components into its structure. In TTH it might be thermal vision station FLIR and night vision goggles. NH90 was built according to a classical single screwed scheme and equipped with two engines. In contrast to Tiger, two alternative versions of power installation were foreseen: engine RTM 322 (mutual development of Rolls Royce and Turbomeca) or US General Electric CT7. Helicopter's fuselage was totally of composite materials, metals (aluminum alloy and titanium) applied only in the most loaded units (Rusiecki, 2006, pp. 30–31).

The first out of 5 NH90 prototypes made its first flight on December 18 1995, the others were tested in 1997 – 1999. The main problem was testing of fly-by-wire system. The first flight of the prototype with full-fledged functional system was only on December 12 2003. That allowed to launch production of serial helicopters, first of which was ready in May 2004 (Rusiecki, 2006, p. 29). Thus almost 12 years passed from the moment of NHIndustries consortium creation till the beginning of NH90 serial production.

NH90 production is happening at four main lines of consortium partners: already mentioned Marignane (France), Donauwörth (Germany), Albacete (Spain), as well as at a plant in Tessera (Italy). Moreover, helicopters, ordered by Australia, were constructed in Brisbane (Fischer, & Gruszczyński, 2017, p. 44). Finland, Sweden and Norway decided to mutually purchase NH90 helicopters in order to save money (Lehtonen, & Isojärvi, 2016, p. 13). The factory Halli (Finland) fulfilled their order.

In this survey we will confine to analysis of production and supply of TTH helicopters for leading European countries. Exports of NH90 beyond consortium members can be a topic for a separate survey, taking into account its complexity and versatility. In 2000 Germany ordered 80 TTH helicopters and in 2007 increased the capacity up to 122 helicopters, but in 2013 decreased it to 82 pcs. First serial helicopter was produced in May 2014, though combat parts to TTH arrived only in June 2011. All ordered helicopters were fully supplied only in 2021 (Wieliczko, 2021, p. 37). Both Italy and Germany simultaneously ordered 60 TTH that received UH-90A marking. The first helicopter was ready in 2004 but the customer got it only at the end of 2007. The first helicopters were supplied not in full equipment, and only starting from 2013 (from the 22<sup>nd</sup> sample) they were delivered fully equipped.

France ordered the first shipment for its army aviation in November 2007 and it consisted of 12 TTH. Next contracts, signed in 2008, 2013 and 2015 consisted of 74 pcs in total. First French TTH was ready in December 2010 and handed to the army after a year long testing – in January 2012. Last 10 helicopters will be handed to the customer only in 2025 – 2026. It means that it will take 16 years to produce 74 helicopters (Wieliczko, 2021, p. 33).

The fourth main European customer – Spain – has bought the least number of TTH. In December 2006 a contract for 45 such helicopters was signed (38 for the Army and 7 for the Air Forces), but due to the economic crisis in 2013 that number became twice less – to 22 pcs (16 for the Army and 6 for the Air Forces). The first helicopter was ready in December 2010, and the whole program was finished in 2021, so the average tempo of supply was 2 helicopters a year. In January 2019 a second order was made for helicopters for Spain – 23 helicopters, but only ten out of all were designated for the Army Aviation, and six more for the Air Forces and seven for Navy (Wieliczko, 2021, pp. 34–35).

Mutual helicopter programs allowed renewing the Army Aviation pool of four leading European NATO countries – Germany, France, Italy and Spain. They were characterized by complex coordination mechanisms and political compromises, which often led to delays and cost overruns (Hartley, 2008). All of them received TTH in service, and three out of four – attack helicopters Tiger. Italy was an exception in the last case as it produced its own combat helicopter A129 Mangusta and put it into service. In 1990 – 1996 the Italian Army received 60 pcs (Kharuk, 2016, p. 35).

The most valuable realization of mutual programs was for Germany. As of 2021 all of its three Army Aviation units – Transport Helicopters Regiments 10 and 30 and Combat Helicopters Regiment 36 – were completely re-equipped by new types of assets. They comprised 51 helicopters Tiger and 82 TTH. 33 light helicopters of other types were used for training purposes and as additional assets (Fischer, & Gruszczyński, 2021a, p. 52). Having modern assets with high tactical technical characteristics allowed to broaden Bundeswehr Army Aviation participation in abroad missions. From 2013 Tiger and TTH helicopters took part in NATO operations in Afghanistan, and starting from 2017 – in missions in Mali.

Supply of Tiger and TTH helicopters to French Army Aviation are estimated by experts as a part of “digital revolution”, meant to adjust this Army branch to network-centric warfare. Though the tempo of re-equipment falls beyond German one. As of 2021 Combat Helicopter Regiments 1 and 5 were re-equipped (each had two Tiger squadrons and two TTH squadrons). Regiment 3 has just started to receive TTH, and its re-equipment will end only in 2025. Even after this process, French Army Aviation will presume transport helicopters Caracal, Cougar and several Pumas in service (the last ones for interaction with anti-terroristic units) (Grolleau, 2022, pp. 82–83).

In Italian Army there are new UH-90A helicopters (alongside with A129) in Army Aviation Regiments 5 and 8. Simultaneously Regiments 2 and 4 continue using old helicopters like AB205, AB212 and AB412 as the quantity of purchased UH-90A helicopters is not enough for its re-equipment (Fischer, & Gruszczyński, 2021b, pp. 55–56). The case is worse in Spain. Its Army Aviation Tiger helicopters supply enabled to completely substituting old samples Bö-105. Though TTH was of sufficient quantity to re-equip only one out of four medium-class transport helicopters battalion – others are still using old assets (Finati, & Rollino, 2021, p. 36).

**Conclusions.** During the last quarter of the 20th – the beginning of the 21st centuries two wide-scale international programs were fulfilled in Western Europe with the purpose to create helicopters for Army Aviation – combat Tiger and mid transport helicopter TTH (the last one is a part of a broader NH90 program). Both of them had series of common characteristics:

- desire to put the most recent and innovative achievements of aviation technologies into helicopters' construction (wide use of composite materials, new highly effective engines etc);
- series of revolutionary decisions in on-board electronics (avionics with open architecture, adjustment to actions in network-centric warfare);
- delay in meeting deadlines (fall beyond the initially set dates for ten years or more);
- low tempo of helicopters supply (in average from two to five assets a year per one country);

Delay in the tempo of helicopter program fulfillment was caused by several factors. One of them was the necessity to coordinate requirement for future helicopters between several participating countries within the program. The other was the end of the Cold War that led to decrease in financial expenses for defence budgets and another revision of requirement on order to adjust to new combat environment. Reduction of armies and military expenses influenced several parameters. For instance, the quantity Tiger helicopters produced was twice less than it was planned at the early stage of the program (even paying attention to expertise contracts for countries that did not participate in the program).

Visible technical innovations put into Tiger helicopters and TTH allowed naming them as assets of new generation. Realization of mentioned programs was a bulk for re-equipment of Army Aviation in leading Western European countries. It was fully fulfilled in Germany where Tiger and TTH became the only types of helicopters of the first line in army aviation units. In France and Spain the process of units' re-equipment with Tiger helicopters ended, but provision of TTH in contracted amounts did not allow to fully renovating transport helicopters pool. In particular it is peculiar for Spain which had to extend in time procurement of new helicopters due to financial issues. In Italy TTH procurement only partially allowed to re-equip transport helicopters units.

Provision of new generation helicopters allowed the countries which utilize them to widen Army Aviation participation in operations abroad, including peacekeeping operations. Though analysis of such participation is far beyond the frame of this article and requires further surveys.

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