UK Civil Aviation Authority

The CAA's Strategic Insights Workshop

A summary of insights

Held on 12th February 2026, RAeS London

CAA Strategic Research and Intelligence team

CAP3260

Contents

Executive Summary

In February 2026, the Strategic Research and Intelligence team convened a cross-functional Strategic Insight Workshop to explore the future operating landscape for aviation. The session brought together diverse perspectives across government and policy, technology, airports, airlines, operations, and strategy. Discussions reinforced a clear conclusion: the aviation sector is entering a decisive decade, shaped by converging forces that will redefine feasibility, value creation, and long-term competitiveness.

Across all themes, participants consistently highlighted the need for:

- A coherent, long-term strategic direction;
- Proactive engagement with regulators and global partners
- Stronger collaboration across the aviation ecosystem to navigate complex transitions.
- The workshop centred on nine key feasibility drivers critical to shaping future trajectories:

  Climate change; consumer behaviour; artificial intelligence (AI); cyber security and digital resilience; the future of the workforce in aviation; geopolitics and supply chains; supersonic travel, the evolving roles of legacy and next-generation aircraft alongside infrastructure demands.

Key Insights:

1. **Societal and regulatory acceptance is as pivotal as technology.**

   Participants emphasised that the feasibility of new aviation technologies and business models will be influenced heavily by public trust, regulatory clarity, and political shifts as well as technical progress. Early engagement and transparent communication will be essential enablers.

2. **Climate change represents a systemic disruptor.**

   Climate-driven pressures are already reshaping operational realities from route planning and airport infrastructure resilience, to aircraft design and sustainability expectations. The sector must pursue resilient strategies that include continuous incremental improvements and bold long-term designs.

3. **Geopolitical and supply-chain volatility will introduce sustained uncertainty.**

   Fluctuations in global fuel markets, constrained access to Sustainable Aviation Fuels (SAF), and disruptions across critical manufacturing and technology supply chains require organisations to build strategic resilience, diversification, and new international partnerships

4. **The legacy fleet will define the pace of transition.**

   Legacy aircraft will remain dominant for much of the next decade. This dynamic could constrain innovation in some areas, while at the same time preserving cost-efficient operations for key markets. Managing this dual reality is a core strategic challenge.

Executive Summary

Emerging Opportunities:

Despite significant headwinds, the workshop identified a set of high-value opportunities for the sector:

- Expansion of local and regional manufacturing capabilities, strengthening resilience and reducing supply-chain exposure.
- Workforce diversification supported by new digital skills, AI-enabled training, and more flexible employment models.
- Growth in sustainability-aligned business models including circular economy approaches and SAF-focused value chains.
- Long-term innovation in aircraft and infrastructure, from hybrid-electric concepts to modular airport design.

Key Takeaway:

The aviation ecosystem stands at a **critical inflection point**, shaped by climate pressures, technological acceleration, regulatory reform, and geopolitical uncertainty. Organisations that proactively build strategic coherence, invest in resilience, and cultivate broad-based collaboration will be best positioned to seize emerging opportunities and navigate the disruptive decade ahead.

Setting the Scene

In February 2026, the Strategic Research and Intelligence team (we) convened a cross-functional Strategic Insight Workshop to explore the future operating landscape for aviation.

We ran the Strategic Insight workshop to build a coherent narrative around the major unknowns facing our industry and to explore what these uncertainties could mean over the near, medium, and long term.

The aviation landscape is undergoing rapid change, and many of the forces shaping its future remain ambiguous or weakly signalled. To make informed decisions, we need a structured way to identify these emerging shifts, understand how they might evolve, and assess their potential impact on the sector.

A central purpose of the workshop was to focus explicitly on extremes and edge cases; the scenarios that sit outside the comfortable centre of our planning assumptions. As the CAA, these edge cases are important to us: even if unlikely, they could have disproportionately large consequences for safety, consumers, or the resilience of the ecosystem. By interrogating these boundary scenarios, we can better understand their likelihood, the indicators we need to monitor, and the strategic implications they hold.

Through this work, we were able to build plausible scenario pathways that help clarify not only what might happen in the future, but why these developments could unfold and what early signals might give us advanced warning. This is essential for understanding where to invest time, attention, and resources. The outputs also support budget setting, ensuring that our financial planning aligns with the strategic risks and opportunities identified across different horizons.

Ultimately, the value of this exercise lies in deliberately thinking about the unlikely. By incorporating low-probability but high-impact possibilities into our planning, we become more resilient, more forward-looking, and better equipped to make decisions under uncertainty.

The workshop provided a disciplined way to ensure that these considerations are not overlooked and are instead integrated into our strategic thinking and operational preparation.

Future Scenarios: Themes and Insights

The following pages summarise the key themes discussed during the Strategic Insight Workshop, reflecting the perspectives, market sentiment, and outward trajectories identified by participants on the day.

These insights are drawn from participant contributions and do not necessarily represent the formal views, positions, or forecasts of the UK Civil Aviation Authority (CAA). Where appropriate, however, the CAA has provided additional context and supporting analysis to complement the points raised.

A Supersonic Led Future

Supersonic travel expected to re-enter commercial aviation within the coming years, has the potential to redefine not just journey times but the entire end-to-end travel experience. As operators introduce aircraft that embody speed, precision, and technological sophistication, service providers are likely to evolve booking and passenger-processing systems to match. Thereby shifting towards AI-driven trip planning, hyper-personalised retailing, seamless biometric identity management, and accelerated movement through terminals.

This next wave of super-fast travel may catalyse a broader redesign of how passengers interact with airports and airlines. However, legacy concerns around noise, emissions, and environmental impact remain active among a small but vocal group of opponents, suggesting that the success of supersonic services will depend not only on technological performance but also on careful stakeholder engagement and credible sustainability narratives.

A Supersonic Led Future

Workshop discussions identified four key areas where the effects of a 2035 supersonic-driven travel future are likely to be most significant:

Booking

- Demand volatility from last-minute supersonic bookings requires assessment of system resilience and slot allocation.
- AI-driven booking platforms that may be offered with supersonic travel may increase need for oversight, transparency, and fairness in automated decision-making.
- Noise and emissions impacts may fuel public opposition, requiring strengthened environmental regulations and community protection.
- Potential increase in business travel impacts capacity and environmental planning.
- Expansion of biometric visa systems necessitates strong standards for privacy, data security, and interoperability.

Departure

- Home-based biometric security processes require new regulations around verification, chain-of-trust, and contingency procedures.
- Faster operations risk widening accessibility gaps; updated accessibility requirements will be essential.
- Greater airport automation demands robust safety, reliability, and fallback standards.
- Dedicated supersonic terminals may impact airport equity and flow, requiring minimum service standards for all passengers.

In-Flight

- Supersonic-specific pilot training may heighten shortages, requiring specialised licensing pathways.
- New expectations on crew efficiency require updated duty-time, fatigue, and competency standards.
- High automation and digital reliance heighten cybersecurity oversight and real-time monitoring needs.

Arrival

- AI-driven biometric customs systems require strong regulation on accuracy, bias, failure modes, and assurance.
- Rapid arrivals will need equally efficient ground transport, encouraging integrated multimodal regulation.
- Reduced airport turnaround times may pressure airport revenue models, with implications for economic regulation and consumer rights.
- Reduced jet lag may increase demand on key business routes, affecting environmental and capacity planning.

A Supersonic Led Future

Feasibility of emerging supersonic operations: Participants also saw a real opportunity in next-generation supersonic travel and low-carbon aviation, but extrapolated that feasibility will hinge on:

Key Enablers:

- Demonstrated safety track record with no major incidents.
- Supportive legal frameworks that lower the likelihood of litigation, even in countries with traditionally high levels of legal action.
- Alignment with societal trends, such as demand for low-carbon mobility.
- Improvements in remote services and automation.
- Social acceptance driven by reliable service and clear public value.
- Lightweight technologies, lower emissions, and improved sustainability.
- A positive tipping point on costs if scaled successfully

> *Supersonic feasibility depends on safety, societal acceptance and scalable economics*

Key Barriers:

- Noise and visual impact concerns.
- Infrastructure readiness i.e. airspace management.
- Political and community resistance.
- Commercial viability and affordability at scale.

What this meant to participants to ensure critical adoption:

1. Early alignment on standards
2. Regulatory pathways
3. Infrastructure requirements

The Impact of Climate Change on Aviation Infrastructure

The workshop explored how climate pressures, operational constraints, and policy uncertainty are reshaping aviation's long-term feasibility, requiring both near-term adjustments and long-term adaptation. The points below capture the key observations, challenges, and opportunities identified:

Key Observations:

- Aviation infrastructure is an interdependent global system; airports, aircraft, infrastructure air traffic management, and regulation.
- Climate change effects are slow but cumulative, often making mindset shifts harder.
- Short-term conditions may resemble today, but long-term impacts will require significant adaptation.
- Rising temperatures may render some aircraft performance untenable (e.g., shorter runways, weight limits).
- Air routes may need to change due to climate shifts.

Challenges:

- Operating in a period marked by political instability and administrative complexity rather than a "golden age" of supportive policy.
- Slow uptake of alternative fuels, due in part to cost and supply issues.
- Consumer perception needs to be addressed to ensure behavioural change.
- Markets may not be ready to adopt new low-emission aircraft at scale.
- Infrastructure must adapt (e.g., aircraft handling, heat resilience, resilience planning).

Opportunities:

- Potential for major redesign of aircraft for lower emissions.
- Incremental improvements to infrastructure can add up.
- Ability to model and predict severe weather more effectively.
- Stronger green incentives from global powers and regulatory bodies.
- Emphasis on accountability: those contributing to climate impact should bear responsibility.

Geopolitics and its Impact on Supply Chains

During the workshop, participants identified geopolitics as one of the most influential and least predictable drivers shaping the future of aviation. Several views were raised, with broad agreement that global power shifts, supply-chain fragility, regulatory divergence, and sustained economic volatility are converging to create a more complex operating environment.

The workshop highlighted that strengthening resilience, diversifying fuel and manufacturing pathways, and anticipating long-term geopolitical cycles are critical for safeguarding aviation's stability and competitiveness over the next decade. The following themes were discussed:

Old Technology Maintained for Longer:

> Aviation infrastructure is an interdependent supply chain. Delays can slow the introduction of new systems, pushing operators to keep legacy technology in service beyond its intended lifecycle.

> Rising fuel prices are influencing decisions to retain familiar, stable technologies.

> In some cases, extending the life of existing systems is considered less environmentally harmful than manufacturing replacements.

> Older technologies are likely to be fully phased out within 5–10 years once supply chains stabilise.

Sustainable Aviation Fuels (SAF):

> UK Government policy on Sustainable Aviation Fuel is being advanced through the Department for Transport's SAF Mandate and associated cross-government delivery.

> Participants discussed a range of potential policy levers, including mandates such as a 10% SAF target by 2030 and broader pricing or fiscal measures.

> Long-term government ambition aligns with Net Zero aviation by 2050, with interim ambitions for domestic aviation and airport operations by 2040.

> Uncertainty remains around SAF sourcing, sustainability assurance, and regulatory oversight.

International Coordination

> Strengthening regulatory partnerships and pursuing more bilateral agreements were identified as priorities.

> Geopolitical tensions and a growing "nation-first" approach may limit cooperation over the next five years.

> A more stable international environment may emerge in the longer term (10+ years).

> The concentration of critical raw materials supply chains and closer engagement with EASA and emerging partners (e.g., Japan) were highlighted.

Supply Chain Resilience

> Key vulnerabilities include reliance on single-source manufacturers and dependency on foreign raw materials.

> Addressing the engineering and manufacturing skills gap is critical.

> Participants noted concerns that low-priced surplus materials, particularly from international markets, could impact UK suppliers.

> Concerns exist over US-dollar volatility in aerospace trade.

Geopolitics and its impact on supply chains

Pandemic / Global Factors

> The UK economy appears to follow 10-year cycles of peaks and troughs.
> Uncertainty remains about whether post-COVID improvements represent genuine resilience.
> Concerns persist over preparedness for future pandemics, conflicts, or global shocks.

Positives in Geopolitical and Supply-Chain Landscape

> Growing middle-class populations in Asia and Africa may open new markets and multilateral opportunities.
> The Asian Development Bank model offers insights for African Development Bank engagement.
> Younger generations prioritising sustainability and collaboration could strengthen workforce resilience.

We also heard that rising global uncertainty is reshaping aviation's overall risk profile. Participants emphasised that building more flexible supply chains and securing long-term SAF procurement strategies will be essential to ensuring resilience in the years ahead. They then reflected on how these dynamics may play out across the following timelines:

3-5 Year Outlook:

> Oil price volatility, especially during transition periods.
> Changes in global power balances influencing fuel supply and logistics.
> SAF (Sustainable Aviation Fuel) goals (e.g., 10% by 2030) requiring new supply chains.
> Rising defence and security pressures affecting logistics.
> Transition period encouraging new fuel types.
> Unpredictable geopolitical alliances impacting markets.
> Shifts in government priorities, new parties, and policy changes.
> Engagement with global organisations will shape aviation's regulatory environment.
> Government priorities, new political parties.

5–10 Year Outlook:

> Emerging middle-class demand, especially in Asia and Africa.
> Tightening airport slots and increased regulation.
> SAF price stabilisation over time.
> Severe weather disruptions driving operational changes.
> Food security and resource constraints affecting wider systems.
> Post-administration political shifts influencing regulation and investment.
> Old technologies being phased out.

10+ Year Outlook:

> Continued growth in middle-class markets. i.e. Asia and Africa; universities moving to these markets
> Evolving infrastructure and digital systems.
> Increased investment in the Middle East.
> Changing workforce expectations (e.g., Gen Z preferring sustainable options).
> Uncertain long-term regulatory trajectory.

Artificial Intelligence In Aviation

Short-Term Landscape

The workshop's opening discussion mapped the short-term AI landscape in aviation, revealing a sector at an early but pivotal stage. Several interconnected themes emerged:

AI in Operations

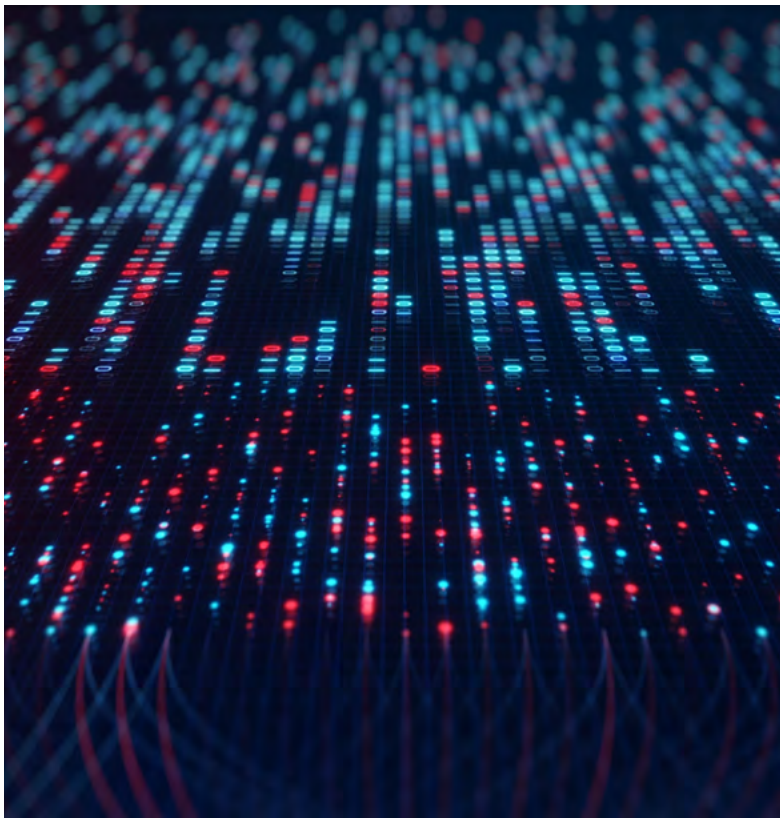
- There is already confident and increasingly widespread use of AI for regulatory and business operations tasks; the 'back office' functions where the consequences of error are lower.
- Two specific ideas surfaced as areas where CAA could add value for industry: an AI-powered **safety case assistant** and a **policy navigator tool**. However, in safety-critical or safety-related domains, the picture is very different. There is a great deal of research and academic interest, but actual deployment remains at low Technology Readiness Levels (TRL).
- The spectrum of applications discussed ranged from autonomous drones and systems, through to passenger-carrying operations, with trust and regulatory confidence diminishing sharply as criticality increases.

Trust and Safety

- **Trust** was identified as the central short-term challenge. Aviation safety has historically been built on learning from incidents and accidents which formulated a series of evidence over decades. AI in safety-critical applications does not yet have this track record, creating a fundamental gap in the sector's established approach to building confidence.
- The group noted a reluctance to deploy AI where safety is critical, with OEMs facing regulatory roadblocks and uncertainty. The overarching sentiment was clearly **human-first:** understanding and human decision-making must remain paramount while trust is established through verification, validation, and demonstrated performance.

Defining AI

- As is often the case, the question of what constitutes as 'AI' was raised. The group acknowledged this but did not dwell on it, recognising the wide spectrum from simple automation through to advanced autonomous systems.
- Accessibility of AI tools and familiarisation with emerging technology and associated legal frameworks (such as the EU AI Act) were noted as ongoing needs.



Artificial Intelligence In Aviation

Key Themes Across other Time Horizons

The short-term discussion naturally evolved into four thematic areas each explored across a near-term to long-term trajectory.

Role of AI

> **Now:** AI's authority is increasing, but remains grounded in trust built through demonstrated experience, knowledge, and performance. Its role is largely supportive.

> **Future:** A progressive increase in AI supporting and eventually contributing to decision-making across the whole lifecycle. **Human oversight** remains essential, but with humans moving out of the loop for specific, well-defined uses where AI demonstrably adds value. The group highlighted parallels with existing safety-assured automation systems where human oversight is retained. Questions arose around whether AI behaviour needs to be **predictable** to be trusted, and what the CAA's evolving role should be particularly around ethical regulation. Concerns about job displacement versus transformation were acknowledged.

> The concept of AI as a "copilot" advising the pilot rather than replacing them with risk pioneers pushing boundaries. A particularly forward-looking discussion touched on **predictive, emotional, and psychological** AI capabilities embedded across systems, raising questions about the pace and direction of progression.

Societal Acceptance

> **Now:** Public familiarity with AI is growing. Future pilots and aviation professionals are being introduced to AI concepts early. AI is beginning to be embedded in culture rather than treated as a novelty.

> **Future:** An AI-enabled generation i.e. children born into an AI-integrated world will reshape expectations and norms. The group also noted that the cost of aviation is closely tied to price, and growing dependence on **energy** (with associated cost implications) will shape how AI is deployed at scale.

Ethics

> **Now:** The role of ethics is increasingly embedded in governance and regulatory frameworks. Accountability and who is responsible when AI is involved in decisions is a pressing concern.

> **Future:** AI-enabled certification processes could significantly impact design cycle times. The group discussed the implications for job roles and whether traditional hierarchies (visualised as a pyramid) will be reshaped as AI takes on more analytical and decision-support functions.

Game Changers:

The final discussion captured transformative developments that could fundamentally alter the landscape:

Next generation AI, artificial organic brains: Moving beyond current architectures towards fundamentally new forms of AI, potentially including biological or neuromorphic computing.

Fully automated maintenance systems and reliability (ISMS): End-to-end automation of maintenance, inspection, and reliability management; a domain where AI could deliver enormous safety and efficiency gains.

Accidents: The recognition that a significant AI-related accident could be a defining moment either accelerating regulation and public acceptance through a transparent, well-handled response, or setting the agenda back significantly.

Multi-agent systems converging into unified AI (25+ Years): Over a longer horizon, the convergence of multiple specialised AI agents into a single integrated system.

The Future of the Workforce in Aviation

Conversations during the workshop acknowledged that the future aviation workforce will be increasingly digital, sustainability-driven, and globally adaptive, shaped by the sector's need for new skills in AI-enabled operations and predictive maintenance alongside the shift to greener technologies. This echoes market findings that highlight workforce shortages, rising demand for advanced technical capabilities, and the industry's push to modernise operations at scale. Participants highlighted the following threats and opportunities:

Opportunities:

- Increased local manufacturing and development of home-grown skills.
- A more diverse workforce, with new skills and perspectives.
- Stronger focus on sustainability driving new business models and innovation.

VS

Threats:

- Potential AI bubble; rapid tech growth followed by slowdown or instability.
- Geopolitical volatility and uncertainty in global workforce mobility.
- Shifting sustainability expectations and scrutiny from the public and regulators.
- Attractive international job markets competing for graduate talent.

A Legacy Aircraft Future:

Participants were provided with a projected 2035–2040 future scenario as the foundation for their analysis and reflections on a legacy-aircraft-dominated future.

Across the discussion, participants agreed that legacy aircraft will continue to play a significant role, particularly for low-cost carriers, but several pressures will emerge:

Key Challenges:

- Retrofit limitations in cabin design, maintenance, and parts sourcing.
- Potential regulatory constraints affecting older aircraft.
- Workforce readiness gaps for new vs. legacy platforms.
- Possible operational restrictions on flying older aircraft to specific countries.
- Growing pressure for governments to take stronger stances on emissions.

Passenger journey experience Implications:

- Longer or more circuitous air routes. Increasingly generic, cost-driven service models and innovation.

What this means for partners:

- There is a window to collaborate on retrofit solutions, workforce upskilling, and transition plans for mixed fleets.

Cybersecurity and Digital Resilience

Participants highlighted a strong link between Cybersecurity and Digital Resilience (CDR) but also how cybersecurity is only one aspect of digital resilience in an ever more digitalised society.

Notable trends identified:

- Digital identity and privacy trade-offs.
- Increasingly autonomous AI systems; making it more important to be able to trust digital systems.
- Geopolitics: Increasing cyber security threats with foreign states;
- Disrupting supply chains for digital systems (e.g., advanced chips, materials) making foreign policy and diplomacy a factor in CDR.
- Quantum computing as a game changer, i.e., massive disruption in digital security and privacy.
- Digital Systems bringing societies and economies together (connecting everything and everyone) making CDR a global 'we are in it together' thing. Individual adversarial actors may seek to gain an edge through cybersecurity exploitations, but the global economy needs trust in CDR and is impacted by incidents, regardless who the impacted parties are.

How Growth at Major UK Airports will Reshape Long-Haul Travel

Market Context

Major UK airport expansion is set to redefine long-haul travel over the next decade. As capacity scales, the aviation ecosystem faces a convergence of structural, behavioural, and technological forces that will influence competitiveness, sustainability, and passenger expectations. Based on our workshop insights, the following themes outline the key forces shaping this future:

Key Market Forces

Rising demand for sustainable, efficient long-haul travel continues to drive investment in new routes, lower-emission operations, and modernised infrastructure.

Global competition is intensifying, particularly from established transfer hubs such as Dubai, Singapore, and Doha, increasing pressure on UK airports to diversify routes, improve service levels, and expand their international reach.

Multi-modal connectivity is now essential: rail and road infrastructure must scale alongside aviation capacity to sustain growth, unlock regional access, and reduce surface-access bottlenecks.

Consumer expectations are rapidly evolving, with strong demand for seamless, digitally-enabled, frictionless journeys across check-in, security, and border control.

Climate-related pressures, from regulatory requirements to public scrutiny, are prompting airports and airlines to adopt greener technologies, lower emissions, and embed sustainability throughout operations.

Experience-led travel is becoming the norm, with passengers increasingly viewing the airport as an integrated part of the journey, rather than a necessary pre-flight process.

Value Creation Opportunities:

Enhanced global connectivity will stimulate tourism, trade, foreign investment, and international business links, as new long-haul routes come online.

Broader route choice will open market growth for both premium and low-cost long-haul carriers, supporting greater network resilience and diversification.

Innovation acceleration, enabled by expansion, will support widespread adoption of biometrics, automation, AI-enabled operations, and predictive analytics; raising efficiency and reducing operational friction.

Investment in greener infrastructure will strengthen regulatory alignment, improve environmental performance, and build public confidence in aviation's sustainability trajectory.

Nationwide economic uplift is expected through job creation, increased demand for local services, and growth across the wider aviation supply chain.

Partnership opportunities will expand, strengthening collaboration between airports, airlines, technology providers, and regional authorities to deliver a more integrated ecosystem.

How Growth at Major UK Airports will Reshape Long-Haul Travel

Risks & Considerations:

Political volatility and short policy cycles risk undermining long-term infrastructure certainty and investment confidence.

Geopolitical shocks may reshape travel flows, disrupt operational continuity, or limit market access for carriers.

Environmental scrutiny could trigger social pushback if expansion is not matched with visible, credible sustainability outcomes.

Infrastructure lag remains a key concern: aviation capacity may outpace upgrades to supporting rail, road, and digital systems, creating bottlenecks that limit the benefits of expansion.

Reputational risks persist if passenger experience does not improve at the same pace as capacity growth, particularly in a social-media-driven landscape where service failures are amplified quickly.

Key Takeaway:

UK airport expansion could present a significant opportunity to reshape long-haul travel, subject to delivery of wider infrastructure, sustainability and policy alignment. Success will depend on integrated planning across infrastructure, sustainability, technology, and customer experience. Stakeholders who invest early in digital enablement, multimodal connectivity, and greener operational models will be best positioned to capture the economic and competitive advantages emerging from this infrastructure transformation.

An expanded infrastructure future:

Growth at major UK airports reshapes long-haul travel

"Major UK airport expansion may also trigger new competitive dynamics, infrastructure demands, operational challenges, and opportunities for technological, environmental, and economic transformation" *(Workshop participant, Strategic Horizon Scanning and Insight Workshop, 2026)*

Below are the key signals, assumptions, challenges, and opportunities identified during the workshop:

Signals & Drivers

Market conditions remain broadly stable, but rising competition, geopolitical uncertainty, increased investment in aviation technology, environmental pressures, shifting holiday behaviours, and climate-driven travel disruption are all emerging signals that passenger demand and traffic flows may begin to change, prompting airports and airlines to adapt their future strategies.

Challenges

Rapid capacity growth creates significant operational and strategic pressures. Airports must ensure commercial viability at scale, redesign air traffic management corridors and runway usage, adopt more dynamic demand-forecasting models, and address persistent workforce and skills shortages. At the same time, they must maintain coherent multimodal infrastructure, manage political instability, and protect their reputation in a highly reactive, social-media-driven environment whilst navigating policy volatility across climates, borders, and immigration regulation.

Airports risk becoming hostages to policy shifts (e.g. climate mandates, border policy, immigration rules)

Assumptions

UK airport expansion is expected to centralise capacity at major hubs while enabling new long-haul connectivity, with continued mass-market demand but declining tolerance for poor experiences; rising environmental expectations and sustainability pressures will shape traveller behaviour, while future growth will depend on enhancing the customer journey, maintaining affordability and trust, and supporting a more purposeful, sustainability-driven resurgence in business travel.

Opportunities

Airport expansion has the potential to generate substantial economic and societal benefits. It can stimulate job creation, drive improvements to national infrastructure, accelerate the adoption of greener and lower-emission technologies, bolster UK manufacturing and regional skills, diversify the aviation workforce, expand long-haul capacity in line with evolving passenger needs, and increase global connectivity and opportunities for international work.

An expanded infrastructure future:

Growth at major UK airports reshapes long-haul travel

As the workshop explored how major UK airport expansion could reshape long-haul travel, participants highlighted that growth will not only increase capacity but also transform how airports operate, integrate with other transport systems, and meet rising consumer expectations. Expansion brings opportunities for resilience and improved passenger experience but also exposes operational pressures and social expectations that must be addressed proactively. The ideas, behaviours, and expectations captured from the workshop below reflect the sentiment that may shape this expanded infrastructure future.

Innovative Ideas:

Segmented airport journeys: specialised routes for families, elderly travellers, or business passengers.

Paperless travel: no passport scanning, no tickets, instant biometric recognition.

Robotic baggage support to reduce stress and improve mobility.

Hotel-airport fusion concepts: hotels integrated into the terminal experience rather than a stopover necessity.

Passenger Experience:

Passengers want faster, smoother, lower-stress journeys with better pricing, simpler navigation, shorter queues, improved surface access, and a more enjoyable, holiday-like airport experience. Frictions may persist in future scenarios, including complex terminal layouts, longer queueing and reduced dwell time, potentially creating inefficiencies across different traveller groups. External factors, such as border control arrangements, suggest that infrastructure expansion alone may not guarantee meaningful improvements in customer experience.

Social Expectations:

People want no negative airport experiences, especially during disruptions.

Travel to airports should be easier and cheaper. Parking should be priced more reasonably.

Airports could provide better wayfinding and restaurant location maps.

The airport process from entry to gate should be shorter and more transparent.

The Synthesis: Aviation at the Crossroads in 2040

Synthesising the full range of insights gathered during the workshop, this narrative integrates the themes, uncertainties, and pressures discussed by participants to present a cohesive vision of what aviation may look like by 2040. It captures perspectives from across the industry and provides a strategic, system-wide view of potential future developments.

In 2040, aviation operates in a transformed global environment. Climate disruptions have reshaped routes, strained performance envelopes, and forced airports to retrofit climate-resilient infrastructure. Jet streams shift unpredictably, requiring new modelling and real-time operational flexibility. Incremental changes proved insufficient; the sector now depends on adaptive systems and long-term design choices.

Geopolitical fragmentation intensified through the early 2030s, exposing supply-chain vulnerabilities in raw materials, manufacturing, and fuel. Nations strengthened bilateral agreements, diversified suppliers, and expanded local industrial capacity to mitigate risk.

Meanwhile, rapidly growing middle-class markets in Asia and Africa created new demands but also required new regulatory and diplomatic agility. Passengers in 2040 are digitally demanding and sustainability-aware. Biometric processing, predictive queuing, robotic assistance, and seamlessly integrated ground transport are standard expectations. Airports unable to reduce friction or demonstrate environmental responsibility face immediate reputational consequences. Experience becomes a strategic asset.

Supersonic travel re-entered the market after breakthroughs in noise, emissions, and regulation. AI-driven booking, biometric processing, and redesigned terminal flows enabled a new premium ecosystem while widening the gap between rapid-transit elites and sustainability-driven mass-market travel. Supersonic operations forced airports and regulators to rethink airspace, standards, and equity considerations.

Legacy aircraft continue to dominate global fleets, but they are strained by sustainability expectations, climate-related operational limits, and complex maintenance needs. Retrofit programmes and mixed-fleet strategies help, but the pace of transition is ultimately shaped by infrastructure, skills, and regulation not technology alone.

The workforce is increasingly digital and values-driven. AI-enabled training, predictive maintenance, cybersecurity oversight, and advanced material skills define new operational roles. Organisations that invest in upskilling and flexible career pathways retain talent and maintain resilience. Major UK airport expansion becomes a national catalyst enabling long-haul competitiveness, economic uplift, greener operational models, and innovation in multimodal connectivity. But expansion alone is not enough: public expectations, sustainability delivery, and policy stability determine whether benefits are realised.

By 2040, coherence, resilience, and collaboration define the aviation ecosystem's leading organisations.

Aviation at the Crossroads in 2040: Implications

For a 2040 aviation future to take shape, the sector must recognise that the forces shaping its trajectory; climate disruption, geopolitical fragmentation, shifting passenger expectations, legacy-fleet constraints, and rapid digitalisation are already converging to create a fundamentally new operating environment. These dynamics are no longer distant or abstract risks; they are immediate pressures that will define the industry's resilience, competitiveness, and legitimacy over the next decade. The implications outlined below highlight the priorities aviation organisations must address now to navigate this decisive period effectively and position themselves for long-term success:

1 Strategic Coherence is Now Essential

Aviation organisations must align fleet decisions, sustainability strategies, digital transformation, infrastructure investment, and regulatory engagement into unified long-term roadmaps. Fragmented planning creates systemic vulnerability.

2 Climate Adaptation is Non-Negotiable

Weather-resilient infrastructure, weather-responsive operations, redesigned routes, and predictive modelling become mandatory capabilities. Climate shocks will increasingly shape performance, policy, and public expectations.

3 Supply-Chain Resilience Determines Competitiveness

Diversified raw-material sources, expanded local manufacturing, flexible SAF strategies, and de-risked supplier networks are required to withstand geopolitical volatility. Resilience becomes a premium asset.

4 Passenger Experience Drives Reputation

Digital transparency, frictionless processing, and sustainability credibility are core to consumer trust. Poor experiences translate immediately into reputational and regulatory pressure.

5 Mixed-Fleet Strategy Must Be Proactive

Legacy aircraft constraints will persist for a decade or more. Organisations must balance retrofit investments, maintenance capability, new-tech adoption, and regulatory compliance, all under rising climate pressure.

6 Workforce Strategy is Business Strategy

Workforce shortages in emerging technical areas may grow. Organisations must invest in digital skills, flexible pathways, and sustainability-aligned roles to retain talent and maintain operational resilience.

7 Airport Expansion Requires Integrated Systems

Success depends on synchronising aviation capacity growth with rail, road, digital infrastructure, and sustainability commitments. Without alignment, expansion risks congestion, reputational damage, and pushback.

Emerging Opportunities for the Future of Aviation

Despite escalating pressures from climate volatility and geopolitical uncertainty to rapid technological change; the aviation sector stands at a pivotal moment where multiple high-value opportunities can be harnessed to shape a more resilient, innovative, and sustainable future. Unlocking these opportunities will require coordinated strategy, regulatory alignment, and cross-industry collaboration. Despite headwinds, several areas offer significant growth potential that require:

Accelerating Local and Regional Capabilities and strengthening **local manufacturing,** maintenance, and supply-chain capacity to reduce exposure to geopolitical shocks and fuel price volatility. Developing **diversified supplier networks** to enhance resilience and support emerging aircraft technologies, SAF pathways, and digital systems.

Using Technology as a Strategic Enabler. Deploying **AI, automation, and predictive analytics** to strengthen operational efficiency, scenario modelling, and risk management. Embedding cybersecurity and digital resilience at the core of future system design.

Building a More Diverse, Future-Ready Workforce Leveraging a **digitally skilled, more diverse** workforce capable of integrating AI-enabled tools, predictive systems, and new operational models. Investing in **upskilling and new talent pipelines** to meet future aviation needs, from cyber resilience to advanced materials and next-generation infrastructure.

Co-Designing Long-Term Innovation Pathways Collaboratively shaping future roadmaps across aircraft, airspace, infrastructure, and digital systems to enable long-term transformation. Aligning stakeholders' regulators, industry partners, manufacturers, and technology providers to ensure feasibility, safety, and scalability.

Advancing Sustainability-Led Business Models Creating and scaling **sustainability-focused products and services,** including SAF ecosystems, greener airport operations, and low-emission aircraft technologies. Capitalising on evolving **consumer expectations for greener travel** and the growing importance of transparent sustainability credentials.

What this could mean for the CAA

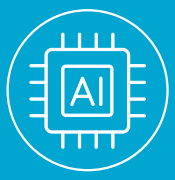
Key assumptions the CAA should prepare for…

Extreme weather will increasingly disrupt UK aviation and infrastructure

A mixed legacy + next-gen fleet will be the norm beyond 2050.

Geopolitical instability will drive supply-chain shocks for at least a decade.

Airport expansion will succeed only with integrated transport and sustainability delivery.



Digitalisation and AI will outpace current regulatory capability.

What this could mean for the CAA

Preparing for 2026-2030, the CAA should:

- Build **resilient regulatory capabilities** to ensure aviation stays safe and reliable as extreme weather becomes more common.
- Develop an **AI regulatory posture**, including testability, verification, and early policy positions for certification.
- Strengthen **geopolitical and supply-chain intelligence** to anticipate shocks that could affect safety or market stability.
- Explore a **mixed-fleet regulatory strategy**, balancing legacy constraints with emerging aircraft technologies.
- Ensure strong alignment with Government on **airport expansion**, especially around passenger experience, resilience, and climate impact.
- Invest in **internal digital and data capability** to match the digitalisation of industry.
- Clarify **our risk appetite** in fast-moving areas, especially supersonic and AI.

Strategic choices

- What is our risk appetite for next-generation aircraft and AI-enabled systems?
- How proactive should the CAA be in shaping climate-resilience standards?

Investment decisions

- Where must we invest in skills and recruitment?
- What early technology or modelling tools are required?

Policy positions

- What stance will we take on emerging issues including airport expansion, SAF, and supersonic services?

Governance

- Do we need new cross-CAA mechanisms to integrate foresight into regulatory decisions?

UK Civil Aviation Authority

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