

No. 122 - JANUARY 2021

ROTOR

BY

AIRBUS HELICOPTERS

MISSION

What really matters

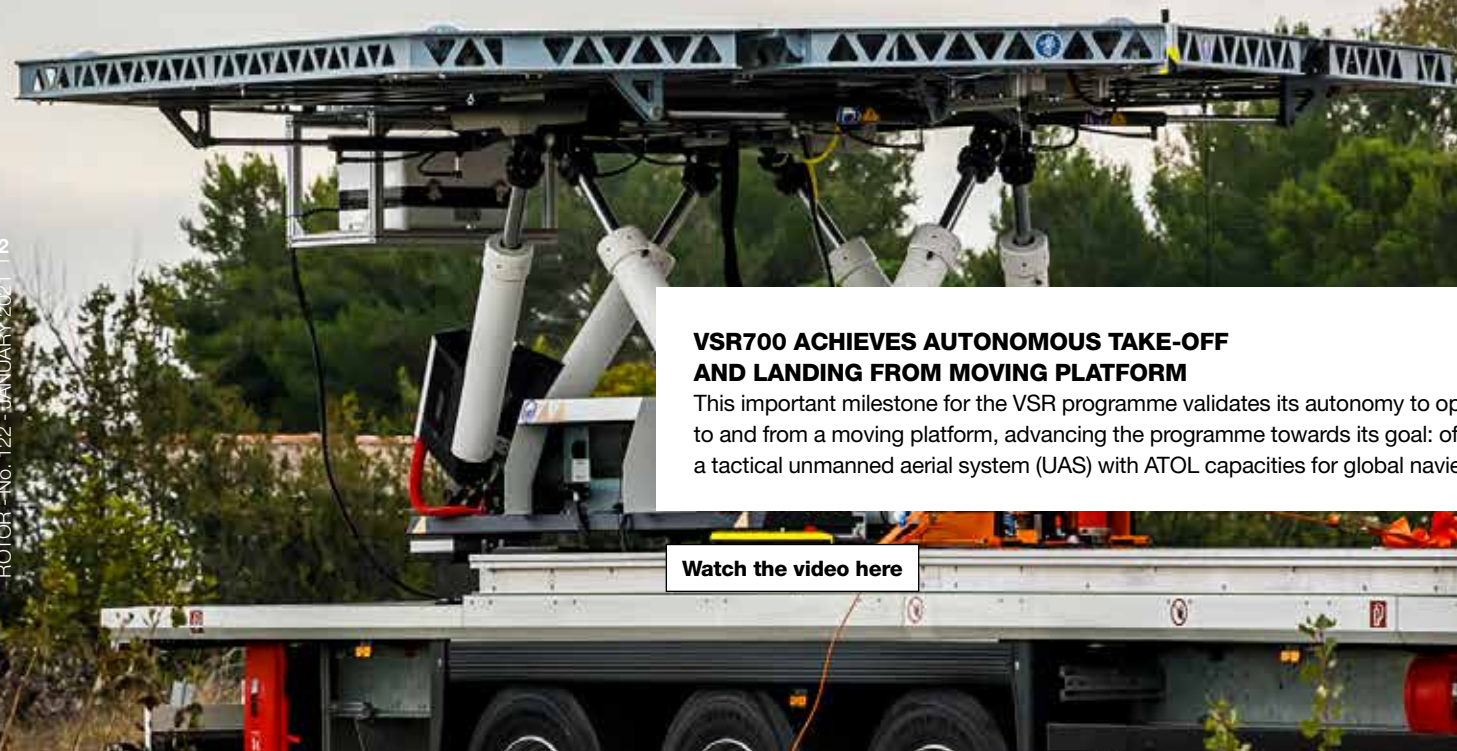
PROFILES

**Is there a doctor
onboard?**

SERVICES

**H160 simulator:
As good as real**

Testing the future



VSR700 ACHIEVES AUTONOMOUS TAKE-OFF AND LANDING FROM MOVING PLATFORM

This important milestone for the VSR programme validates its autonomy to operate to and from a moving platform, advancing the programme towards its goal: offering a tactical unmanned aerial system (UAS) with ATOL capacities for global navies.

[Watch the video here](#)

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EXPERTISE

THE ECUADORIAN AIR FORCE TAKES DELIVERY OF THEIR FIRST THREE H145s

Airbus Helicopters has delivered three H145s to the Ecuadorian Air Force, the first military customer in South America for this helicopter. A total of six H145s will be delivered in 2021. The H145 helicopters, known as “Cobra” in the Ecuadorian Air Force, will help with missions related to national security, such as border surveillance and the fight against drug trafficking, as well as carrying out rescue operations at high altitudes, medical evacuation (medevac) and assistance in the case of natural disasters, both during the day and at night. The contract includes training for 12 pilots and 15 technicians, as part of an in-country operational training programme.



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BUNDESWEHR ORDERS 31 NH90s FOR SHIPBORNE OPERATIONS

The German Bundeswehr has ordered 31 NH90 helicopters, to be known as Sea Tiger, for the German Navy’s shipborne operations. The helicopters will replace the German Navy’s Sea Lynx Mk88A fleet which entered into service in 1981. The Bundeswehr has already ordered 18 NH90 Sea Lion naval transport helicopters, seven of which have already been delivered. The widespread use of the NH90 TTH by the German Army and the NH90 NFH by the German Navy enables considerable synergies in terms of logistics and training. Both the Sea Tiger and the Sea Lion are derivatives of the NH90 NFH.

FIRST NH90 DELIVERED TO THE SPANISH AIR FORCE FOR SAR MISSIONS

The Spanish Air Force took delivery of a first NH90, which will boost their search and rescue (SAR) and combat search and rescue (CSAR) mission capabilities. The Spanish Air Force will receive 12 NH90s intended to replace its aging fleet of AS332 Super Pumas and which will be based in Cuatro Vientos, near Madrid. Spain has ordered a total of 45 NH90s in the tactical transport version, to be operated by the three armed forces. Thirteen helicopters have already been delivered to the Spanish Army Airmobile Force (FAMET) for the Maneuver III Battalion in Agoncillo. Airbus Helicopters in Spain is involved in the manufacturing of the NH90’s fuselage and the avionics software development and integration.

WORLD SUCCESS FOR THE ACH130 ASTON MARTIN EDITION

The ACH130 Aston Martin Edition will enter service in Latin America, North America and Asia Pacific over the coming months. The first example in Asia Pacific of this exceptional model was ordered by an existing Airbus customer in New Zealand. It will be used privately as well as in VIP charter operations. In Latin America the ACH130 Aston Martin Edition has just entered service with an undisclosed VIP customer in Guatemala. Most recently another undisclosed private customer in Canada has ordered the third example. Launched in January 2020, the ACH130 Aston Martin Edition is a stylish special version of the ACH130, and particularly features a range of interior and exterior designs created by Aston Martin.



© Adrien Daste

EXCEPTIONAL



© Lloyd Horgan



© Patrick Heinz

MILESTONE BECOMES FIRST LEASING CUSTOMER FOR H160

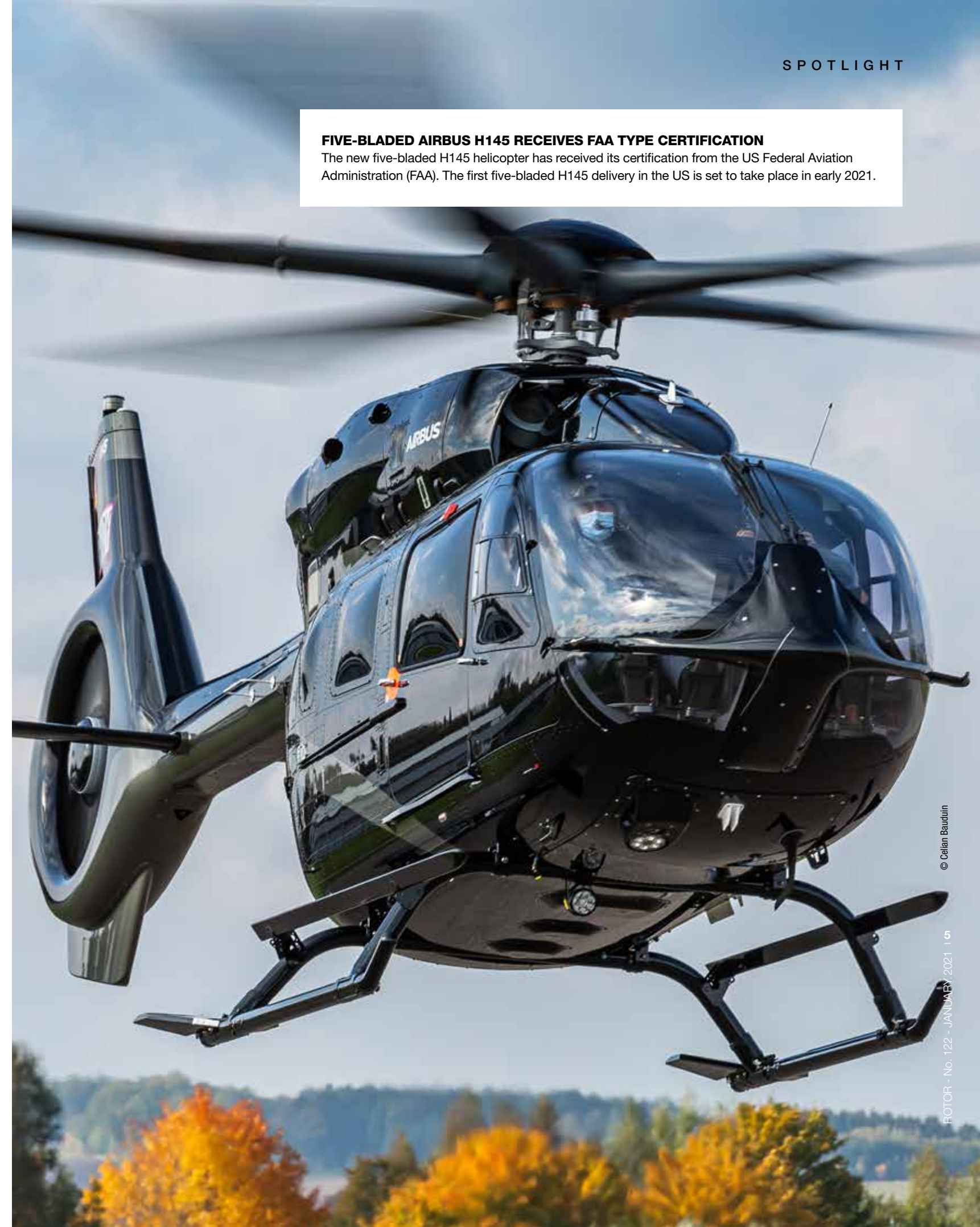
Milestone Aviation and Airbus Helicopters have agreed to include six H160s in Milestone's orderbook, the first of which is set to be delivered in 2023. The helicopters will be destined for a range of missions including offshore transportation and emergency medical services. Milestone supports over 45 customers in more than 30 countries serving a variety of industries, including offshore oil and gas, search and rescue, emergency medical services, police surveillance, mining and other utility missions.

THE 1,400th H135 IS DELIVERED TO MONT BLANC HELICOPTERS

In 2020, the H135 family reached a major milestone: the company's 1,400th H135 was delivered to the French operator Mont Blanc, adding to a fleet of more than 20 H135 and H145 helicopters in service with the operator to provide helicopter emergency medical services (HEMS) in France. Since first entering into service in 1996, the H135 family of helicopters has gone through regular improvements in performance and capabilities to respond to the unique needs of HEMS operators. Today, the H135 is a leader in the HEMS industry, currently holding 25% of the global market share for HEMS and boasting over 650 units in service.

FIVE-BLADED AIRBUS H145 RECEIVES FAA TYPE CERTIFICATION

The new five-bladed H145 helicopter has received its certification from the US Federal Aviation Administration (FAA). The first five-bladed H145 delivery in the US is set to take place in early 2021.



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Bruno Even, CEO of Airbus Helicopters

“Engineering the future cannot be improvised.”

After the difficult year we have just left behind, I like the idea of starting in 2021 with this issue of Rotor Magazine dedicated to innovation. Innovation is all about hope, optimism, new challenges and preparing the future, the self-same values that we all share here at Airbus Helicopters. 2020 was a tough year for us all, with our industry having to face a number of setbacks that were impossible to foresee. Despite this incredibly difficult context, Airbus Helicopters managed to resist the effects of the crisis in terms of market share, especially thanks to the success of the H160 and the new H145, two helicopters which were certified in 2020. These achievements were borne out of the boldness, determination and foresight of our predecessors, who chose the path of innovation then so that we can reap the rewards now.

That's why it is up to us as leaders in the helicopter industry to continue to trust in innovation despite the hardships of the current situation. We need to bring incremental innovation to our current products and in parallel keep a long-term

vision as it takes time to mature technology and ensure it can meet a market need. Engineering the future cannot be improvised.

Our innovation strategy is intimately linked to our values, with a firm focus on making helicopters and VTOL aircraft even safer, easier to fly, more accessible and sustainable in the interests of both the environment and society as a whole. We want to improve the things that are truly important to you, our customers and users.

However, innovation is not just a question of figures, investment and budgets; above all, it comes down to attitude and values. We have to provide the necessary conditions to foster creativity, enthusiasm and willingness to go the extra mile, and we cannot do this alone. Indeed, at Airbus Helicopters we are conscious that innovation is also a matter of humility: we know that we don't have all the answers and we need the ground-breaking ideas of our partners, suppliers and collaborators in order to shape the future. By innovating together, we will all go even further.

6 Million

flight hours reached by the H145 family of helicopters (BK117, EC145 and H145).

Over 3,000 HEMS helicopters

around the world are performing about 200 life-saving missions every hour. In the US alone, over 1,000 HEMS helicopters transport an estimated 400,000 patients annually.

33

MINUTES

On average, one person is saved every 33 minutes in France by a Dragon (EC145) from the Sécurité Civile.

2 H160s

were acquired by Hélicoptères de France to address a wide range of operations.

The H135 now benefits from a new alternate gross weight that enables operators to have an increased maximum take-off weight of up to **120 kg or to extend the range by up to 75 NM or even have 40 minutes extra endurance.**

1st NH90 TTH

FOR QATAR

which performed its first flight in Marignane. In total, 28 multi-role helicopters will be delivered to the country.

52

MISSIONS PER DAY

are done on average by ÖAMTC Air Rescue, who operates 28 H135 helicopters and who just acquired five more in December 2020.

Around 10,000

transportations related to COVID-19 were flown by HEMS helicopters in the US in 2020.

MORE THAN

300

customers in 60 countries use helicopters from the H135 family.

Testing the future

The future of helicopters is being written now. After years of continuous improvements to products and services, the convergence of factors deriving from the crises we currently face may provide the definitive boost needed to take vertical flight to the next level. The aim: to adapt to new market demands for helicopters that are safer, cleaner, quieter and more autonomous.

Article: B. Morant, A. Marchand, H. Couthaud



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“If there’s one thing we know at Airbus Helicopters, it’s that the only way to stay competitive in a complex economic context is to innovate,” explains Tomasz Kryszynski, Head of Research at Airbus Helicopters. “For Airbus Helicopters, innovation only makes sense if it allows the company to progress to better serve its customers. This is why we continue to invest to improve our existing range, develop the new programmes expected by the market, imagine future VTOL transport, and find innovative solutions to reduce the environmental footprint of our helicopters.”





Maturing this technology takes time and involves demonstrating its viability through three possible approaches: firstly, through testing of the technobricks one by one in the Flightlab; secondly, testing on disruptive in-flight demonstrators such as the RACER and CityAirbus; and finally, by cooperating with suppliers, partners and universities that can contribute innovative and viable ideas from outside the company.

THE TECHNOBRICK INNOVATION STRATEGY

Testing new technologies in the Flightlab allows Airbus Helicopters to put ideas into practice very quickly while at the same time considerably

reducing the costs associated with test flights. “The Flightlab is our research laboratory, allowing us to quickly test the technologies of today and tomorrow that may one day be used to equip our current range, or may end up on our demonstrators or on even larger platforms like airliners,” says Krysinski. The many solutions currently being tested include improvements to decrease the emissions output of conventional thermal engines, hybrid and electric propulsion technologies, autonomy advances and other technologies to improve flight safety, and sound reduction research under the Quieter Skies project (more information on page 13).

1: The CityAirbus full-scale demonstrator conducted its first take-off in May 2019.

2: The Flightlab began its operations in spring of 2020.

[Watch the video here](#)



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UAM: REALITY OR SCIENCE FICTION?

Airbus Helicopters' innovations in the field of Urban Air Mobility (UAM) are aimed at developing a safe, clean flying platform with a minimal noise footprint. While this is still at the demonstrator stage where a broad knowledge base is being built, the idea is to develop a certifiable vehicle, which can be released when the market is ready.

“The advantage of using technology demonstrators is that we can very quickly test the different technology options and validate them based on our criteria,” says Joerg Mueller, Head of Urban Air Mobility at Airbus. “The CityAirbus demonstrator allows us to test the novel eVTOL architectures as well as certain technobricks, such as electrification or advanced flight controls. “However, UAM embraces so much more than just platforms: it’s creating an entire ecosystem that encompasses air traffic management and regulation, the integration into cities including ground infrastructure, and the delivery of a transport service to the passenger. We are working closely with EASA, the French Directorate General of Civil Aviation (DGAC), and the German Luftfahrtbundesamt (LBA). Nonetheless, there is a further decisive factor: public acceptance. We have to prioritise safety, generate no CO₂ emissions on the flight, and optimise for noise. In summary, we need to ensure that we provide real added value for citizens if we want to introduce these solutions in major cities.”

[Watch the video here](#)

Airbus Helicopters Flightlab

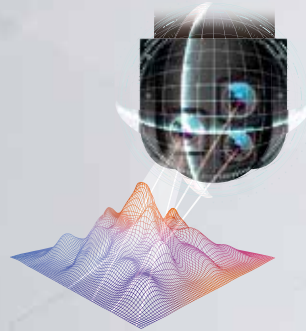
Literally a flying laboratory that enables the technologies of tomorrow to be tested today, bringing new innovative solutions for improving flight safety while reducing emissions.

Customer value

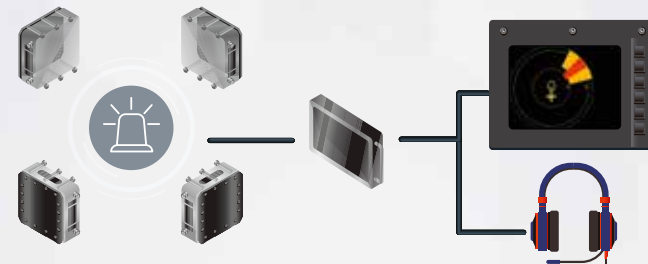


1 Exploring autonomy and improving flight safety

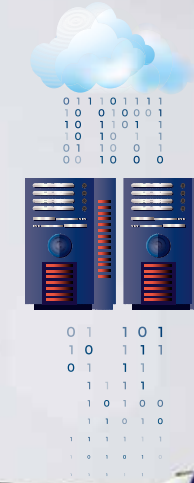
1.1 Image detection (EAGLE) will enable low-altitude navigation based on vision through cameras, automatic obstacle recognition, 3D reconstruction of landing zones, etc. **2021**



1.2 Rotor Strike Alerting System (RSAS) alerts crew about collision risks to the main and tail rotors by indicating in which direction the nearest obstacle is. **2020**



1.3 Viability of Health and Usage Monitoring System (HUMS) for light helicopters. **2021**



1.4 UAM flight controls modify the ergonomics of pilot controls to make helicopter flight more intuitive and easy. **2022**



2 Pursuing hybrid and electric propulsion technologies

Engine back-up system (EBS): A 100-kW electric motor connected to the main gearbox will provide emergency electric power in the event of a turbine failure. **2021**



3 Quieter skies: reducing sounds levels

Measurements of sound levels in urban areas: supported by the French civil aviation authority DGAC. Airbus Helicopters conducted flight tests to measure and correlate the sound levels of helicopters as perceived by people, and particularly how buildings affect this perception. **2020**



Speed up the power

Despite the fact that the helicopter industry and operations represent only a small contribution (0.02%) to global CO₂ emissions¹, Airbus Helicopters is committed to developing, building and testing alternative propulsion systems to disruptively reduce CO₂ emissions in the near future.

Today, helicopters are powered by thermal engines that burn fossil fuel to obtain energy. One of their main strengths is their ability to deliver large quantities of energy with a limited mass of fuel, but as a counterpart, fossil fuels are likewise notorious for producing emissions such as nitrogen oxide and carbon dioxide. Fortunately, the solutions are many: from decreasing the emissions output of conventional thermal engines, to going on to hybrid and even fully electric flight.

AN EMISSION-LIGHTER FUTURE

Airbus Helicopters is constantly studying options on its thermal engines to reduce CO₂ emissions. Over the past half-century, innovations in the field of engine technology have increased turbines' efficiency and compression ratios; today's engines reduce their CO₂ emissions by 50% while generating three times more power². But fuel consumption can also be reduced through a combination of improved aerodynamics and weight reduction.

Another area is power management. An eco-mode on twin-engine helicopters sets one engine to idle ("sleep" mode) while the other runs at a higher, fuel-efficient setting. Developed with Safran Helicopter Engines, and first tested on the Bluecopter demonstrator (an H135 testbed), this technology can generate fuel savings, improving the way helicopters use one or both thermal engines at the same time.

HYBRID: A GREENER FUTURE

A mid-hybrid solution is being developed as a back-up for single-engine helicopters in the event of an engine loss: the electric engine can intervene for about 30 seconds of power to let a pilot manage a safe descent. The system is the first concrete application of hybridisation on a light helicopter, and will be tested on the Flightlab in early 2021.

That opens the door to full hybrid studies next year. "We're looking for larger power – more than 200 kW – to be able to have the engine work at the same time as the turbine to optimise the fuel consumption during a mission," says Luca Cossetti, Innovative Power Solutions at Airbus Helicopters.



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AND ELECTRIC?

The main challenge of the fully electrical helicopter is currently the storage of the electric energy, regarding both mass and volume. But Airbus Helicopters is optimistic, especially as electric energy storage is improving. The company is addressing the electrical market with the CityAirbus demonstrator, fully electric, whose multi-rotor architecture and particular mission type favour the concept.

(1) Air transport represents between 2 and 3% of global CO₂ emissions, and helicopters represent about 1/100 of the air transport fraction.

(2) Source: SHE.

DID YOU KNOW?

91.5% of the emissions from a helicopter engine is in the form of hot air. Carbon dioxide accounts for 6% of the vehicle's emissions.

THE ULTIMATE STEP : HYDROGEN (DIRECT BURN OR FUEL CELLS)

The ultimate step could be the use of another sort of energy: hydrogen. Hydrogen could be used in two main ways: replacing kerosene on modified turboshafts (in other words, a direct H₂ burn, zero CO₂ solution), or feeding a fuel cell to produce electric energy for a full electric propulsion system (a zero emission solution).

This technology has made significant advances, particularly in the fixed wing segment, but the power requirements and the integration on a helicopter remain a challenge. Nevertheless, hydrogen technologies could be mature enough to fly on a helicopter demonstrator as early as 2029.

SUSTAINABLE ALTERNATIVE FUELS

Airbus believes sustainable alternative fuels, deployed for use on in-service rotorcraft or for future fleets, has the potential to become a major driver for CO₂ reductions, recognising that transitioning to sustainable energy sources will require cross-industry dialogue and partnerships.

1: Transitioning to sustainable energy sources will require cross-industry dialogue and partnership.

2: Electrical propulsion is at the core of an Airbus electrical vertical take-off and landing vehicle (eVTOL).

Listen up! Sound reduction as a mindset

Since the introduction of noise certification limits, Airbus Helicopters has always looked at ways to lower the sound level of its helicopters. Its goal? Driving the change to remain the benchmark for low sound levels while going one step ahead of requirements.

Article: Heather Couthaud

The main source of sound from a helicopter is from its rotor blades. Blades produce several types of sound, some due to air displacement (thickness noise); others from forces acting on the air that flows around the blade (loading noise)—caused by lift and drag, for example. Still other sounds come from aerodynamic shocks on the blade surface, or interactions with turbulent inflows of air. The engine and gearbox generate sound, too, especially up close. Helicopter type (heavy vs light) and the position of the listener contribute as well. What tends to register most with observers is when helicopters fly in certain “phases”, notably take-off or landing—precisely where they are needed the most for the service of the population (think of policing or EMS services).

APPLYING INNOVATION WHERE IT'S NEEDED

Traditionally, Airbus helicopters fall well below the International Civil Aviation Organization's (ICAO) limits regarding noise, thanks to the regular application of new technologies. These include the Fenestron's optimised blade and stator designs, which serve to mask the sound of rotors and reduce the discomfort to passengers; the automatic variable



© E. Riaz

rotor speed control system that automates the rotor towards lower rotational speeds when the helicopter flies close to the ground—a position that registers strongly with observers nearby; and Blue Edge blades with their double-swept shape that limits the levels and impulsivity of blade vortex interaction (BVI) noise.

This has resulted in Airbus producing quieter aircraft, particularly the H130, H135, H145 and H160, which are industry-wide benchmarks for sound level in their respective classes.

DID YOU KNOW?

Our perception of sound is just as important a factor in judging how quiet, or not, a helicopter is. We tend to be more bothered by impulsive, tonal, high frequency sounds, but the duration of one's exposure to the sound also matters.

GOING BEYOND REQUIREMENTS

In the mid-term, the company's goal is to reduce helicopters' operational noise emissions, thereby substantially impacting the public's perception of their sound.

Innovation efforts are now focused on improving the Fenestron, working on blade shapes, further reducing rotor speed, exploring low-sound flight procedures by modifying flight trajectories, and inventing very specific solutions for reducing a helicopter's perceived sound footprint in urban areas.

“A helicopter will emit sound differently depending on its flight phase,” says Julien Caillet, a sound expert at Airbus Helicopters. “A landing procedure with a steeper glide slope can lower blade vortex interaction noise, and flying the helicopter with a given attitude can also reduce tail rotor noise in several flight conditions. That's why research is being done into automating the landing within the autopilot mode to make take-offs and landings quieter.”

Technology can reduce operational sound as well.

Since rotor noise has decreased thanks to the technologies mentioned, engine noise has started to gain attention, particularly in operations close to the ground. Caillet and others are working on ways to reduce the sound from engines, too. Additionally, studies related to hybridisation show that this could also bring reductions in noise emissions by lowering rotor rotational speeds and eventually engine sound.

SOUND PERCEIVED

In June 2020, Airbus Helicopters' innovation and acoustics teams, supported by the French civil aviation authority DGAC, conducted a study to measure the sound levels of Airbus helicopters as perceived by urban residents in order to positively influence the design and trajectories of future eVTOLs, which should perform increasingly more operations above cities.



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CityAirbus: vertical flight 2.0

For Airbus, urban air mobility is a great way to accelerate its zero-emissions strategy and, with the CityAirbus demonstrator, develop a future flying machine with full electric propulsion.

Article: Alexandre Marchand



Forced to tread carefully in the relatively unexplored field of urban mobility, CityAirbus conducted its maiden flight on 1 May 2019, at the Donauwörth (Germany) site, restrained by safety cables.

Since then, the CityAirbus demonstrator has been carrying out free flights hovering in manual and automatic mode in Donauwörth and later at the Manching site. The team's ambition was to achieve a first automatic flight, gradually expand the flight envelope and now to validate the level of performance in order to pave the way for the next CityAirbus generation.

PREPARING THE FUTURE

"The main challenge for Airbus as regards CityAirbus is providing it with the range, weight, power requirements and autonomy of a future serial vehicle. From the very beginning, the CityAirbus demonstrator design took aerospace standards into account, with a comprehensive architecture fulfilling the highest safety levels that allows us to gain experience on the relevant aspects of a future certification effort. In particular, environmental issues and electrical propulsion are at the core of an electrical vertical take-off and landing vehicle (eVTOL)," explains Eric Ferreira, Head of UAM engineering at Airbus.

With a total weight of around 2 tonnes (compared to the 2.2 tonnes of the CityAirbus demonstrator) and the ability to carry a highly modular payload of up to 250 kg, a serial CityAirbus could find application in the field of urban air mobility, as well as for

emergency medical services.

The real challenge, however, is to integrate this new class of vehicle safely in the urban environment. This is why Airbus isn't merely embarking on the development of a vehicle, but is on a quest to co-create an entirely new market that sustainably integrates urban air mobility into the city context, while at the same time addressing environmental and social concerns.

INNOVATIVE TECHNOLOGIES

At the heart of CityAirbus lie innovative power systems, engines and propulsion choices: four batteries, eight electric motors of 100 kW connected to the same number of propellers, grouped in pairs in four nacelles 2.8 m in diameter. Engine redundancy is a key factor in safety, but the aircraft also represents a constant search for simplicity, which is synonymous with reliability. For example, the position of the nacelles is fixed, as is the pitch of the propellers. The variation of thrust and control of the vehicle is simply managed by adjusting the rotation speed of each propeller. The aircraft has no servo controls, thus reducing weight, increasing reliability and bringing down maintenance costs.

To deal with issues related to its use in urban areas, particular attention has also been paid to its acoustic footprint: the electric motor is inaudible and propeller rotation speed relatively low (120 to 140 m/s compared to around 200 m/s for a traditional helicopter), all contributing to the aircraft's discretion.

"A full-scale experimental demonstrator enables us to test new technical solutions that could eventually also transform helicopter flight."

Eric Ferreira,
Head of UAM
engineering at Airbus

Going further, faster!

Increasing the speed and range of helicopters at reasonable cost: this is the ultimate goal of RACER, the first aircraft to represent a new breed of flying machine. The countdown has begun.

Article: Alexandre Marchand

While taking off and landing like a helicopter, RACER (Rapid and Cost-Effective Rotorcraft) will also fly as fast as a propeller aircraft, around 400 km/h.

This combination of supposedly contradictory performance capabilities, vertical flight and speed, is an old dream taking new shape in the form of RACER. As well as delivering on expected performance, the project led by Airbus Helicopters incorporates technical solutions with a sophistication that overcomes complexity.



This fusion of performance and simplicity is without doubt RACER's real success.

ENVIRONMENTAL OBJECTIVES IN SIGHT

The aircraft combines the rotor of a helicopter with the propulsive propellers of a fixed-wing aircraft. The propeller nacelles are attached to the fuselage by a box wing that provides high-speed lift while housing the landing gear and power transmission to the propellers. In addition, ambitious environmental objectives are expected to be met thanks to an 'eco-mode' that allows one of the two engines to be shut down during the cruise phase, then to be restarted quickly and automatically at maximum power due to a new type of electric motor. It is no coincidence therefore that the RACER programme is partly financed by the European Commission's H2020 research programme, as part of Clean Sky 2.

AN EXAMPLE OF TRANSNATIONAL COLLABORATION

Before flying any missions at 400 km/h however, all aircraft development and fine tuning must be completed. Today, Airbus Helicopters and its thirty European partners are putting everything into preparing a first flight that will take place one year from now. The lateral drive shafts, each of which is 3 m long and spins at 3,000 rpm, will be essential to achieving the expected performance. Their upcoming qualification will enable Airbus to overcome one of the programme's biggest technical obstacles.

The RACER fuselage is being assembled in Romania. This will then be sent to Donauwörth, Germany, to be fitted with the fuel system, part of the electrical system and the nose. Wing assembly will also be validated before all elements are shipped to Marignane, France, where the tail boom from Spain and main gearbox, co-developed with Italian partner Avio, will also be fitted. This distribution of activities follows the new industrial logic of site specialisation implemented by Airbus Helicopters. Final assembly will therefore take place in Marignane, in the building reserved for prototypes.

In this final stretch of development leading to the first flight, a new, and complicated but exciting phase is beginning for Airbus Helicopters teams and their partners.



The new alternate gross weight of the H135 gives operators an increased MTOW of up to 120 kg



Article: Alexandre Marchand – Photos: Thomas Goisque

1

Sahel, 2019. A Gazelle is shot down in combat and the daring rescue of its crew by a Tiger leads to an incredible adventure. One year later, survivors and crew tell their story.

“Fighting lasted all night, it was difficult, intense and covered a wide area.”

Colonel Meunier, Commander of the Tactical Desert Air Combat Group.

In June 2019, French armed forces launch Operation Aconit, a major push in the Liptako region, a hotbed of armed terrorist groups. Around 20 helicopters are deployed: Gazelles and Tigers for reconnaissance and attack missions and NH90 Caimans and Cougars used to transport and drop commandos.

THE LONGEST NIGHT

“On the night of 13 to 14 June, after tracking a motorbike all day, a surveillance drone spotted a group of about a dozen men in a remote forest. No fire...very suspicious,” explains Colonel Meunier, commander of the Tactical Desert Air Combat Group. Around 40 mountain commandos, travelling in four Caimans, are sent to assess the situation, about 15 minutes after two Tigers had also deployed.

The first shots ring out as soon as the commandos land, leaving no doubt: the enemy is on the run. It is 2300 at night and level 5: no moon or residual illumination.

“Fighting lasted all night, it was difficult, intense and covered a wide area,” says Colonel Meunier. By early morning, firing continues, but the battle is less intense. Two Gazelles are brought in, taking advantage of the first light of dawn to replace the two Tigers, one of which stays behind a few minutes to transmit instructions.

A HORRIBLY FAMILIAR SOUND

“I was heading into my tenth flight hour and my third rotation in the combat zone since the night before,” says ‘Paco’, commander of this last Tiger. “We were glad to return to Ménaka for some well-earned rest...”

1: The ‘TIGREX’ (Tiger Extraction) procedure was developed a few years previously during operations in Afghanistan.

2: For seven years, Tigers have criss-crossed the Sahel, bringing firepower and the reliability of a helicopter well able to take the blows and damage of war.

3: Ultimately, the Tiger crew saved the lives of three men.

Paco identifies the woods where a man has been sighted, apparently unarmed. One of the Gazelles makes a first pass at about 200 metres from the boundary, without spotting anything. During the second pass, 10 metres above the ground, the team hears a horribly familiar sound, like gravel slamming against the fuselage. They are hit...The engine dies, leaving the pilot just enough time to level out the helicopter before impact. After a long slide, the helicopter hits a mound of earth and flips over. The Tiger crew see the Gazelle hit the ground and burst into flames. A radio message goes out immediately: “The Gazelle is down; the Gazelle is down...!”

NO TIME FOR HESITATION

When the dust clears, the Gazelle’s three crew members are visible and still moving. They are all alive, but injured. Without hesitation, the Tiger’s commander, Paco, signals the pilot: - Put her down, we’re going in to get them! Less than 90 seconds after the crash, the Tiger with its rotor turning lands around 30 metres from the burning wreckage. A maritime Atlantique 2 is filming the scene from a moderate altitude: the Gazelle’s onboard sniper, who was the least injured during the crash, drags the Gazelle’s commander towards the Tiger. Incapable of walking, the Gazelle’s commander tries to roll himself away from the burning helicopter.

The commando does what he can: he positions the first man on the right landing gear strut, the



second on the left gear strut. He then climbs onto the right gun arm of the helicopter, above the rocket cradle. Only the commander is secured, as the survival straps of both pilot and commando have been damaged or lost in the accident. All they can do is lock their arms, hold on and not let go. A real challenge for two injured men.

The Tiger’s crew, who know what danger all three men are in, are living their own nightmare. Weighing up the situation, the commander decides that getting off the helicopter puts everyone at greater risk and would prevent an emergency take-off in the face of immediate danger. His intuition tells him that the three survivors can hang on for a few minutes, that they have the strength to pull through. Paco calmly gives the order: - Come on, let’s take off and head for the helicopter lift zone.

“HOLD ON GUYS...”

The second Gazelle contacts the Tiger: - Are you picking up two?

- I’m taking three... we’re trying for three.

The Tiger pilot focuses, flying low and slow. A few centimetres away, separated by the plexiglass canopy, he can see his two comrades in pain. Hold on guys, just a few more seconds... hold on... With the two men positioned on the forward landing gear strut, the helicopter is off balance. Focused on his flying, the pilot ignores this. The Tiger takes everything he throws at it without complaint. After four minutes in flight, maybe five, the helicopter lands near the commandos. The doctor on duty immediately takes charge of the injured men and prepares them for evacuation. After a few more minutes of waiting, a Cougar medevac lands to transport them straight to Gao.

Today, all three men have resumed their full commando and pilot duties.



FRANCE

WHAT REALLY MATTERS

Article: Belén Morant – Photos: TRE/ Benjamin Bechet

On 2 October 2020, Storm Alex hit the Nice countryside, destroying almost everything in its path. Devastating homes and cemeteries, torrential rains destroyed several bridges and over 50 km of roads. The towns and villages of the Tinée, Vésubie and Roya valleys were cut off from the world, sometimes left without running water or electricity.

A few days earlier, when the first alerts began to reach the base of Hélicoptères de France (HDF, HBG Group) in Carros, a flight assistant and sales executive for the company, Florence Mayere, thought that the floods would be like many that had affected the valley in the past. “Nobody had predicted the scale of Alex. At this HDF base, where we usually operate one H125 for aerial work, we quickly increased our fleet to four aircraft operating at full capacity,” says Mayere.

A HIGHWAY IN THE SKY

Others immediately joined them. In the first few days, more than 30 helicopters were operating in the valleys. With the support of the armed forces, the prefecture immediately established an extremely effective organisation: all take-off clearances required their approval and permanent radio contact was introduced to give priority to the most urgent missions, that of delivering supplies, evacuating the wounded, searching for missing persons and emergency material assistance.

“We managed material damage: roads, electricity and water. It was a great example of collaboration. With so many helicopters in the sky, a unique configuration with many electric power lines... we needed really effective rules. It was like a highway: permanent radio contact, ascending and descending on the left...,” Florence Mayere remembers.

15,000 HOUSEHOLDS WITHOUT POWER

At the height of autumn, with overnight temperatures already at zero degrees, power cuts deprived many households of heating and hot water. With several roads closed or blocked, electrical provider Enedis depended on the pilots of STH, the helicopter services division for RTE*, to transport emergency teams and heavy equipment, such as power generators, to villages left without electricity. For Philippe Anfosso and his team, responsible for the maintenance and upkeep of RTE lines in the Var and Alpes-

Maritimes regions, there was nothing ordinary about this mission: “I’ve been flying over these valleys for more than 30 years as part of my job, and I myself live in the countryside. Emotionally, it felt like an apocalypse as we know people who live in the valley. I even have colleagues who lost their homes,” explains the RTE worker. The most urgent need was to assess the extent of the damage, deal with alarms from transformers in the Roya valley and monitor the electrical network connected to the hydroelectric plants that had been buried. The STH helicopters, those belonging to RTE, were in the area from Sunday to evaluate the Roya, Vésubie and Tinée valleys.

AN IMPOSSIBLE MISSION WITHOUT HELICOPTERS

“No high-voltage network had been impacted, because in our valleys all lines are up high,” explains Philippe Anfosso. “As a



result, we were able to focus on electrical substations, to find out if it was possible to keep the lines going.” For this surveillance mission, teams used the H125, and the inspection was purely visual. “We inspected close to 350 km of cables, most of which are inaccessible on foot. It’s basically an impossible mission without a helicopter. On foot, it would have been a distance of around 1,200 km... basically, I would still be inspecting the lines today.” RTE set about helping Enedis by transporting generators and other essential equipment for repairs. A week later, 97% of the people affected by the storm once again had electricity in their homes. For several weeks, RTE continued these helicopter missions to monitor high-voltage installations.

THE ONLY CONNECTION WITH THE OUTSIDE WORLD

Roads and railways were cut off, isolating thousands of inhabitants who were unaware of what was happening in the neighbouring valley. “When we flew over the valley for the first time the Saturday after the storms, it looked like a war zone. It was as if the road had been bombed; in some places there was no road left,” explains Antoine Albin, works coordinator at NGE Foundations for the French railway system, SNCF. “It’s scary when you know the valley and what it used to look like.”

Antoine Albin and his team are currently securing the Conti-Vintimille line. In inaccessible areas where machines and equipment

1: “In the first few days, the constant presence of helicopters in the valleys reassured the inhabitants, who were completely cut off from the world,” Florence Mayere recalls.

2: RTE used four H125s to inspect lines and transport technical teams, and the H215 to transport loads weighing up to two tonnes.

are delivered by HDF helicopters, they are working non-stop to restore rail traffic as quickly as possible. “Here, rail access hasn’t been as badly hit as road access, so it’s important to sustain it to open up the villages above the valley as soon as possible,” he states. “In this emergency situation, the helicopter is an essential tool, to ensure the safety of personnel when moving loads, and because of its flexibility, which allows us to go wherever we need quickly. There is a price, of course, but all things considered, the helicopter offers maximum guarantees for safety and technical performance.”

Tende Hospital, which was forced to accept some patients from Saint-Lazare Hospital when it was rendered unusable after Alex hit, was also isolated. The only way to access the area was by air. “Medicine, oxygen, gas, heating fuel, food... everything had to be brought in by air,” explains Xavier Coye of Brunelis, pilot and coordinator, responsible for regulating helicopter resources for the CHU (University Hospital Centre) in Tende. “Under ordinary circumstances, the H125 can carry 15 tonnes of freight, in a regular operation with several rotations, including a tonne of oxygen, 12,000 litres of fuel, medicine, masks, food, etc. We operate around 20 rotations per week that enable the hospital to continue treating its patients.”

* RTE: réseau de transport de l’électricité, or French electricity transport network.

[Watch the video here](#)

RTE DURING STORM ALEX

- Close to 200 flight hours
- Five helicopters: a Super Puma and four Ecureuils carried out non-stop daytime rotations.
- 20 generators and response teams were transported
- Around 40 employees were mobilised during the crisis



BRAZIL H225M: STRONGER TOGETHER

Article and photos: Guilherme Wiltgen

All three Brazilian armed forces conducted joint exercises with their H225M in order to increase the interoperability and capabilities of the Brazilian Armed Forces when faced with hybrid threats and their ramifications.

From 28 September to 9 October 2020, the Brazilian Navy's 2nd Naval Division and Naval Special Operations successfully conducted the joint exercise, Operation Poseidon. The joint exercise was intended to foster the interoperability of the Brazilian Armed Forces

“Our core operations are based on joint exercises involving the Army, Navy and Air Force. In this difficult [year of] 2020, the Ministry of Defence planned 17 joint operations, which the Armed Forces have successfully carried out. The same helicopter was tested by all three Forces and we are operating as one.”

General Fernando Azevedo e Silva,
the Brazilian Minister of Defence.

and was carried out by crews of the 1st Army Aviation Battalion (Brazilian Army) and the 3rd/8th Aviation Group (Brazilian Air Force) operating from the Brazilian flagship. These units operate the same model helicopter as the 2nd General Purpose Helicopter Squadron (HU-2), the H225M, which was acquired through a strategic alliance entered into between Brazil and France. Before the sea phase, Naval Aviation conducted deck landing training with the aid of a naval air station landing platform, which simulates a ship's landing deck. Holding patterns, approaches, landings and take-offs were carried out in order to simulate actual shipboard operational conditions as closely as possible, aiming to familiarise crews with operating procedures at sea.

INTEROPERABILITY OF THE THREE FORCES

An important milestone was reached on 6 October, when the H225Ms belonging to all three forces conducted a joint landing on board a Brazilian Navy ship for the first time, thus cementing the idea of the interoperability of the individual forces. The Ministry of Defence had planned for the necessity of this interoperability in 2008, when it signed the contract for the purchase of 50 H225M helicopters, which are manufactured locally by Helibras. The second phase involved the deployment of special forces from the NAM Atlântico, which transports approximately 60 military personnel to the Navy Training Center, on Rio de Janeiro's southern coast, for infiltration and exfiltration exercises. The H225M helicopters were armed with 7.62 mm machine guns and flew with snipers on board.

FULLY PREPARED

Lieutenant-Brigadier Raul Botelho, Chief of the Joint Staff of the Brazilian Armed Forces, monitored the exercises closely, stressing the importance of the operations being carried out. “Our three armed services can only be brought together through exercises and joint operations, and these allow us to pinpoint improvements that can be made going forward. We believe that we can best serve our country and Brazilian society by ensuring that we are always prepared for whatever circumstances we may face. We also believe that to defend our nation is to guarantee national sovereignty, which requires well-trained armed forces.” “We need to know how our other forces operate so as to work together,” explained General Luiz Dias Freitas, Land Operations Commander (COTER). “This exercise enables us to enhance the work done by these other forces and vice versa.”



1: The exercises increased interoperability between troops and squadrons.

2: Joint operations demonstrated the H225M's capability for carrying out special operations missions.

3: The H225M can operate both from ships and from land, in all weather conditions by day or by night.

4: Its large cabin and heavy-lift performance enables the H225M to carry up to 28 troops in cabin seats.

FERRY FLIGHTS DELIVER ON A PROMISE

The particular task of delivering new helicopters to their end customers falls to the hands of ferry flight teams, who often convey aircraft across scores of countries, terrain and weather conditions. A look behind the scenes.

Article: Heather Couthaud

Helicopters may need to be ferried to a customer. Often they're flown from a port of arrival, as in an aircraft flown by Antonov to Thailand and ferried two hours to its base. In another case, an H225 was ferried from France to Tanzania on a 20-stage, 7,700 nautical-mile journey of thirteen days.

No matter the distance, flights are meticulously planned around the helicopter's autonomy and crew workload. For multi-day journeys, visas, lodging and transport must be arranged, as well as ground handling and maintenance stops.

If any of these hits a snag, the delay can lead to repercussions, from having clearances expire, to missing a weather window. En route to Tanzania, rigorous planning ensured the crew avoided a severe low pressure area. "There is no improvisation. We must manage flights to this degree," says Robert Vincenti, an Airbus Helicopters test pilot.

BECOMING FAMILIAR WITH THE AIRCRAFT

Ferry flights often have the advantage of showing the helicopter's operational side – its endurance, its behaviour under various climatic conditions (icing, humidity, sand, maritime) – to a new owner. Seeing the machine fly five or six hours at a time is a gauge of its reliability. Because a customer's pilots make the flight with the Airbus flight crew, it leads to greater assurance

as they become familiar with the machine. And many times, flights cement relationships. "Some customers still call me," says Robert Vincenti. "They were proud to have flown such a mission. There is a confidence that's established and they know that if there's a problem one day, we'll be there to help."



© Anthony Pecchi

- 1: Ferry flights often have the advantage of showing the helicopter's operational side to a new owner.
- 2: The UK team flew in formation over Germany, Luxembourg and France before arriving back in Oxford in the afternoon to deliver the H145s.



© Gregor Wiebe

Before the doors close on Oxford... literally

On 24 March 2020, just a week after the UK entered a national lockdown to control the COVID-19 outbreak, Airbus Helicopters UK (AHUK) faced a problem: four H145s ordered by the Ministry of Defence were ready for pick-up... in Donauwörth, Germany.

To meet its contract to deliver four H145s and a 13-year support system to the UK Ministry of Defence, Airbus Helicopters UK needed to send four ferry pilots and three engineers to and from Oxford and Donauwörth at a time when the pandemic was forcing borders to close and air travel to shut down.

GOING THE EXTRA MILE

To reduce the risk to the crew and the length of time they would be away, the Oxford team hired a private jet to depart on 30 March and drop them at a municipal airport in Germany. The next day the UK team left Germany, flying in formation over Germany, Luxembourg and France before arriving back in Oxford in the afternoon. En route, they refuelled twice, having called the airports shortly before to

confirm their services would be open.

The above-and-beyond effort meant that the helicopters were delivered to the MoD by the end of May and through June, ensuring continuity in the country's training programme. "There's no doubt that Airbus Helicopters UK's quick actions in getting their personnel into place were crucial to avoiding a very difficult situation for ferry flights once the COVID rules kicked in across Europe. I'd like to thank them for going the extra mile and getting these new helicopters to the UK on time," said Group Captain Chris Mullen, Commandant of No. 1 Flying Training School.

"We feel a huge sense of duty to our customers," says Colin James, Airbus Helicopters UK Managing Director. "The job had to be done, people were willing to do it, and the company did everything it could."

"You must do the maximum to reduce the exposure to all sorts of risk, while having an optimum return in terms of route, security, and workload."

Robert Vincenti,
test pilot at Airbus Helicopters, on ferry flights.



© STARS

1
“The H145 is an incredible platform to work on. The ability of our crews to provide care is significantly improved. And the heater’s fantastic!”



© Starlite

2
“The extensive experience of the medical crew across a diversity of fields enables us to provide the highest level of emergency interventions in the field.”



© Karina Flores

3
“It’s a job that combines the rush of adrenaline with application of medical knowledge and criteria to optimise resources and make decisions to ensure each patient gets the best possible treatment.”

1 **Greg Barton,**

paramedic with STARS

You never know what you’re going to experience from day to day. The variety comes from the uncertainty of what we deal with and the environments we work in. In Calgary, we could be at 30 degrees Celsius and have to fly into the mountains and end up at a high altitude where it’s zero degrees.

Also, we’re working under a running helicopter, so one of the challenges is the exposure to the elements, not to mention the patient’s exposure – trying to keep them warm in a time critical circumstance, where cold is actually bad for them. The best part is being able to make a profound difference in the lives of so many people. Seeing those survivors validates the hard work we’ve put in and keeps us motivated.

Most people in the paramedics profession have the ability not to become nauseated, since we’re trained to work in a ground ambulance. It’s a different environment in a helicopter, where there are so many planes of movement.

2 **Tabitha Nicholson,**

Starlite Medical Manager

I have worked in South Africa and across the African continent in various medical roles. As a student, I worked on the Surf Rescue helicopter service in

Durban, which was operated by Starlite Aviation. I have always had a passion for the aviation industry, in particular the facilitation of aeromedical evacuations. When I was offered the opportunity to join the Starlite team as the Medical Operations Manager, I welcomed it and have been with the company since September 2019.

A flight physician or flight paramedic requires all the necessary qualifications to operate and for those working in the field in Mali, a moderately high level of physical fitness is necessary, to cope with the extremes of heat, humidity and long hours both in the regions in which we operate as well as in the aircraft cabin. On the personal front, you need to have excellent crew resource management skills, which go a long way in strengthening the cohesion of the medical team and flight crews. A good sense of humour definitely helps to pass the time between call outs.

3 **Dr. Karina Flores Rojas,**

Medical Director at Eliance Chile

I can say without any exaggeration that I absolutely adore my job. The possibility of complementing urgent medical assistance with aerospace medicine while in the air and saving people’s lives due to the rapid response provided by aerial resources is extraordinary.

It’s a job that combines the rush of adrenaline with application of medical knowledge and criteria to optimise resources and make decisions to ensure each patient gets the best possible treatment, and all with the ultimate aim of saving their life and minimising any short- or long-term after-effects. As Medical Director, I consider it essential for medical crew to have a grasp of basic aircraft aerodynamics and operational security, and pilots should also have an understanding of patient care and aerospace medicine. It’s the only way they can speak the same language so that each of them can understand the tasks the other person has to perform.

For example, a patient may be suffering respiratory insufficiency which could be further complicated if we subject the patient to hypoxia, meaning that we may only be able to fly at a certain altitude. It’s fundamental for pilots to be aware of these factors.

Is there a doctor onboard?

A quick, accurate and precise decision can save a life when time is running out. Doctors aboard EMS helicopters know everything about the value of the Golden Hour.

Article: B. Morant / H. Couthaud

FRANCE A SUPER PUMA IN PARIS

Fast, powerful and safe, the helicopter is the perfect response to tricky aerial work. This is demonstrated by Heliswiss International's AS332 Super Puma C1 which takes to the skies in a flight over Paris.

Article: Alexandre Marchand – Photos: Iris Yassur



On Saturday, 24 October 2020, the Heliswiss International Super Puma leaves the heliport in Issy-les-Moulineaux for Maison de la Radio, a modern building in the west of Paris, not far from the Eiffel Tower. The pilot, Stéphane Thomann, openly admits to having visited Paris only twice in his life. By following the Seine though, and keeping an eye on the world-famous metal tower rising from the morning mist ahead, there is almost no chance of him straying off course.

PERFECT CONDITIONS

After a five-minute flight, he is in position, in front of the famous circular building. "Four assistants were on site," explains Stéphane Thomann. "Two on the ground where the load was waiting and two others on the roof, to take delivery." The day's mission: lifting new window cleaning platforms onto the roof and removing the old ones, a technique referred to in aerial work jargon as double rotation. For the 44-year-old pilot with 11,000 flight hours under his belt, it's a simple and straightforward job. Weather conditions are perfect, with unrestricted visibility and a slight breeze. The Super Puma HB-XVY he's flying boasts credentials that are remarkably like his own: the same Swiss nationality, almost identical in age (close to 40 years old) and similar experience (15,000 flight hours). "The Super Puma is really well suited to this work and I have complete faith in the aircraft," stresses Stéphane Thomann. "In a job like this, it's vital to trust your helicopter." Stéphane Thomann is now ready. With his head pressed to the aircraft door, he fixes the ground, glancing only briefly at essential instruments inside

the cockpit to monitor readings. He controls the helicopter with centimetre precision, following directions given by the assistants. The 80 metre-long sling makes it possible to limit the effects of downdraft. In four double rotations and 30 minutes of flight, 21 tonnes of equipment have been moved. Doing the same job with a crane would have taken several days and meant blocking numerous streets.

AN ACCOMPLISHED ATHLETE

The Super Puma is a true athlete, where discipline and performance have been pushed to the extreme. In this, it foreshadows the H215, its replacement in the Airbus Helicopters catalogue, with the same optimisation of performance in aerial work. The cabin is completely empty, no upholstery, no seats. Weighing 4,533 kg when empty, it has to be the lightest helicopter in its family. Certified for a maximum take-off weight of 8.6 tonnes, it's basically capable of lifting the equivalent of its own empty weight. Needless to say, the loads lifted in Paris, the heaviest of which came in at 3.9 tonnes, were easily within its power. The most remarkable thing is that this heavy lifter is

also a long-distance champion, capable of crossing Europe in one go in 2 hours 30 minutes. "In the days leading up to the Paris lift, we were in Switzerland, then Munich and finally Birmingham where we hoisted advertising panels onto building fronts. We left the UK on 23 October on a direct flight to Issy-les-Moulineaux." A tour worthy of a rock group, with space in the cabin to transport several cubic metres of equipment. "We are very autonomous with our Super Puma," explains Stéphane Thomann before heading back to his base in Switzerland.

HELISWISS INTERNATIONAL

Heliswiss International has specialised in transporting heavy loads for more than 35 years. The company, which is part of the Swiss Helicopter Group, currently operates three aircraft. The Swiss Helicopter Group itself operates a fleet dominated by Airbus helicopters (notably H120s and H125s) across 14 bases in Switzerland and the Principality of Liechtenstein.

1: Twenty-one tonnes of equipment were moved during just 30 minutes of flight.

2: The Maison de la Radio building is very close to the Eiffel Tower in Paris.

[Watch the video here](#)



AS GOOD AS REAL

Rotor Magazine goes behind the scenes of the construction of the H160 full flight simulator, whose qualification was obtained in summer 2020.

Article: Courtney Woo

When H160 test pilot Olivier Gensse stepped out of the full flight simulator (FFS) after the final practice run and said, “that felt just like the H160,” it was music to the ears of the simulator project team. Today, pilots and synthetic flight instructors have already begun training in the new H160 simulator as they prepare for the entry into service of the helicopter in 2021.

A PARALLEL CONSTRUCTION

“Whenever a new helicopter is launched at Airbus, construction of the FFS begins in parallel so that pilots can begin simulator training well before the actual helicopter enters service,” says Christoph Zammert, head of customer support and services at Airbus Helicopters.

In the H160’s case, this meant tight collaboration among three partners: Airbus Helicopters, which sets the requirements and provides the H160 software and data; Thales, which produces the hardware, motion, acoustics and visuals; and Helisim, which runs the training centre in southern France and works with Thales on installation.

The team worked side by side with the H160’s engineering department, following the aircraft’s entire development so that any design changes could be rapidly integrated on the simulator as they arose.

“Building an FFS concurrently with the actual product is always more complex than building a simulator for a finished product. There are more

unknowns and many moving pieces,” says Sabrina Barbera, head of training and flight operations at Airbus Helicopters. “This makes the process a unique and exciting challenge, which had been done only once before with the H175.”

REPRODUCING THE TEST PILOT’S REALITY

The role of the test pilot, therefore, cannot be underestimated. The test pilot knows the helicopter like a second skin, so if the simulator does not replicate the experience of flying the real thing to perfection, then it’s not up to snuff. “Throughout the H160 flight test campaign, Olivier’s team recorded all the data and manoeuvres that were performed, which we then incorporated into the simulator’s software,” says Barbera. “We then attempted to perform those same manoeuvres in the simulator, relying on software to ensure that our results were as close as possible to the behaviour of the actual aircraft.” “During the ‘flight phase’ of the simulator construction, the question I always asked myself was, ‘does this feel like an H160?’” says Gensse. “The flight test pilot brings an analysis that any other pilot wouldn’t have at the beginning of the helicopter’s life.”

Complete fidelity is essential for all aspects of a full flight simulator. For the H160, this means having onboard real Helionix and FADEC, the Airbus Helicopters data pack and as much real hardware as possible, especially in the cockpit.

1: Gensse spent around ten sessions inside the simulator, making sure all his assessments were taken into account until he could say he felt like he was “in an H160”.

2: The level D designation is the highest level of full flight simulation possible. For certain authorities one hour in a level D simulator can substitute one hour of flight in the actual aircraft.



SIMULATION FOR SAFETY

One of the greatest added-values of simulator training from a pilot’s point of view is that you can experience malfunctions that you could not perform in real flight, “performing all the critical failures we would not try to simulate in a real aircraft because the risk is too high, and the value too low,” says Gensse.

A technological breakthrough on the H160 that can be understood with FFS training is the vortex pre-alerting system, which increases safety by warning pilots when entering flight conditions that could lead to a vortex ring state if immediate action is not taken.

“Pilots can experience how the aircraft feels when the system kicks in, and when it doesn’t,” says Gensse. “If you react, you get the good sensation; if you don’t react, you feel the difference. So pilots remember that feeling and will avoid getting trapped in real flight.”

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1

2

© E. Pratz

BEING FIRST ON THE SCENE NEEDS TOTAL SUPPORT BEHIND THE SCENES.



WE MAKE IT

Times may be challenging, but you can rely on our dedicated team to ensure every one of the countless individuals who depend on us, can rise to that challenge. Because the best air support deserves the best ground support. Our dedication, expertise and determination have contributed to over 100 million hours in the air. And it's this commitment to teamwork, that makes the team work.

Partnerships. We make it fly.