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What aerial combat system for 2050?

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SUMMARY OF RECOMMENDATIONS

The Air and Space Academy (AAE) working group's deliberations on the future of combat helicopters led to the following recommendations:

When making industrial decisions, it is essential to guarantee and preserve strategic autonomy by ensuring the freedom to use systems without external restrictions (like the American ITAR regulation), whilst managing their upgrades within participating states so as to also preserve freedom of export. Europe now possesses all the industrial capabilities needed to guarantee genuine sovereignty in the field of combat helicopters whilst providing the required freedom of action; it must use these capabilities optimally, and preserve and develop them making use of the aids and incentives put in place by the European Commission (such as the European Defence Fund) to encourage European cooperation and strengthen the European Defence Technological and Industrial Base (EDTIB).

New systems' development must be informed by doctrine on the use of force, promoting European convergence through the European Union (EU) Military Committee and the European Defence Agency (EDA), with the possible inclusion of other partners (non-EU members).

Adaptability must be at the heart of the system, with an open architecture (such as MOSA) that incorporates scalable electrical capacity from the design stage on, in order to meet future technological and operational needs.

Secure connectivity within multi-domain networks (air, land and sea) must be strengthened to enable optimal integration into combat clouds.

It is essential to retain manned attack helicopters for deep-strike missions, whilst at the same time developing modular, low-cost, mass-produced support drones to form a coherent system.

Harmonisation of specifications and equipment across participating countries must be maximal, with sustained cooperation during the support phase, maintaining a single configuration throughout the equipment's lifecycle wherever possible.

When it comes to aircraft design, the right balance must be struck between maximum take-off weight and fleet size in order to optimise procurement costs.

Maintenance must be factored in at the design stage to minimise the volume of equipment and personnel required, with particular attention paid to engines, the main cost drivers in support operations.

This comprehensive approach aims to deliver a high-performance, flexible, connected and sustainable European aerial combat system.

1. SCOPE AND PURPOSE OF THE STUDY

The Air and Space Academy's Dossier 51[1], containing recommendations for new European military helicopter programmes (on the three identified segments – heavy and tactical utility helicopters, very heavy helicopters and specialised armed helicopters), was published in 2021 and presented to several official bodies and industry representatives. It was the subject of a forum at the Eurosatory exhibition in June 2022.

This forum confirmed that it was time to start preparing for the next generation of helicopters and VTOL[2] aircraft, the key being to establish a common set of operational requirements at European level with harmonised funding – two conditions requiring strong, sustained political will on the part of the Member States.

The forum highlighted the following points:

- the next generation of helicopters should also include medium-sized multi-role helicopters;
- the requirements should include versatility, survivability, open system architecture, reduced crew workload, interoperability and maintainability;
- Airbus Helicopters, Leonardo Helicopters and Safran Helicopter Engines are already involved in ongoing projects for medium-to-heavy helicopters[3] and are ready to continue their cooperation in future military programmes[4].

1 *AAE Dossier 51: "Towards new European military helicopter programmes", 2021.*

2 *Vertical take-off and landing aircraft.*

3 *Ongoing projects – NATO's NGRC, the ENGRT (EDF) and the NGMH (PESCO) – all focus on next-generation medium-to-heavy helicopters.*

4 *There are no projects involving heavy helicopters.*

To date, projects to develop technology building blocks funded by the EU or NATO have focused research efforts on medium-to-heavy helicopters (NATO projects, for example, prioritise high-speed capabilities which do not necessarily meet European operational requirements).

Following an industry initiative, a working group reviewed feedback from experience from previous cooperative military programmes and produced Opinion 17[5], which was published in 2023.

This opinion set out 14 recommendations for optimising the delivery of a future cooperative programme in the following four areas:

- keeping risks under control through a robust pre-contractual phase;
- optimising programme implementation (technical specifications, costs and timetable);
- maximising fleet availability and optimise maintenance;
- developing synergies and interoperability between the armed forces of European countries.

A working group was set up in 2024 to pursue the study initiated in the 2021 dossier, focusing on the renewal of the attack helicopter fleet (such as the Tigre, Mangusta, Apache, etc.) for European defence.

The current opinion is based on observed geostrategic developments and the growing role of drones in current conflicts, and sets out nine recommendations for retaining armed attack helicopters within combat helicopter fleets.

5 *AAE Opinion 17: "*Recommendations for new European military helicopter programmes*", 2023.*

2. RECOMMENDATIONS

2.1 Background: "War is looming over our continent"[6]

With the "*Retour de la guerre*"[7] (Return of war), high-intensity combat is once again becoming the benchmark for military organisation and capability planning. The fighting taking place in Ukraine provides significant feedback in this regard.

The most recent engagements highlight, in particular, major developments in terms of battlefield transparency, the accuracy of indirect fire, and the acceleration of the acquisition-to-fire cycle.

Drones have come to play a decisive role in every aspect of the conflict.

For ground forces, to which combat helicopters are attached, there is now a "no man's land" in which forces are rarely stationed (since target detection leads to their destruction) and where speed of movement is vital (hit-and-run tactics)[8].

The armed forces must be able to rely on state-of-the-art equipment and be capable of adapting to accelerating developments, as illustrated by the drone sector in the Ukrainian theatre.

They continue to bank on autonomy, initiative and daring, placing great emphasis therefore on the principle of subsidiarity in the command of operations.

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6 *Item No. 1 by General Mandon, Chief of the General Staff of the French Army, 1st September 2025.*

7 *François Heisbourg, "*Le retour de la guerre*", Odile Jacob.*

8 *Rapid, surprise attacks followed by an immediate withdrawal, aimed at weakening the enemy without prolonged engagement.*

The fleets (systems) currently in service in the European armed forces are set to become obsolete by around 2050[9]. As the roll-out of a new helicopter platform programme in Europe takes around 20 years from convergence of operational requirements to entry into service, discussions must begin without delay. They must focus primarily on harmonising operational doctrines and requirements, but also on securing budgets and organisational issues (project management and industrial planning).

Recommendation 1: Strategic autonomy

Guarantee freedom of use in all theatres of operation, by ensuring that these weapon systems are not subject to any ITAR-related restrictions[10] and that participating states fully control any upgrades of the systems. Export policy must also benefit from the same freedom of decision.

2.2 A doctrine of use adapted to the new geopolitical context

Any decision leading to the establishment of common specifications must be based on the operational requirements of the relevant armed forces, once defined (theatres and types of operation, types of combat flight, operational environment, etc.).

Since, according to General Mandon, "*the prospect of fighting against more powerful adversaries is [...] a reality*", the considerations set out in this opinion are primarily applicable to Europe's eastern flank. Nevertheless, its southern flank remains a long-standing theatre of operations for European armies, one that has lost none of its relevance and which requires suitable

9 See Appendix 1.

10 With a greater focus on connectivity, particularly with regard to sovereign data links.

equipment and sufficient strategic autonomy[11].

Like the Indo-Pacific, this southern flank (and the northern flank, given geographical parallels) is characterised by the need to operate over long distances, possibly calling for new configurations (convertible or combined aircraft with wings allowing for high speeds[12]) not strictly necessary in the context of Europe's eastern flank. Furthermore, operations there could be conducted by helicopters operating from aircraft carriers. The United States will develop rotary-wing aircraft suited to these conditions, then will quite naturally seek to export them to Europe.

Modern firing density and precision in high-intensity combat zones make large-scale manoeuvres difficult, particularly the deployment of armoured vehicles, which are specifically targeted by so-called loitering munitions. The traditional mission of combat helicopters, designed as an anti-tank weapon primarily in the contact zone, is seemingly becoming obsolete in high-intensity combat theatres.

The operational commander must now give priority to enabling the forward forces to engage, and to this end must "shape" the enemy's formation by seeking to destabilise it in its depth.

The air assets available for this mission are limited to a few sorties against identified targets by fighter aircraft or long-range drones (with a range of over 100 km), as well as the deployment of combat helicopters. Ground-based deep-strike capabilities are, in fact, still largely limited to rocket fire[13].

Combat helicopters, deployed by ground forces, appear particularly well-suited to this mission, which is essential at the operational level. They are capable of attacking high-value targets, striking groups of armoured vehicles on

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11 In particular, the concept of the "wider Mediterranean" in the Italian defence model refers to the geostrategic area that extends beyond the Mediterranean basin proper to include its natural extensions towards the Sahel, the Horn of Africa, the Middle East, the Gulf of Guinea, and the sea routes linking the Atlantic to the Indian Ocean.

12 The presence of a wing, thanks to its superior aerodynamic efficiency, enables greater range compared to helicopters with a traditional design, as well as high speeds. However, in theatres of operation characterised by a significant ground-to-air threat, it is the ability to manoeuvre very close to the ground that remains paramount.

13 Rocket launchers currently have a limited range, largely because they cannot be deployed close to the front line for safety reasons. On average, the maximum range of these systems is reduced to between a third and a half of their theoretical range.

standby and destroying long-range artillery across the battlefield, as well as disrupting the enemy's logistics.

One of the main challenges of deep-penetration combat for helicopters is in their ability to penetrate the forward zone of the enemy's defences without suffering excessive losses. The density of fire near the line of contact and throughout the enemy's forward area, the quantitative and qualitative development of short-range surface-to-air artillery, and the new offensive capabilities of drones constitute a threat that requires specific manoeuvres to be set in place for this crossing.

Security and survivability are therefore essential to the success of such an operation, which must be able to project sufficient force to obtain a significant impact on the ground.

The capability of a future aerial combat system will therefore depend partly on a modernised combat helicopter and partly on the possibility of developing an "air module" comprising combat helicopters operating in conjunction with drones, supported where necessary by artillery and/or aircraft[14].

In the rear area of friendly territory, combat helicopters will remain a key asset for the command to respond rapidly to a threat, in support of a force controlling the area, or in the event of incursion by a powerful enemy (enemy armoured forces operating after a breach in the line of contact).

In any case, helicopters remain the most suitable weapon system for ground forces to rapidly shift military focus[15] and provide a highly effective additional tool in anti-drone measures, both day and night[16].

14 A "sweep" mission to destroy surface-to-air defences in the path of an offensive raid.

15 Shift in focus: redirecting fire or manoeuvres towards a different location or enemy. Thanks to their speed and ability to overcome terrain obstacles, helicopters are a weapon system that naturally facilitates such a shift in focus.

16 Attack helicopters are generally equipped with the precision-firing capability of their turret-mounted machine guns and air-to-air missile capabilities, which could be supplemented by the addition of rocket launchers adapted for anti-drone combat.

Recommendation 2: Doctrine

The entire process should be guided by the doctrine of use set out by the armed forces. To promote European convergence, the armed forces' capability managers should present their plans to the relevant NATO authorities[17] and the European Union Military Committee, with the support of the European Defence Agency, possibly involving other partners (the United Kingdom, Norway, Switzerland, etc.).

2.3 A new aerial combat system

The widespread use of low-cost, mass-produced drones enables effective direct support for ground troops and can replace combat helicopters in the forward combat area[18].

These drones can be equipped with payloads enabling a wide range of missions, including surveillance, firing, radio relay, jamming, deception, and so on. These capabilities are also designed to support the operations of combat helicopters.

However, the development of anti-drone systems, as well as their typically very limited range and speed, restrict the use of drones in the tactical-operational depth (between 30 and 120 km).

The replacement of attack helicopters in the 2040s and 2050s will not merely involve a generational change in rotorcraft, but must enable the development of a new weapons system that interacts with other systems, notably drones.

Manufacturers are developing the capability to carry certain drones on board cargo helicopters, for instance, and making progress in mastering the technology required to control drones from helicopters[19].

17 These include authorities such as the JAPPC and the committees responsible for STANAGs.

18 Close combat zone of around 50 km around the line of contact.

19 Concept of Manned-UnManned Teaming: MUM-T.

Recommendation 3: Adaptability

Ensure that the weapons system is capable of adapting to technological developments and to changing operational requirements.

Define an open system architecture from the outset, similar to the MOSA concept[20] and ensure the device is designed with sufficient electrical power and computing capacity, and that it can be upgraded in the future.

Guarantee operational freedom and the use of systems not subject to ITAR regulations.

Recommendation 4: Connectivity

Boost the weapon system's ability to integrate and operate securely and robustly[21] in air, land and naval combat zones (cloud combat)[22].

2.4 The role of humans in the future system: can we forgo piloted helicopters?

With the growing use of drones, and the rise in artificial intelligence tools, the ethical question of the role of humans in the decision-making process cannot be sidestepped: how can we ensure that the decision to destroy remains in human hands, in all tactical scenarios, regardless of the intensity of the conflict?

The destruction of a significant number of combat helicopters in Ukraine received considerable media attention

20 *MOSA (Modular Open Systems Approach) is an integrated strategy for the procurement and maintenance of systems, using modular and open architectures to promote competition, technological flexibility, innovation, cost savings and interoperability.*

21 *In particular, through the use of an inertial navigation system and, in the long term, a quantum navigation system.*

22 *AAE-DGLR Opinion 18 "*Collaborative air and space combat operations in Europe*", Sept. 2023.*

and may have led to the impression that this system was now obsolete, given that unmanned aerial vehicles (UAVs) were achieving significant and sometimes spectacular tactical results; but more detailed analysis has shown that the Russian forces' initial tactics, using helicopters for daytime support at altitudes that left them vulnerable, have been replaced by a much more effective approach, resulting in fewer losses.

In any case, the war in Ukraine cannot be taken as the sole benchmark. It clearly demonstrates that UAVs have come to play a major role in combat, raising questions about the value of retaining manned systems.

If the aerial combat system, currently based on specialised helicopters equipped with generally powerful weaponry (rockets, missiles, machine guns), has as its only primary missions to provide fire support to forces operating along the line of contact[23], and to respond to an unexpected threat in the rear area of friendly forces, it would seem feasible to replace it with a system comprising armed UAVs, with "disposable drones" and/or recoverable drones, depending on the equipment and weight of the aircraft. For reasons of mobility, it would then be advisable to deploy and operate these drones directly from "transport and control" helicopters.

However, combat helicopter missions could primarily be carried out deep within enemy lines. If such operations were limited to the destruction of known targets – akin to raids – they could be carried out by drones alone. However, if such deep-penetration operations were expanded to include manoeuvres involving the possibility of opportunistic destruction (such as the destruction of a second-line armoured unit or ground-to-air or ground-to-ground artillery logistics sites), then the use of an air combat system comprising manned helicopters would be essential.

In any case, a piloted helicopter provides the ability to reverse a course of action, even in the face of jamming.

23 Referred to as "Close Air Support" (CAS) by NATO.

Recommendation 5: Piloted helicopters in an aerial combat system

Maintain a strike capability using armed manned helicopters capable of conducting attack missions deep within enemy lines.

2.5 Availability of drones adapted to the future air combat system

Drone capabilities in terms of range and lethality are constantly evolving, making it impossible to base doctrine solely on the known capabilities of drones currently in service. However, the rapid obsolescence of a drone does not necessarily mean that its payload will become obsolete. It is therefore necessary to be able to separate the airframe from the payload.

Furthermore, as drones are being integrated into all weapon systems, helicopters should be able to make the most of this, or at the very least coordinate with other types of drones operating in the same combat zones.

Given the limited capabilities of the drones currently being considered for operation with an armed helicopter, there is a clear need to transport these drones by helicopter to their deployment area. Due to the helicopter's carrying limitations, these drones are consequently lightweight and their numbers remain limited[24].

These aircraft-launched drones are capable of acting as an extension of the combat helicopter, particularly to keep the latter out of the most dangerous areas, thereby increasing its operational range for intelligence gathering, jamming and even fire support. This requires control capabilities either on board the combat helicopter or, failing that, from a dedicated helicopter commanding the combat helicopters and drones. After 2035, concepts will evolve towards forms

24 *If they are not launched from the helicopter (ALE – Air Launched Effects), VTOL air-to-air combat drones would need to accompany the manned helicopter from the start of the mission and would therefore need to have equivalent speed and range: their acquisition cost would then be significant, with a maximum take-off weight (MTOW) quickly exceeding 3-4 tonnes.*

of autonomous cooperation, in which helicopters supported by artificial intelligence will be able to counter swarms of unmanned aerial systems for combined intelligence, surveillance and reconnaissance or strike missions.

Better suited to attack missions than a helicopter designed for transport, combat helicopters could also be equipped with weapons systems to complement its conventional armament.

Recommendation 6: Helicopter and drone programmes

Develop low-cost, mass-produced support drones, with a modular, 'plug-and-play' payload, adapted to a range of missions or general-purpose tasks[25], and build up a comprehensive programme around helicopters and drones.

2.6 Controlling ownership costs[26]

In seeking the solution best suited to European operational requirements, the next-generation air combat system will operate within a tight financial framework. The aim will be to enable the armed forces to deploy a sufficient number of helicopters for their missions[27] and to find compromises that ensure a sustainable ownership cost.

To this end, cooperation at European level will be crucial and will also form a key part of the programme, ensuring that committed manufacturers can expect a satisfactory economic outlook.

Differences in specifications between Member States should be minimised as far as possible, whilst recognising the importance to national forces of retaining certain specific equipment.

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25 Missions such as reconnaissance or destruction, or tasks such as decoys, jamming, radio relay, etc.

26 The total cost of ownership is defined as the total cost from the start of the programme (development and production) through to the end of the equipment's life. The relative cost of support is generally estimated at around 60% of the total cost of ownership.

27 The number of helicopters is one of the factors contributing to operational superiority. This sheer number alone makes it possible to achieve a significant tactical advantage and to ensure a degree of continuity, or even the necessary ubiquity, of forces across a vast combat zone.

Recommendation 7: Harmonising technical specifications

Aim for maximum harmonisation of specifications and equipment among the countries participating in the programme and ensure continued cooperation between nations during the support phase, with the goal of maintaining a single configuration throughout the aircraft's service life.

Recommendation 8: Fleet sizing

Strike the right balance – since the system's cost is proportional to the helicopter's maximum take-off weight (MTOW) – between the choice of weight and size of the fleet.

Take into account the high, and rising, proportion of costs – both recurrent and non-recurrent – linked to weapons systems, avionics, and electronic warfare and self-protection equipment.

Recommendation 9: Maintenance management[28]

Incorporate maintenance considerations from the helicopter's design stage, striving to minimise the maintenance required and the manpower needed per flight hour in order to optimise availability.

Focus specifically on the engine, which represents a significant proportion of the total maintenance cost.

28 This point supplements the recommendations set out in Opinion 17 on the ILS.

3. CONCLUSION: TOWARDS A EUROPEAN AERIAL COMBAT SYSTEM

Procuring non-European equipment, particularly from the US, may be necessary to meet short-term needs if equivalent equipment is not available within Europe, but in the long term it undermines efforts to achieve strategic autonomy, when the current stance of our American ally shows that such efforts are more necessary than ever.

Furthermore, the duplication of European programmes constitutes a huge financial waste, particularly for programmes with high R&D costs (as is the case with large aeronautical systems), and a major obstacle to the consolidation of the European defence industry. Europe now possesses all the industrial capabilities needed to guarantee genuine sovereignty in the field of combat helicopters whilst providing the required freedom of action; it must use these capabilities optimally, and preserve and develop them by making use of the aids and incentives put in place by the European Commission (such as the European Defence Fund) to encourage European cooperation and strengthen the European Defence Technological and Industrial Base (EDTIB).

At a time when Europeans need to increase joint spending to effectively strengthen their defence capabilities and ensure long-term sustainability, European cooperation is therefore essential for the development of future systems. However, to derive the maximum benefit from such cooperation, participating states must meet a number of conditions throughout the entire lifecycle of the systems.

To address this issue, AAE has made a number of recommendations[29] aimed at developing a new-generation European attack helicopter programme. It is urgent that European nations take this matter in hand.

29 *It is clear that some or all of the recommendations in this opinion could apply to the modernisation of combat helicopters.*

APPENDIX 1: Preliminary overview of the largest combat helicopter fleets in Europe

This amounts to a total of around 450 to 500 combat helicopters reaching the end of their service life around the year 2050.

APPENDIX 2: Priorities for modernising combat helicopters

Focus on key priorities

Any new combat helicopter programme should be procurable by the armed forces in sufficient numbers as to achieve the desired effect in combat, within the context of a tight budget.

Consequently, in any future programme, new technologies must be carefully restricted to what is deemed essential for the fulfilment of combat missions. High speed – which significantly increases the weight of the aircraft and, consequently, costs – does not therefore necessarily appear to be justified for combat helicopters.

Adaptations to modern forms of air-ground combat

Connectivity

Modern armies are primarily made up of interconnected systems that enable command and control (C2); for an "air combat module", there is a requirement for dual connectivity with both ground-based[30] and airborne[31] C2 systems.

The proliferation of these technologies (radio, satellite, integration into mobile networks, etc.) increases the load on the carrier and requires effective integration, particularly outside the cell, for the various antennas and the supply of the necessary power[32].

The AAE has also addressed the importance of collaborative combat for future systems development. Its recommendations will also need to be taken into account in the context of a future helicopter programme[33].

Lethality

Engaged in combat situations that are rarely identical, the attack helicopter unit must have appropriate weaponry that is immediately available; whilst it may be able to make use of the armament carried by an accompanying drone, it must also be able to defend

30 *Such as the French army "Scorpion" programme.*

31 *For example, via Link 16 and/or specific radio units.*

32 *Cf. Recommendation 5.*

33 *Collaborative combat, or "killweb": this involves integrating the attack helicopter into a network powered by artificial intelligence to strike a detected target in the most effective way.*

itself in close-quarters combat or strike protected targets out of direct sight using armament that is not necessarily available on drones.

The attack helicopter should therefore logically be equipped with self-defence and offensive weaponry, including a nose-mounted turret gun, air-to-air missile capability, and the ability to carry rockets and missiles.

The MUM-T represents a major development that will increase lethality through the use of reconnaissance drones to detect threats. Crews will be able to rely on augmented reality interfaces that merge sensor data, thereby helping to reduce the workload during extended missions. Engagements from a safe distance, using long-range missiles, will limit exposure, whilst electronic warfare will provide non-kinetic capabilities to neutralise enemy defences.

Survivability

The effectiveness of very short-range surface-to-air threats (missiles, weaponry mounted on combat vehicles) has been highlighted during the fighting on the Russian-Ukrainian front. Helicopter survivability requires meeting three key requirements:

- the capacity to avoid detection, therefore to be concealed by natural terrain features, flying between obstacles, preferably at night, whilst minimising thermal, electromagnetic and acoustic signatures as much as possible;
- failing this: the capacity to avoid being hit by quickly taking cover behind obstacles, and to have a comprehensive, fully automatic countermeasures system[34];
- failing this: the capacity to withstand certain types of damage caused by gunfire, through the redundancy and protection of vital components, as well as the ability to make an emergency landing.

The attack helicopter's active and passive survivability must therefore be enhanced by maintaining sufficient manoeuvrability, reducing its radar signature, equipping it with systems for detecting and protecting against enemy fire, and shielding the helicopter's vulnerable parts.

34 In challenging environments, fly-by-wire systems will improve manoeuvrability.

Combat damage

In a potentially high-intensity conflict, repairing the inevitable combat damage sustained by deployed vehicles is a key factor in ensuring that damaged vehicles can rapidly be returned to service. This must be factored into the vehicle's design. As the presence of civilian personnel may not be possible on site, provision must also be made, on the one hand, for military personnel (possibly reservists) to be trained in diagnostics and emergency repairs, and, on the other hand, for the necessary equipment for such interventions to be at hand.

Adapting to technological change

Programmes supported by European funds that focus on technological building blocks should be able to contribute to future developments, including the future aerial combat system.

It is important to take into account predictive maintenance based on generative AI techniques and, from the design stage, to consider recommended maintenance plans for wartime[35].

Advances in technology are driving an increase in on-board electrical power requirements: it is important to take this into account in the overall design of the device.

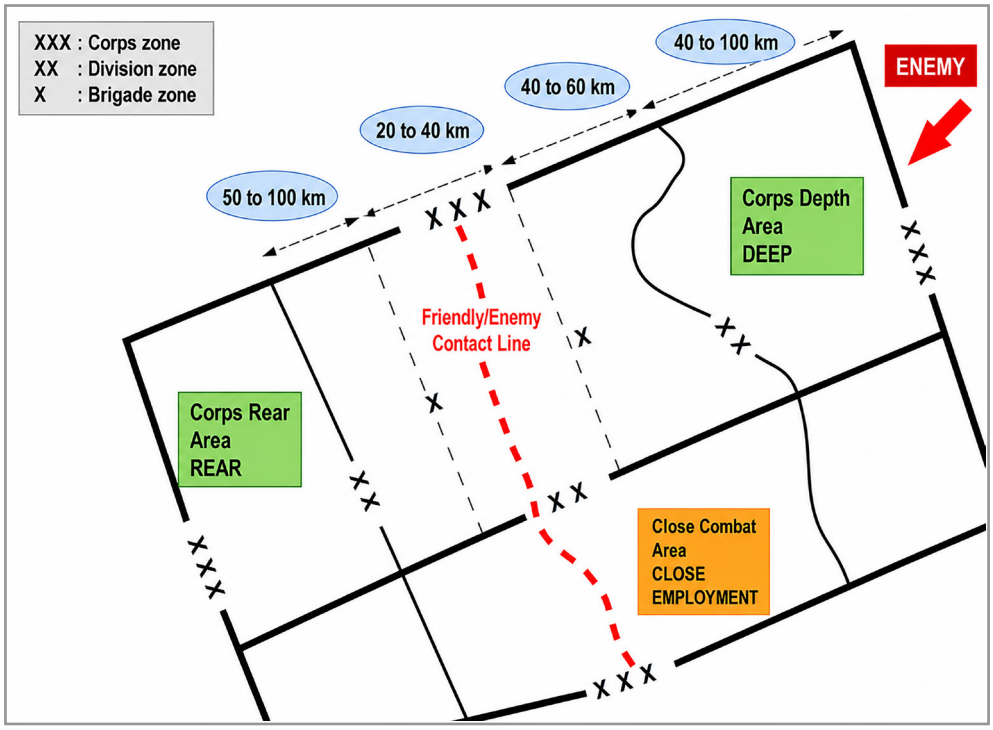
Adapting to challenging conditions

The deployment of European combat helicopters over recent decades shows that, over the course of a programme's lifespan, all manner of conditions are encountered in operation; the helicopter must be capable of operating in extreme conditions (temperatures, dust or snow, altitude, saline atmosphere), and maintenance operations must be able to be carried out under these same conditions.

The system must also be subject to advanced maintenance carried out as close as possible to the operational areas, minimising the number of staff exposed to the risk as much as possible and prioritising access to key components.

35 *HUMS (Health and Usage Monitoring System) devices will make it possible to anticipate maintenance requirements and support operational availability.*

APPENDIX 3: The role of air combat in battlefield tactics



APPENDIX 4: Acronyms

CAS: Close Air Support
CEMA: French Chief of Defence Staff
C2: Command and Control
EDA: European Defence Agency
EDF: European Defence Fund
EUMC: European Union Military Committee
ENGRT: European Next Generation Rotorcraft Technologies
HUMS: Health and Usage Monitoring System
ILS: Integrated Logistic Support
ITAR: International Traffic in Arms Regulations
MOSA: Modular Open Systems Approach
MTOW: Maximum Take-Off Weight
MUM-T: Manned-Unmanned Teaming
NATO: North Atlantic Treaty Organisation
NGMH: Next Generation Medium Helicopter
NGRC: Next Generation Rotorcraft
PESCO: Permanent Structured Cooperation
R&D: Research and development
UAV: Unmanned Aerial Vehicle
VTOL: Vertical Take-Off and Landing

APPENDIX 5: List of working group members

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