Lufthansa Innovation Hub

UK Civil Aviation Authority

Innovation Hub

Signals and Trends related to Technology & Innovation in the aviation sector

November 2022

Executive Summary

- This quarter, we are pleased to partner with Lufthansa Innovation Hub to co-write the Novel propulsion section of this report. They offer their analysis of the novel propulsion market, including electric vertical take-off and landing (eVTOL), electric, supersonic and hydrogen technologies. Overall, the novel propulsion market is growing, and we do not see it slowing down anytime soon.
- At the same time, vertiport operations continue to garner further attention, with Civil Aviation Authorities and stakeholders worldwide contributing to its development through the introduction of operating standards.
- On the other hand, in a quest for sustainable aviation that meets net-zero ambitions, careful consideration is being given to alternative propulsion systems, such as open rotors. Yet, airport operators worldwide are employing highly automated airside vehicles to offer efficient, money-saving operations. Again, this is a theme well embedded in the increasing use of automated tools to enhance passenger experience or provide efficient services and solutions.
- Similarly, Air Traffic Management is increasingly becoming digital and providing streamlined air traffic services between Air traffic controllers, pilots and other airspace users. For instance, ADS-C and remote (or digital) towers are two critical themes featured in this report. Quantum Technologies is also receiving traction from government and private organisations, but early indications show it has legal and regulatory implications.
- And finally, this quarter, secure communication networks that use 4G, 5G and broadband networks for emergency and rescue operations have emerged as a strong signal. Whilst its use is led by international security forces, they have applicable use cases in aviation.
- At the Innovation Hub, we expect further signals on the advanced use of technologies in aviation, presenting various opportunities and threats for investors and the CAA. We will continue monitoring and reporting on these in our quarterly reports.

Purpose of this document

- A few years ago, the CAA Innovation Hub started collecting data about innovation trends. The dataset is derived from enquiries received from innovators via our Innovation Gateway, conferences, articles and desktop research.
- This report presents a snapshot of signals and trends related to Technology & Innovation in the aviation sector. These early indications of change will help the CAA manage any threats at an early stage and secure opportunities in relation to these changes.
- The signals and trends are the starting point for the CAA Corporate Horizon Scanning framework. The approach we have developed to monitor signals and trends in Technology & Innovation will be reapplied to other areas such as environmental, political or sociological trends.
- As we keep monitoring the market and expanding our dataset, we expect subsequent issues of the report to present an even more comprehensive overview of signals and trends in Technology & Innovation.

Our approach

- The CAA has been gathering a lot of signals in technology and innovation, and our outputs are becoming of increasing value to both internal and external stakeholders.
- The wide variety of signals we have seen coming through has created a huge list of indicators of change. As a result, we are now able to identify a taxonomy that groups all those signals in logical themes.
- Doing so will not only make our database more digestible, but it will also help us better understand what we need to focus on and also provide a high-level view of the most active innovative areas, that will support the CAA’s ability to respond to innovation.
- We review a vast amount of data, and we are only in the early stages of looking at how we can further improve our taxonomy, for example the level of detail and analysis of sub-themes, as well as how we assess technology vs application.
- The next slide sets out the taxonomy for the key themes.

Taxonomy for key themes

Key Themes
Novel Propulsion *Electric aircraft, hybrid propulsion, electric Vertical Take-off & Landing (eVTOL) aircraft, hydrogen fuel, charging infrastructure, Net zero, etc*
BVLOS Operations for Remotely Piloted Aircraft Systems (RPAS) *Beyond Visual Line of Sight (BVLOS) for deliveries and inspections, etc*
Automated and Autonomous Systems and Operations *Automated Flight Operations*
Training of the Future *Advanced learning platforms, use of virtual reality for training, etc*
Airport of the Future *Robots at airports, technology to improve passenger experience, etc*
Airspace Integration *Unmanned Aircraft System Traffic Management (UTM)*
Communication Networks for Aviation *Bluetooth technology to improve airport ops, mobile networks, satellite networks etc*
Advanced Design/Manufacturing *3D printing, use of AI for design etc*
Aircraft Maintenance/Flight Ops of the Future *AI solutions for aircraft safety, aircraft maintenance technology, etc*

Definition

We report three indicators of change:

Strong Signals

These are 2-3 signals we have received over the last three months on innovative solutions or practices - it also represents a change in direction and may indicate the making of a new trend. With this in mind, we will only report on new strong signals without reinstating previous ones – unless it becomes a new trend.

New Trends

This refers to when we have observed and/or collated a pattern of signals over time (up to 6 months) with 3-5 organisations carrying out similar activities over this period.

Existing Trends

These are trends that keep developing. Such trends are characterised by a range of key players and new entrants acting on these trends. Products and services are typically at an advanced stage of development.

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Trends

1. Novel Propulsion

A sustainable future requires a propulsion system that can meet global net zero needs and meet anticipated noise and emissions standards. Open-rotor engines have been plated as a solution to achieving fuel efficiency and global sustainability goals. Open-rotor engines have been around for a while. The initial drive to develop the technology was seen in the 1970s and 80s as concerns over fuel prices increased. However, open rotors never reached the commercial market, possibly because:

- Fuel prices became somewhat acceptable,
- Customer interest waned in alternative sustainable engine technologies
- Noise levels were undesirable for the market.

However, we have seen revived interest in open rotor engines as concerns over:

- Energy
- Sustainability
- Net zero goals
- and the environment

have increased.

1. Novel Propulsion

There are a variety of options for installing an open fan engine: under the wings in either a low- or high-wing configuration, or at the back of the aircraft. GE Aviation led efforts in the 1980s to develop the concept of an open rotor propulsion system, including flight demonstrations. In the last decade, state-of-the-art computational fluid dynamics and computational aero-acoustics have enabled progress in open rotor aero-acoustic design beyond what was achieved in the 80s.

Currently, progress is being made on open rotor architecture by CFM International, Airbus, GE Aviation and Safran as part of sustainable aviation initiatives.

For instance, CFM International has agreed under a joint venture with Airbus to flight-test the open rotor propulsion system developed under the Revolutionary Innovation for Sustainable Engine (RISE) program on the A380. But, flight-test work has already commenced between GE Aviator, Airbus and Safran to develop fuel-efficient open rotor architecture for sustainable aviation. CFM launched the RISE program last year to contribute to the aviation industry's pursuit of net-zero emissions. However, Airbus's collaboration with CFM will see the development of open rotor architecture using the Airbus A380 testbed aircraft that will be demonstrated in the mid-2020s

Technologies matured as part of the RISE Program will serve as a foundation for CFM engines that could be available by the mid-2030s..

1. Novel Propulsion

For the development of the open-rotor conceptual engines, CFM has established a full-scaled roadmap with more than 300 different components, modules, and full-engine builds to test and mature the technologies.

Open rotor engines are expected to consume substantially less fuel when compared with traditional ducted turbofans. However, before rotor engines are installed on modern aircrafts, community noise must be tested & minimised to ensure appropriate noise levels as planes fly overhead.

1. Novel Propulsion

Other initiatives on fuel efficiency include NASA's Transonic Truss Braced wing with Boeing and academia supported through the Sustainable Flight Partnership to accomplish the aviation community's goal of net-zero carbon emissions by 2050.

The partnership with Boeing includes a demonstration of a Transonic Truss-Braced Wing - a unique design of the aircraft's wings which reduces drag during flight and fuel consumption by up to 10 per cent.

NASA is testing this innovative configuration as an option for future airliners. In addition, it is undergoing explanatory testing with NASA to predict how the aircraft will perform.

If successful, this technology could be used for new aircraft in the 2030s.

Pilot Training

Separately the CAA has commenced internal work with stakeholders to review and clarify requirements for eVTOL operators and training providers on pilot training, competency and licensing requirements.

We have seen increasing interest in pilot licences for personal mobility aircraft.

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Novel Propulsion– Lufthansa Innovation Hub Overview

Leaderboard of the Most Backed Up Startups in the Novel Propulsion Category in 2022

Definition

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Infrastructure: Digital or physical facilities to enhance the development of vertiports.

eVTOL: We consider an air taxi a small electric vertical take-off and landing (eVTOL) vehicle designed to operate in urban/suburban areas. Example: Volocopter or Lilium.

Electric Aircraft: applied to regional, conventional take-off and landing passenger aircraft using as the source of energy electricity stored in batteries. Example: Eviation, Alice.

Hydrogen Technology: We include commercial passenger aircraft that intend to use hydrogen as propulsion and projects that want to implement these systems on existing aircraft.

Supersonic Technology: New commercial passenger aircraft that aims to surpass the speed of sound, start-ups dedicated to developing this technology or engines that help to achieve this goal.

★ Leaderboard

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Leaderboard of the most backed up startups in the Novel Propulsion category in 2022 USD*

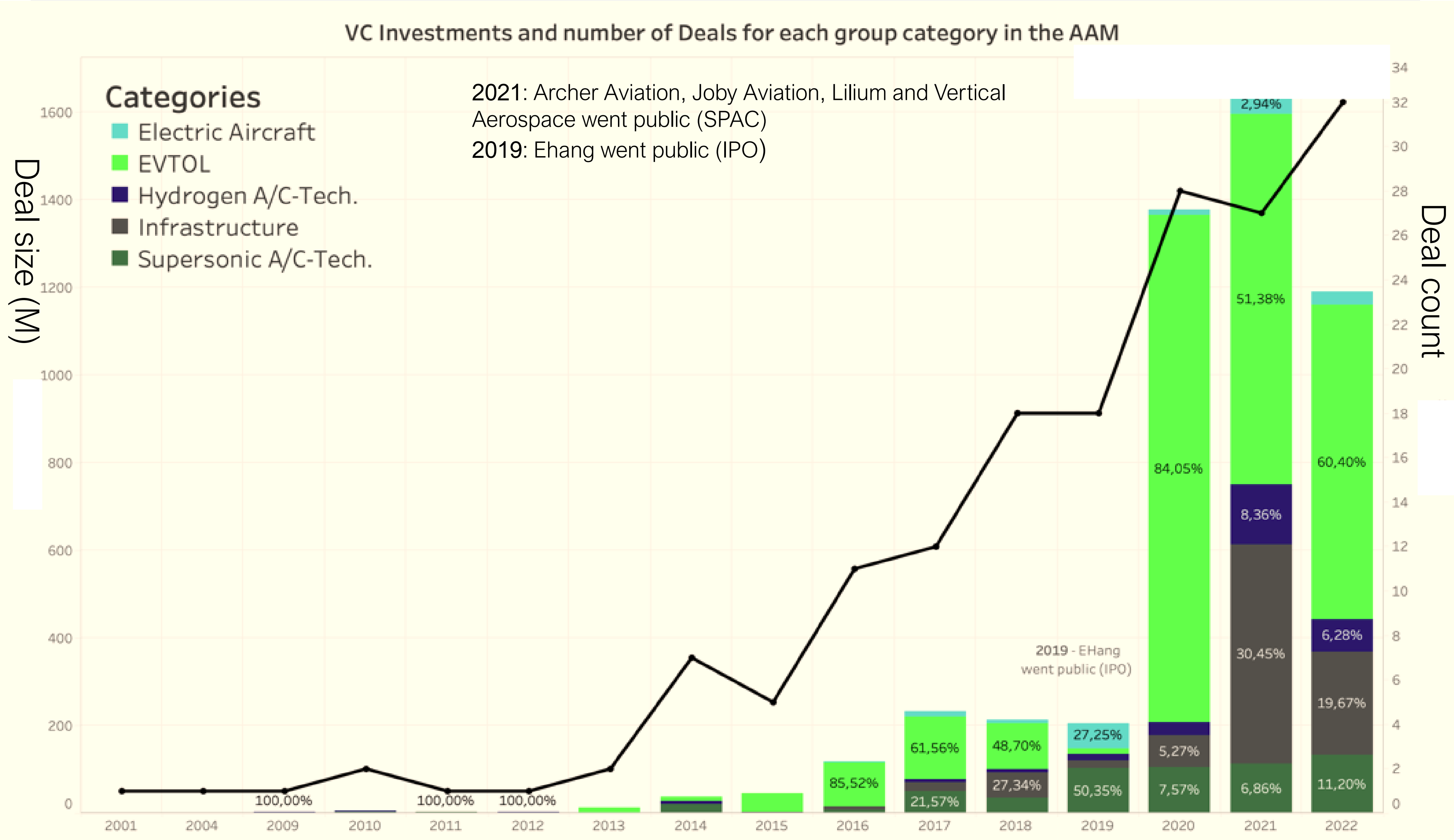
POS	Infrastructure (Physical – Digital)	eVTOL	Electric Aircraft (from 9 passengers)	Hydrogen Technology	Supersonic Technology
1	Skyrise – 248,97	Volocopter – 532,38	Heart Aerospace – 37,08	ZeroAvia – 139,14	Boom Supersonic – 319,13
2	Merlin Labs – 246,00	Overair – 170,00	Ampaire – 26,61	Universal Hydrogen – 90,47	Reaction Engines – 128,31
3	Skyports – 176,99	SkyDrive – 115,84	Electra.aero – 20,00	Hybrid Air vehicle – 45,25	Hermeus – 118,90
4	Daedalean – 97,00	AutoFlight – 100,00	VoltAero – 13,34	Hydrogen Craft – 4,35	Venus Aerospace – 32,42
5	Xwing – 58,00	Autonomous Flight – 32,13	Zunum Aero – 12,80	HyPoint - 4,22	Destinus - 29,24
6	Unifly – 36,92	VOLANT (China) – 15,77	Wright (Air) – 5,22	H2 Clipper – 2,55	Exosonic – 4,27
7	Urban-Air Port – 26,07	Airspace Experience Technologies – 13,73	Maeve Aerospace – 3,61	Hypersonic Launch Systems – 1,78	
8		Maglev Aero – 11,76	Faradiar – 0,01	Jimeidongli – 1,57	
9		Shidi Technology – 10,00		SEEEX Tech – 1,49	
10				Beyond aero – 0,50	

Source: Pitchbook

*This leaderboard only considers those that are still considered startups today (2022). Those that were once startups but are now public companies (SPACs or IPOs) are not considered in this chart. It also doesn't consider companies with publicly unavailable funding data i.e. Supernal or Ferrovial

VC Investments and Number of Deals

£ Novel Propulsion investments have skyrocketed in the last 3 years



Source: Pitchbook. Note: the percentage represents deal size share gathered from each category that year.

£ Novel Propulsion Investments have skyrocketed in the last 3 years

Novel Propulsion is an attractive sector for investors

- The number of deals has increased yearly. But, in the last three years, Novel Propulsion sectors massively increased the number and deal sizes. The most significant deals were the massive investments in BETA Technologies, Volocopter, and AutoFlight for the eVTOL category, which gathered about $778M.
- Nevertheless, after seeing enormous momentum in 2020 and 2021, in 2022, a shrink in Novel propulsion deal sizes could be expected due to factors like the war in Ukraine and the economic recession. But there is a sign of consolidation and investments more focused on promising players.
- Yet, we see signs that Novel Propulsion sectors still attract investors' attention with announcements such as those made by Volocopter, raising $153M and completing crewed test flights in Rome, or Beta Technologies' plans to have web charging stations across the Eastern U.S., Urban-Air Port opening the world's first hub for eVTOL in the UK, or Merlin labs raising $105M and partnering with USAF. These developments are accelerating the transition to Advanced Air Mobility (AAM).

eVOTLs are still getting strong support from investors

- In 2021, three eVTOL leading players (Archer aviation, Joby, and Lilium) went public to SPACs. We can see eVTOLs are the main driving force in the Advanced Air Mobility environment.
- This year its share grew by almost 10% compared to last year, with a vast majority of investments going into later-stage deals, which is quite remarkable for an industry that has not brought to market a single product. For this same reason, we expect consolidation to put at risk those startups that need to progress more.

The big unknown in 2021: Infrastructure.

The second main drive in the 2021 Novel Propulsion environment was the infrastructure category. Again, the massive investments in eVTOLs opened the space for startups to develop more extensive and complex infrastructure.

Those startups gathered about $500M, representing 31% of the deal sizes that year, with investments in Skyryse, Skyports, and Merlin Labs. This year, despite infrastructure still being in the second position of most backed-up categories, right after eVTOL, the money flowing into it has shrunk by almost half.

2. Highly Automated Airfield Vehicles

With passenger numbers predicted to increase over the next decade for domestic and international travellers, airports have started to rethink their approach to airport design, operations, and ground-side and airside traffic.
Highly automated airside vehicles that use elements of artificial intelligence have steadily been investigated and adopted in airports worldwide to provide efficient and streamlined services for passengers and operators. Its use is becoming a trend likely to grow further owing to an increasingly digital world.

Automated jet bridges, aircraft tags, baggage carts, de-icing vehicles, and passenger shuttles have all been part of the move to highly automated airport operations.

The concept is not new. For example, we now have Personal Rapid Transits (PRT) at Heathrow. Oslo Airport tested automated snow removals in 2018; Norway and Netherlands airports have been trialling automated baggage handling since 2020, and Helsinki Airport trialled an automated street sweeper.
The list of operators exploring the use of highly automated airfield vehicles is growing steadily.

Birmingham Airport launched a trial using an autonomous vehicle to transport passengers around the airport

Oslo airport is developing a proof of concept for automated baggage handling.

Thordrive received $16.7m series A funding for its autonomous cargo and baggage tractor and finished a proof of concept with two major airlines. They are now looking to expand they're reach to North America before Europe & Asia.

STEER Tech was awarded funding under the North Central Texas Council of Governments Automated Vehicles Program to develop a testbed at the Dallas Fort Worth International Airport that will demonstrate an automated parking ecosystem.

3. Air Traffic Management - ADS-C

ADS-C is a contract between the aircraft and air traffic control (ATC) for regular position reporting. The two-way methodology agreed upon by ICAO and ATCs transmits position reports of the aircraft on an agreed-specified frequency. This includes aircraft position, altitude, speed, navigational intent and meteorological data to Air Traffic Services Units for surveillance or route monitoring.

ADS-C has been used in oceanic airspace for decades. It was used to conduct trials in Maastricht Upper Area Control Centre in 2019 before becoming operational in the area earlier this year. It differs from space-based ADS-B, a one-way broadcast of the aeroplane's position and other information derived from onboard systems. ADS-C may be used for surveillance or position reporting allowing the controller to look directly into the aircraft Flight Management System.

There are now plans to broaden the use of ADS-C to continental Europe. But it will not replace ADS-B.

ADS-C have been plated as a critical technology enabler by SESAR to support European digitisation. It is pitched as a technology that increases the efficiency of air navigation services by providing improved flight predictability, which leads to more accurate sector traffic load predictions, ultimately enhances operational planning efficiency.

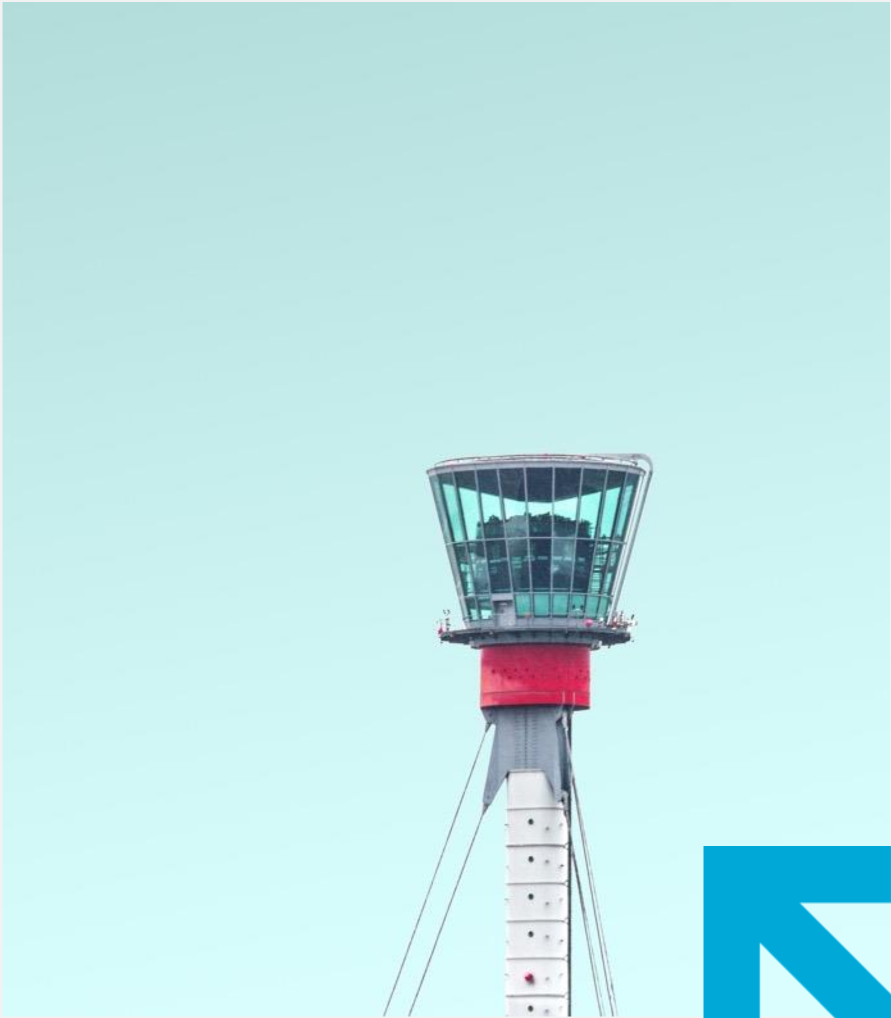
3. Air Traffic Management- ADS-C

ADS-C may have the added benefit of aiding controllers with decision-making when a plane is in the air, which may help reduce flight delays, fuel burn and CO2 emissions.

There is already an implementation plan with Air Navigation Service Providers to ensure ADS-C is implemented by 2027. Standards already exists to support current ADS-C operations and are being used by the likes of Airbus and in the Maustrucht area. However, Eurocontrol will add an Operational Excellence program to compliment previous standards with a new specification covering log on and ADS-C common services to enable benefits and efficiencies for trajectory information sharing

In addition, specification for common services to enable ADS-C deployment built on SESAR CONOPS is being prepared and will be delivered in 2023. Eurocontrol is also developing guidelines to document best practices and recommendations as different stakeholders deploy different elements of AF6 (initial trajectory sharing).

Public consultation will be launched by Eurocontrol mid August 2023 on 2 key specification areas; ADC, and System Wide Information Management (SWIM - an interchange between all providers and users of ATM information)



3. Air Traffic Management- Remote Towers

Remote towers, also known as digital towers, provide Air Traffic Control (ATC) services from a remote location instead of a conventional ATC tower situated inside an airport. The Remote Tower Centre is fitted with screens and controls to enable the air traffic controller to provide the same services as if they were in a conventional tower. The global remote towers market is projected to grow to USD 392 million by 2025 and this quarter, we have seen an expanded investment in them.

Remote Tower operations have been around for some time. They are an essential technology enabler within International Civil Aviation Organization's (ICAO's) Aviation System Block Upgrade, PANS-ATM. Its use goes back to 2013 when Airservices Australia trialled a remote tower in Alice Springs, followed by the opening of a remote tower at Sweden's Örnsköldsvik Airport in 2014. Similarly, the Australian Department of Defence trialled a Remote Tower at RAAF Base Amberley in 2019, and London City airport has been fully controlled since 2021 by a remote tower 100 miles away in Swanwick, Hampshire

Limited telecommunications, secure network infrastructure, and capacity issues of big airports pose significant constraints to the remote tower market. But there are costs, safety, and efficiency savings to be made with them as they can help several airports consolidate their operations into a single remote tower.

3. Air Traffic Management- Remote Towers

Here are activities are some activities pertaining to remote towers:

- In the US, Frequentist is performing Remote Digital Tower activities with the Naval Information Warfare Center Atlantic in support of the United States Air Force, US Navy and United States Marine Corps. Remote Tower trials are also taking place in Leesburg and Colorado.
- Saab and Atech announced a partnership to provide remote towers to civil and military customers in Latin America.
- Avinor and Konberg Gruppen announced the opening of a remote tower in Bodo, Norway, to control several airports.
- Remote tower facilities have been commissioned in Sweden, Germany, and Hungary.
- Airservices Australia is investigating the introduction of remote towers at Sydney Kingsford Smith, Canberra and Western Sydney International (Nancy-Bird Walton) airports.

The benefits remote towers provide are clear. For instance, they have a minimal environmental impact due to the absence of a conventional staffed tower, they provide centralised operations, reduce staffing costs, etc.
However, as the use of remote towers is set to develop even further, consideration must be given to infrastructure, cybersecurity and resilience measures at a scale to ensure the ongoing safety of remote towers.

The UK CAA has policy and approval requirements to ensure the safety of remote towers.

However, as remote towers are becoming increasingly common other civil aviation authorities have begun measuring the impact of remote towers and how to regulate them.

4. Vertiports

Progress is being made to expedite the development of vertiports and other infrastructures that support eVTOL aircraft, with key organisations publishing vertiport standards and guidance documents for the industry. For instance, in June 2022, FAA released its engineering brief, which provides interim guidance to existing heliports and on the design of vertiports or vertistops.

Ultimately, FAA expects the guideline to evolve into a performance-based design standard which may be influenced by design standards developed by other stakeholders, including standard development agencies and other aviation authorities.

FAA's guidance was later followed by ASTM international's standard specification on the planning, designing, and establishing of vertiports intended to service vertical take-off and landing aircraft that may include standard category aircraft, optionally piloted aircraft, and uncrewed aircraft.

The CAA has commenced work to review publications by the FAA, ICAO, EASA and other stakeholders in preparation for determining UK design requirements and operating standards for eVTOL facilities.

5. Quantum Technologies

Quantum technology uses the unique properties of quantum physics to achieve performance that cannot be achieved using classical physics. Its use could increase computational performance for specific problems and make networks more secure. Commercial quantum remains several years in the future, but companies are trialling it now.

Most governments see quantum technologies as a critical technology of national interest, and there is a global race for its adoption. As a result, the quantum ecosystem is globally interconnected with stakeholders from different sectors, including academia, the private sector and government. But a trusted marketplace is required by all players to enhance the commercial development of quantum technologies.

Quantum sensing is already being used in mining industries to detect underground mineral deposits. But, the most transformative quantum applications are still in the embryonic and research phase.

However, a thorough look at patents shows that the number of quantum computing and communication applications is growing each year steadily, with most applications for quantum communication being investigated under the aerospace, aviation and space radar.

Whereas technologies such as quantum computing and quantum sensing are being investigated by the banking, finance, automotive and pharma sectors.

0 1 2 3 4 5

Adoption rate, 2021
(0 = none;5 = mainstream)

$3 billion Investment in 2021

Quantum Computing

Quantum computing uses quantum properties of particles to process information at a faster rate than classical computers.

Quantum Sensing

Quantum sensing may be used to provide measurements of physical quantities at higher sensitivity and magnitude than classical sensors can. Applications include radar, microscopy, and magnetometers.

Quantum Communication

The transfer of encoded quantum information between distant locations based on an optical fibre network or satellites. It uses a quantum-secure connection through quantum encryption.

5. Quantum Technologies

Whilst quantum technology is still in the embryonic phase, we have started to see vast investment in it with the market projected to grow in the next decade. First adopters are expected to take advantage of the market.

Rapid investment	Approaching maturity	Market expected to grow fiercely
1.7bn	**10 years**	**10bn**
Investment in start-ups since 2020	Estimated time to unlock use cases	Projected market size of quantum computing in 2027 and growing by 50% each year

In the UK…

£147m
Awarded to the Industrial Strategy Challenge

£93m
Invested in the National Quantum Computing Centre

£33m
Annual budget for the Engineering and Physical Sciences Research Council's (EPSRC) programme

Use cases being explored

1. Airlines that hold vast amount of passenger information can use quantum technologies to improve accuracy and speed up simulation scenarios instead of looking at things in isolation.
2. Transport planners have started to explore the use of quantum computers to improve efficiency on driverless vehicles and aircraft that may require greater computing power for network controllers to make decisions in real time.
3. International research teams are exploring the use of quantum communication to connect satellites with quantum secure communication payloads.
4. Some airlines are looking to use quantum and data engineering to build features for customers.

5. Quantum Technologies – Next Steps

Whilst quantum technologies are positioned to benefit aviation and similar sectors, its initial scoping sessions indicate that it has legal and regulatory implications, including how data is processed, product liability and cyber security, especially on eVTOL and uncrewed aircraft of the future.

The CAA will begin internal discussions in December of this year to further explore this technology and determine how we can support its developers within the aviation sector and future-proof our services.

6. Automated and Autonomous Systems Operations

The UK has a thriving AI ecosystem. In 2021, the UK was first in Europe and third in the world for private investment in AI companies ($4.65 billion) and newly funded AI companies (49), making the UK an attractive place for aviation innovation building on the existing industry capabilities of AI and autonomous systems.

The aviation industry is increasingly referring to and understanding the benefits of integrating highly automated and autonomous systems. In particular, the CAA has observed that many Future Flight Phase 3 Projects plan to deploy highly automated systems within their concepts. The industry perceives successful demonstrations as a pathway to realising their aspirations of autonomous systems. Nonetheless, many of the new users highlight the scalability and full maturity of the associated industries will be heavily dependent on building a consumer-focused and inclusive regulatory framework for autonomous systems. The technology is new and still developing.

Thus all the risks still need to be fully understood. Aviation and other sector regulators recognise this and are working together to develop programmes to engage with and regulate future systems.

Current work by the CAA considers the reforms necessary to provide a robust and future-proofed legal framework capable of supporting the safe deployment of high automation and autonomous systems in aviation. Learning from sectors such as Defence with more mature adoption, an Autonomous Systems Programme must not only examine the safety and cyber security assurances. Trust and integration within the current system, the associated cultural challenges and ethical considerations are fundamental pillars of any programme and future framework. From engagement with the military and other industries, it is understood that many overlapping thematic challenges exist.

A coordinated approach to autonomy is advocated across domains, with a joined-up approach to the development of taxonomy, standards and understanding the cyber security risks. AI in non-safety critical roles is also gaining interest, particularly at airports and ticketing services.

The impact on the consumer is yet to be fully assessed, but it should be at the core of any organisation considering the deployment of such technology.

Strong Signals

1. Communication Networks for Emergency Operations

This quarter we have seen projects exploring the use of secure mobile, broadband and radio networks for security and emergency rescue operations.

For instance, in France, a consortium led by Airbus and Capgemini was selected by the French Ministry of the Interior and Overseas under the 'Radio network of the future" (RRF) project to provide secure broadband communication networks for the French security and rescue forces. The project aims to use high-speed (4G and 5G) networks as a priority mobile communication system to guarantee the continuum of daily security and emergency rescue missions in the event of a significant crisis event.

The RRF deployment will make France one of the countries providing its security and emergency forces with new-generation communication networks.

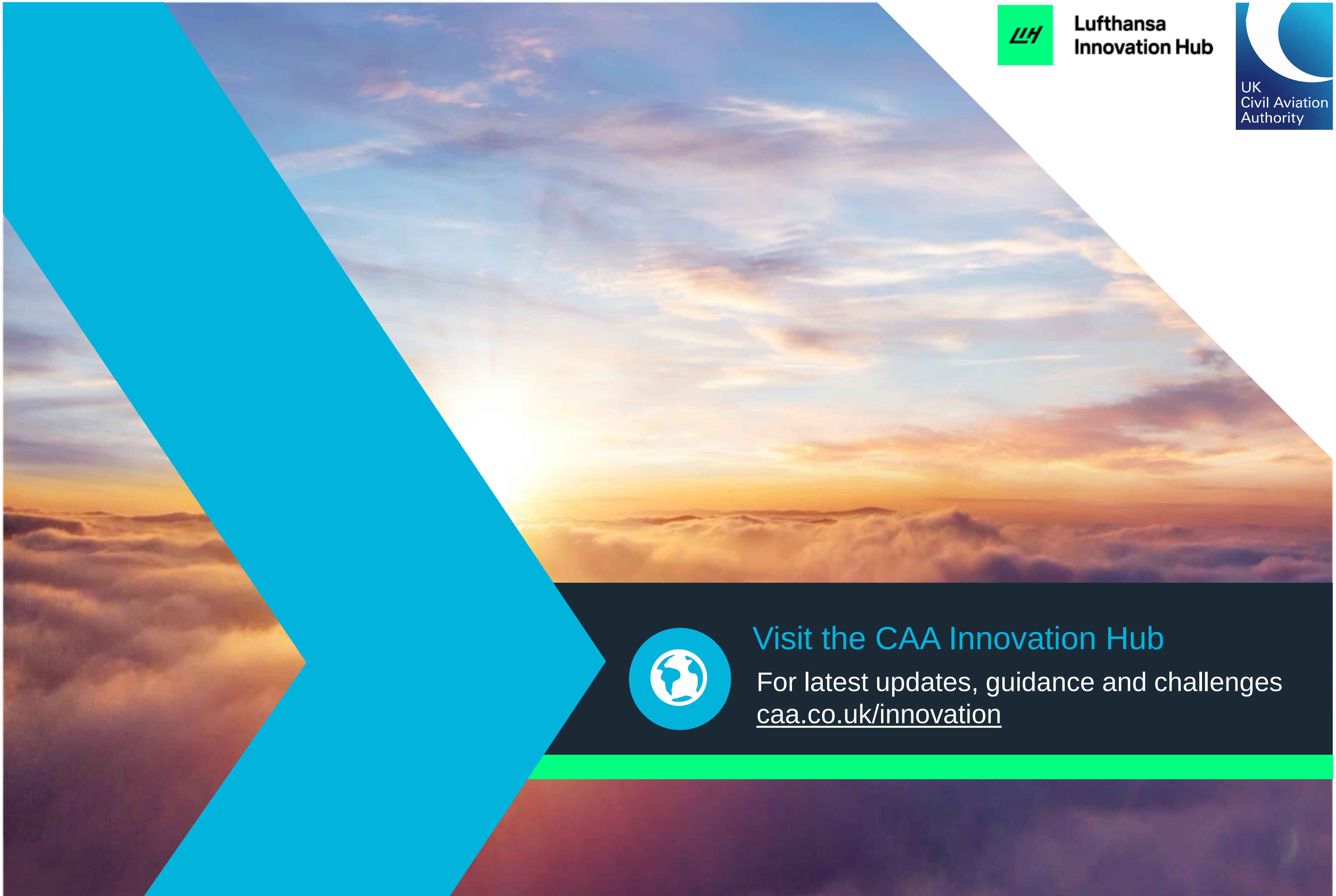
In the UK, Home Office announced at the start of the new financial period it is leading a cross-government programme to deliver the new Emergency Services Network (ESN) critical communications system. This will replace the current Airwave service used by the emergency services in England, Wales and Scotland and transform how they operate.

ESN will enable fast, safe and secure voice, video and data across the 4G network and give first responders immediate access to data, images and information in live situations and on the frontline. The Home Office has chosen telecommunications provider EE to build the 4G voice and data network for Britain's emergency Services. Still, it will have a private network and end-to-end encryption capability made by the Home Office and other partners.

In the US, Firstnet, in partnership with AT&T, was selected to deploy, operate, maintain, and improve the first high-speed, nationwide wireless broadband network dedicated to public safety that includes services for fleet management and search and rescue operations.

Why is this important?

Secure networks are built for public safety with a dedicated network core that separates public safety traffic from non-public safety traffic. In aviation, it can be used with drones to improve location services to help with mapping capabilities during search and rescue and recovery operations.



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