Pathway to Advanced Air Mobility (AAM)

NACC/WG/09

4th October 2024

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Who we are

Voice of Air Traffic Management

193 Members

97 technology and other service providers

96 ANSPs

90% of world traffic

Why does ATM need to change?

Environment

Capacity

New Entrants

Safety/Security

OTHER ?

The Complete Air Traffic System (CATS) Global Council

*The CATS Global Council is an **innovation forum** of industry bodies, which believes that a shared blueprint and joint action are vital to make sure that future skies are efficient, clean and safe and can generate global economic prosperity and social welfare.*

ANSPs

Airspace Users (Civil, Military)

Airports Vertiports

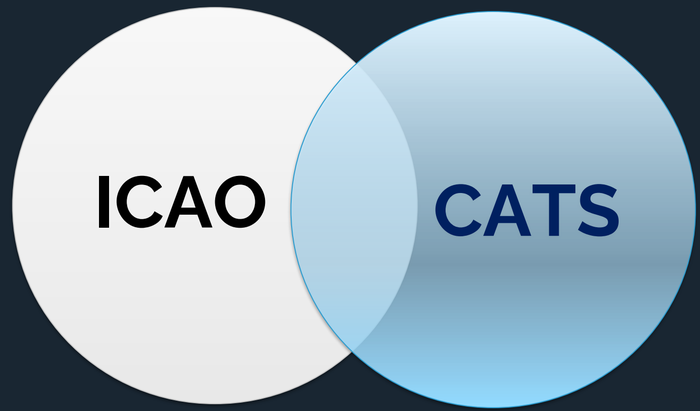
OEMs

R&D Centres and Academia Consultants

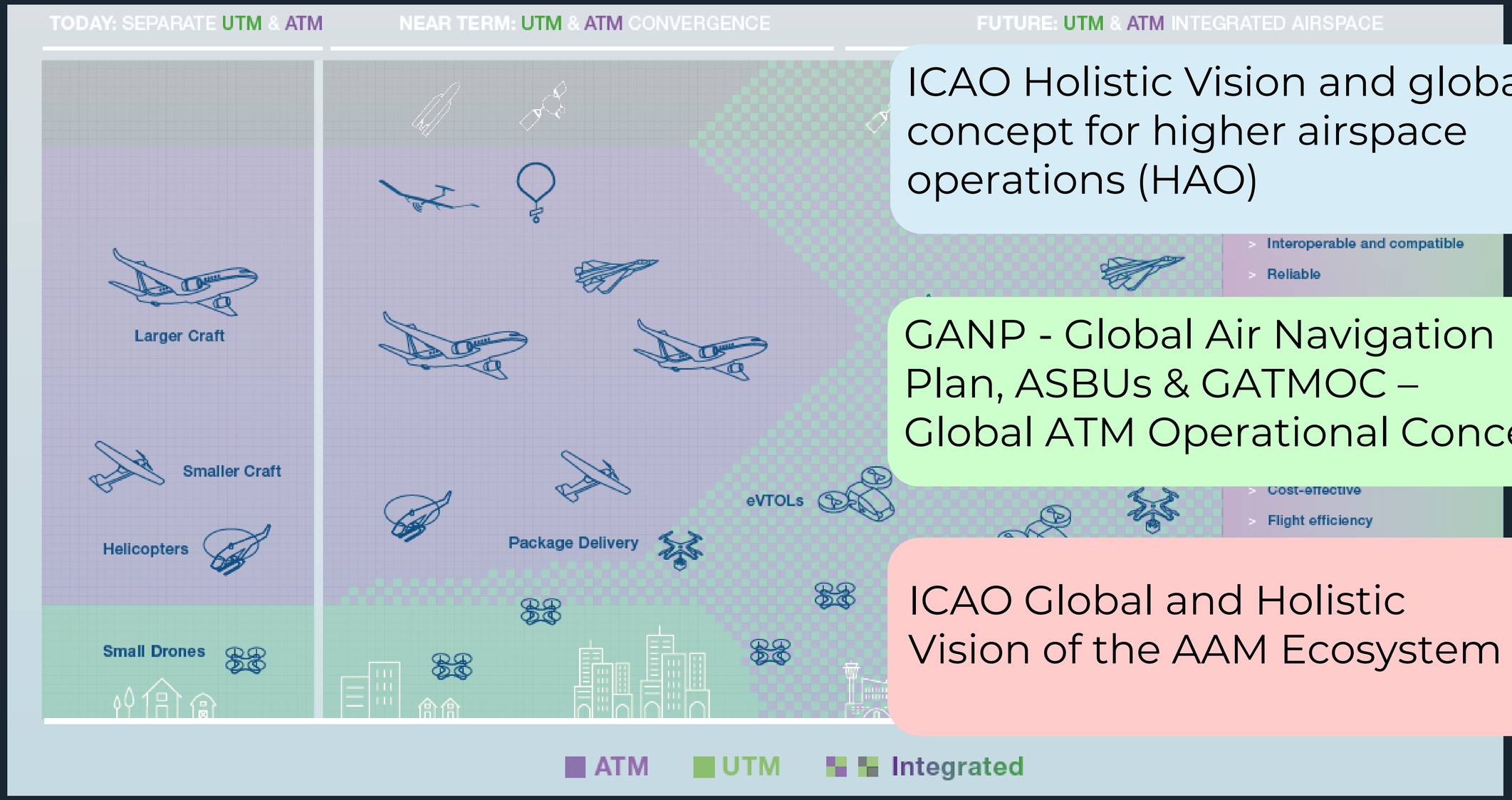
Professional Staff Organisations

UTM/ UAS/ eVTOL

Tech Companies



ICAO Vision for the future



ICAO Holistic Vision and global concept for higher airspace operations (HAO)

GANP - Global Air Navigation Plan, ASBUs & GATMOC – Global ATM Operational Concept

ICAO Global and Holistic Vision of the AAM Ecosystem

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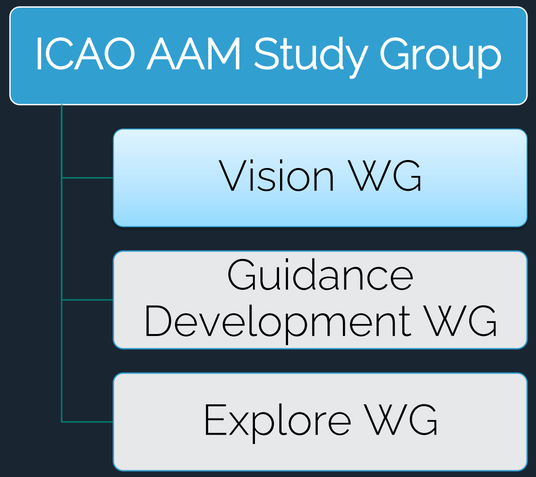
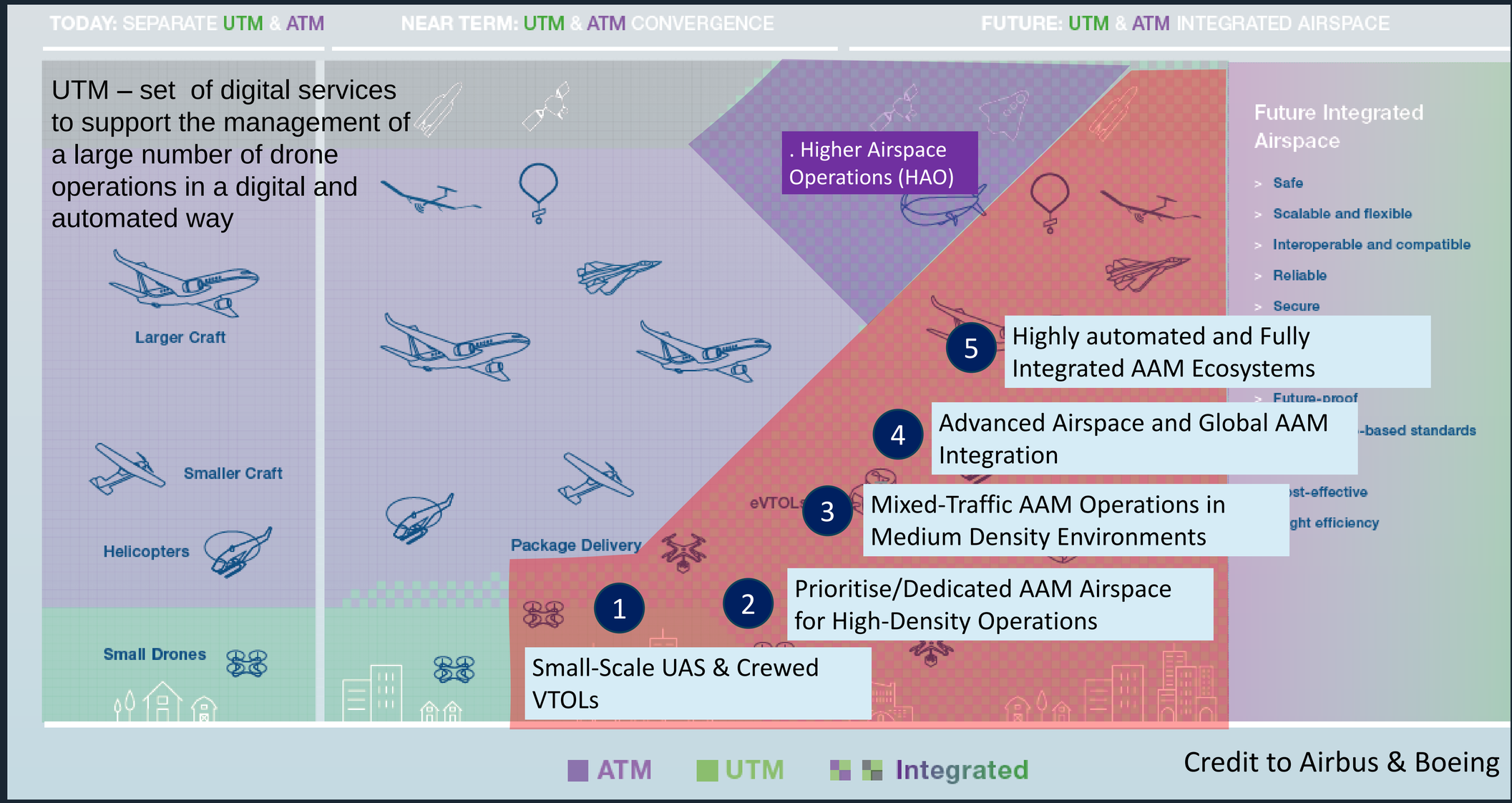


1. Initial **Principles** & Aspirations	2. Identify and Define **Enablers**	3. **Pillars** of the Vision	4.Assumptions **/Challenges**	5. Outline **Evolutionary Steps**	6. Describe **Aspirational Vision**	8. **Assess Impact** of AAM -Benefits & risks of AAM	9.Conventional aviation and AAM ecosystems - **convergence considerations**	10. **Conclusions & Recommendations**

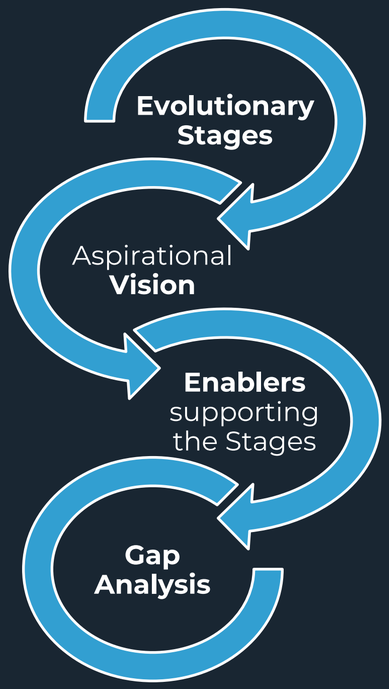
Q3 2023

Q1 2025

Supporting ICAO to develop a Global and Holistic Vision of the AAM Ecosystem



Credit to Airbus & Boeing



Stage 1. Short-Term Advanced Air Mobility (AAM) Operations

Small-Scale UAS and Crewed VTOLs

- Focus on practical applications of AAM technologies in urban and remote environments.
- Utilizes **existing** infrastructure and regulatory frameworks.
- UAS operations include last-mile delivery, medical supplies, and infrastructure support.
- Crewed VTOLs used for urban air taxi services, regional commuters, EMS, and cargo delivery.
- Key enablers include strategic deconfliction, segregated airspace, UTM systems, Common Information Service Provider and BVLOS operations.

Stage 2: Dedicated AAM Airspace for High-Density Operations

UAS and Crewed VTOLs operating in highly congested airspaces

- Maintains some segregation from general aviation to manage complexity.
- Dedicated airspace includes corridors, vertiports, and management systems.
- Key enablers: **Advanced automation**, UTM systems, and robust safety protocols.
- Strategic segregation enhances safety while managing high-density traffic.
- Supports operations like passenger transport, cargo delivery, and emergency response.

STAGE 3. Mixed-Traffic AAM Operations in Medium-Density Environments

Mixed traffic: UAS, VTOL, General Aviation, and IFR traffic

- Key features: Collaborative digital airspace, communication protocols, DAA systems.
- Partial integration with major airports for passenger and cargo transport.
- UTM and ATM integration for real-time situational awareness.
- Community and infrastructure integration for seamless travel.
- Challenges: Regulatory development, public acceptance, safety, and reliability

Stage 4. Advanced Airspace and Global AAM Integration

Small-Scale UAS and Crewed VTOLs

- Global interoperability and ATM/UTM integrated airspace ("Integrated Sky").
- Advanced multi-dimensional traffic management systems with AI-driven automation.
- Cross-modal and cross-border integration supporting seamless transportation networks.
- Sustainability focus with green technologies and environmental impact monitoring.
- Global infrastructure development with vertiports and CNS system integration.
- Challenges include cybersecurity, public trust, and socio-economic impacts.

Stage 5. Highly Automated and Fully Integrated AAM Ecosystems

Highly automated AAM operations

- Complete autonomy with AI-driven systems managing all aspects of operations.
- Minimal human involvement, with humans shifting to supervisory roles.
- Adaptative ecosystem with real-time decision-making and optimization.
- Smart, interconnected infrastructure with dynamic airspace management.
- Universal integration across transportation modes and global infrastructure.
- Sustainability-focused with zero-emission operations and environmental monitoring.

Enablers for the success & growth of AAM

Groups of AAM Enablers (Pillars of the vision)

1. Policy, governance, and strategy
2. Regulations, Safety, Security & Sustainability
3. Societal acceptance
4. Supporting Aviation Infrastructure
5. Airspace Integration
6. Aircraft Systems
7. Workforce & new skills

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- Establish global, regional, and local AAM strategies.
- Create multi-stakeholder governance frameworks.
- Foster collaboration between public and private sectors.
- Align national and international aviation policies

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- Develop harmonized regulatory and certification standards for AAM vehicles and systems.
- Establish certification pathways for AAM operators and automated systems.
- Integrate security protocols for unmanned and manned systems.
- Ensure safety by incorporating advanced risk management.
- Prioritize sustainability in vehicle design and operations.

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- Engage communities through education and outreach.
- Address public concerns about noise, privacy, and safety.
- Promote equitable access to AAM services.
- Encourage media and public communication to build trust.

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- Build vertiports and landing sites in urban and suburban areas.
- Establish electric and alternative fuel charging infrastructure.
- Implement robust digital networks for communication and data sharing.
- Plan for scalable infrastructure that can handle future growth.
- Spectrum!

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- Integration of UTM / ATM systems.
- Implement dynamic airspace reconfiguration for flexibility.
- Trajectory-Based Operations (TBO)
- Advanced Communication Systems
- Digital Twin and Simulation Technologies
- Detect and avoid (DAA) system
- New/adapted flight rules?

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- Advance electric and hybrid propulsion systems.
- Enhance vehicle performance, reliability, and safety.
- Incorporate sustainability into aircraft design and lifecycle management.
- Establish certification processes for AAM aircraft and their subsystems.
- Invest in automation, AI, and autonomous technologies.

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- Train the workforce for new roles in AAM operations and management.
- Promote STEM education and upskilling programs.
- Develop certification and licensing for AAM operators and automated systems.
- Support the transition to automation-enhanced work environments.

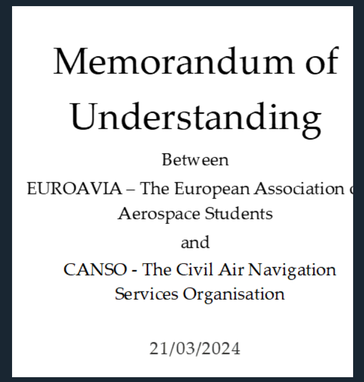
Thriving aviation community
CANSO “Tomorrow’s Voices” Initiative

1. **Create partnerships to champion STEM education** among diverse candidates, ensuring that we cultivate a talent pipeline that reflects the diversity and creativity of the global community.

2. **Enhance recruitment efforts for critical roles** such as systems engineers, data architects, analysts, and experts in AI/ML.
By organizing **diversity and inclusion** awareness campaigns, we aim to promote and implement measures that challenge existing norms and encourage the evolution of the aviation workforce.

3. **Identify future skills needed** in aviation and define clear career paths that will allow young professionals to thrive in a rapidly changing industry.

Global Aviation & Aerospace Skills Taskforce
Developing the Workforce for the Future


Memorandum of Understanding

Between

EUROAVIA – The European Association of Aerospace Students

and

CANSO - The Civil Air Navigation Services Organisation

21/03/2024

A unified vision for the future

Advance a **common future sky vision** for transformation of ATM and integration of AAM, encompassing all aircraft from low-level drone operations to Higher Airspace Operations.

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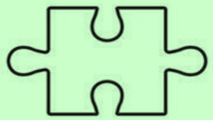

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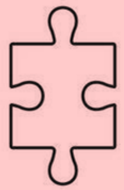

Thank You

For more information, please contact:

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CANSO

SHAPING OUR FUTURE SKIES