AI-Driven Full Autonomous Flight

The Nuts and Bolts

DEFENCE AND SPACE

Miguel Martin Acosta
Chief Engineer UAS R&D

AIRBUS

Airbus UAS is the business unit in charge of research and development of Civil and Military Unmanned Aerial Systems and Technologies focused in autonomous flight, connectivity, advanced missions, zero emissions and U-Space integration.

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What is full autonomous flight?

“Flight capability of an aerial machine without human intervention”

Why Full Autonomous Flight?

Core Functions

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Core Functions

Perception

Situational Awareness

Core Functions

Perception

Situational Awareness

Connectivity

Connected to the world

Core Functions

Perception

Situational Awareness

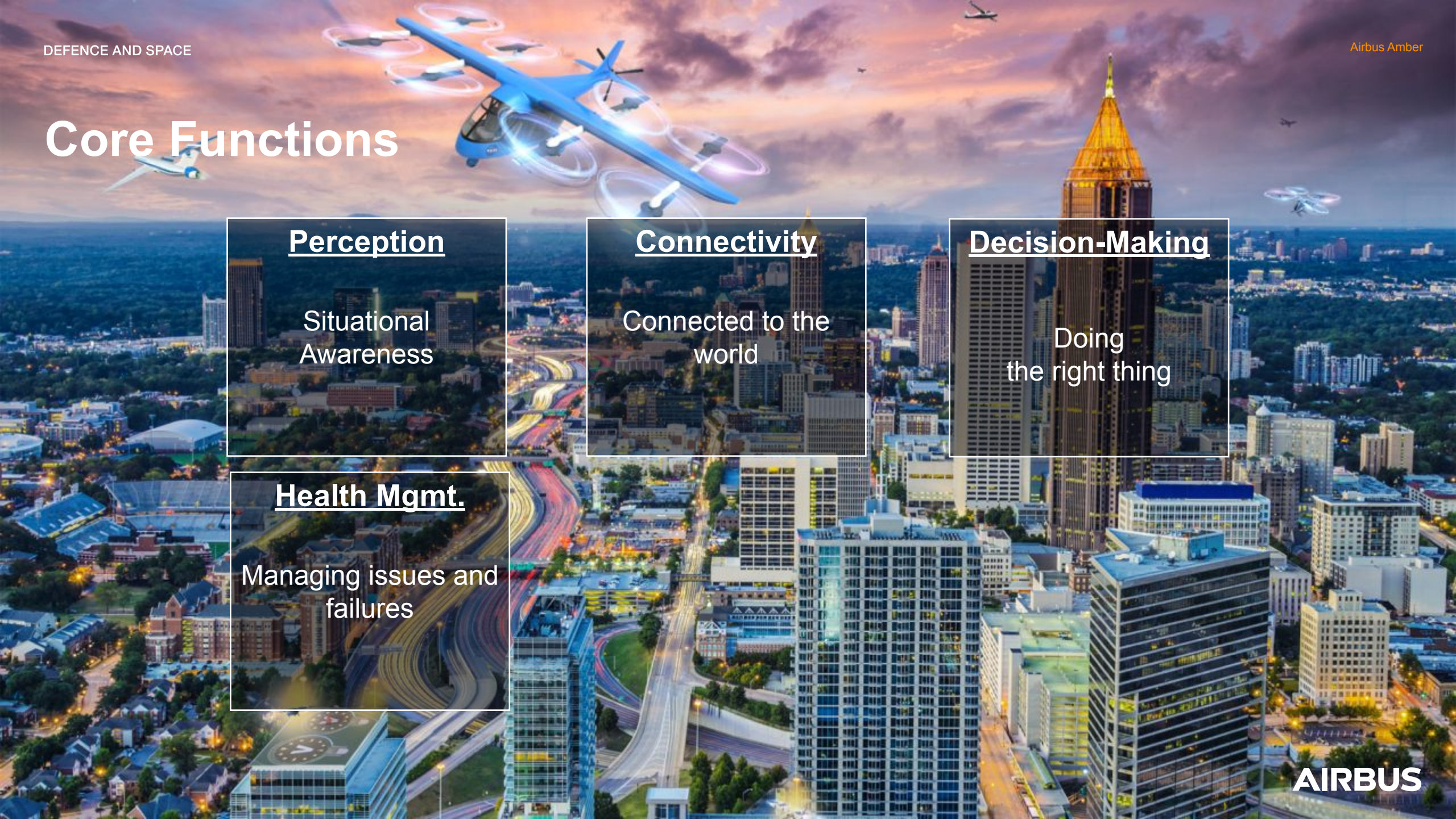
Connectivity

Connected to the world

Decision-Making

Doing the right thing

Core Functions



Perception

Situational Awareness

Connectivity

Connected to the world

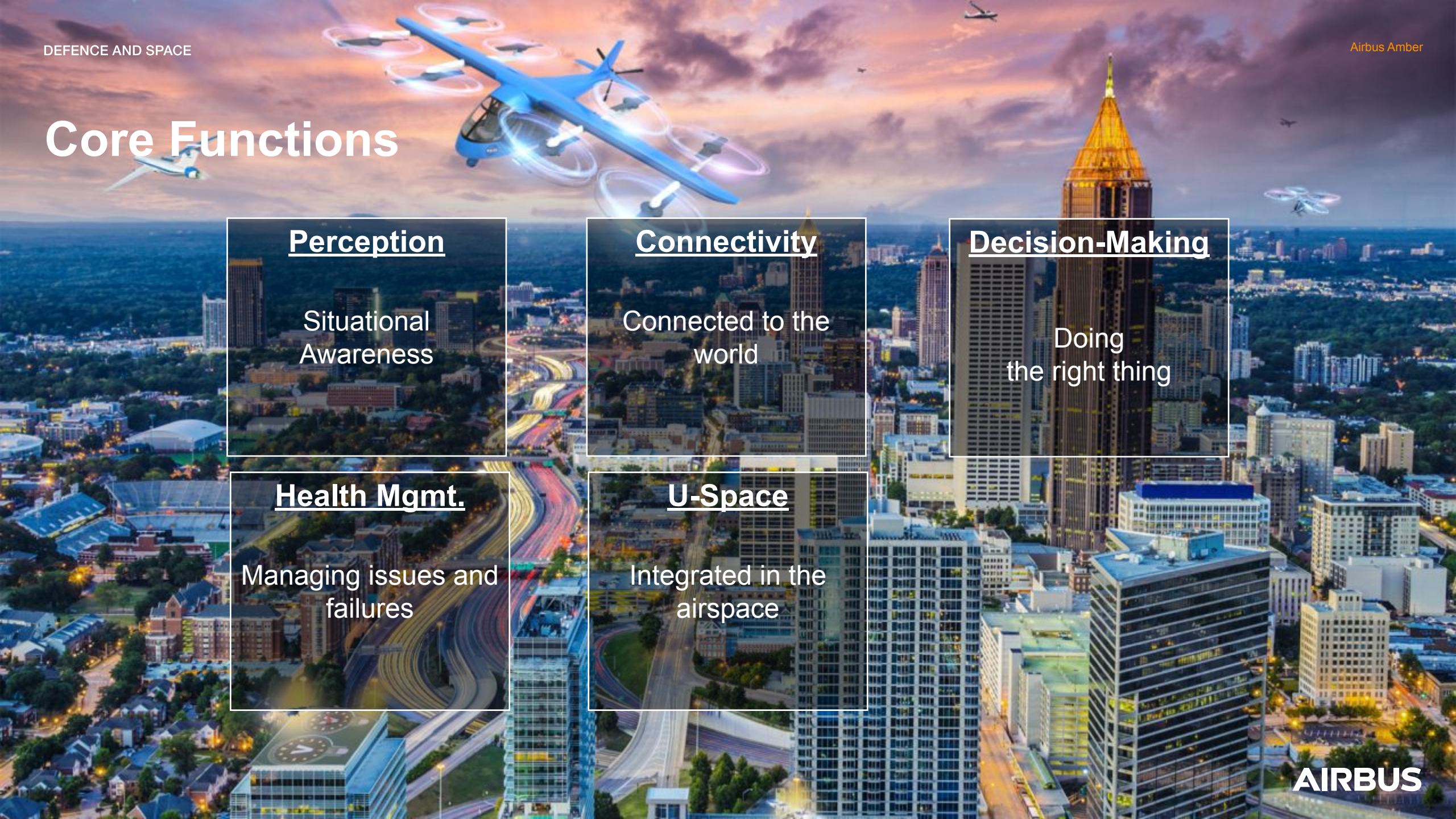
Decision-Making

Doing the right thing

Health Mgmt.

Managing issues and failures

Core Functions



Perception

Situational Awareness

Connectivity

Connected to the world

Decision-Making

Doing the right thing

Health Mgmt.

Managing issues and failures

U-Space

Integrated in the airspace

Core Functions

Perception

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Doing the right thing

Health Mgmt.

Managing issues and failures

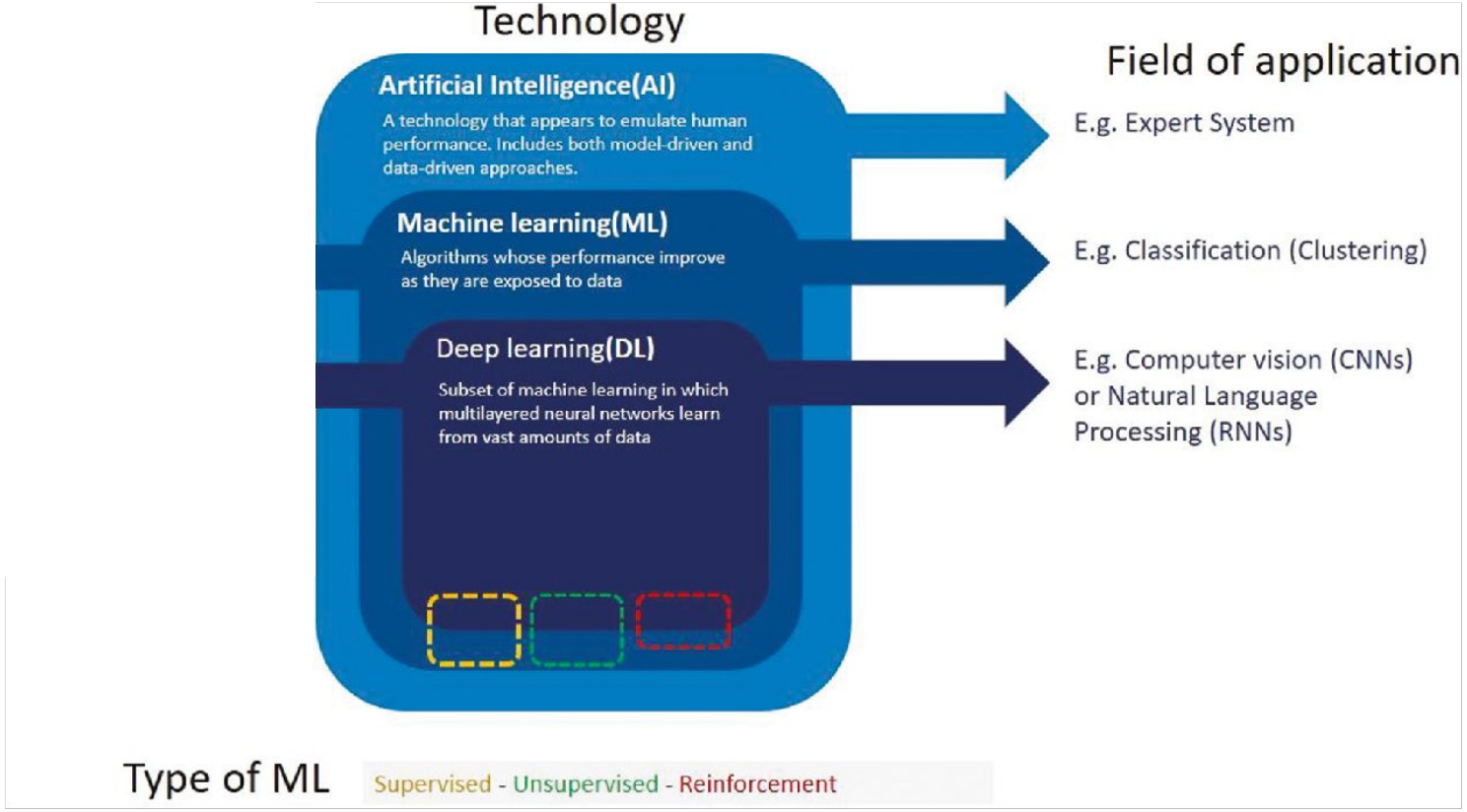
U-Space

Integrated in the airspace

Trustworthiness

Safe, explainable and assured

AI-Driven Full Autonomous Flight



Source: EASA

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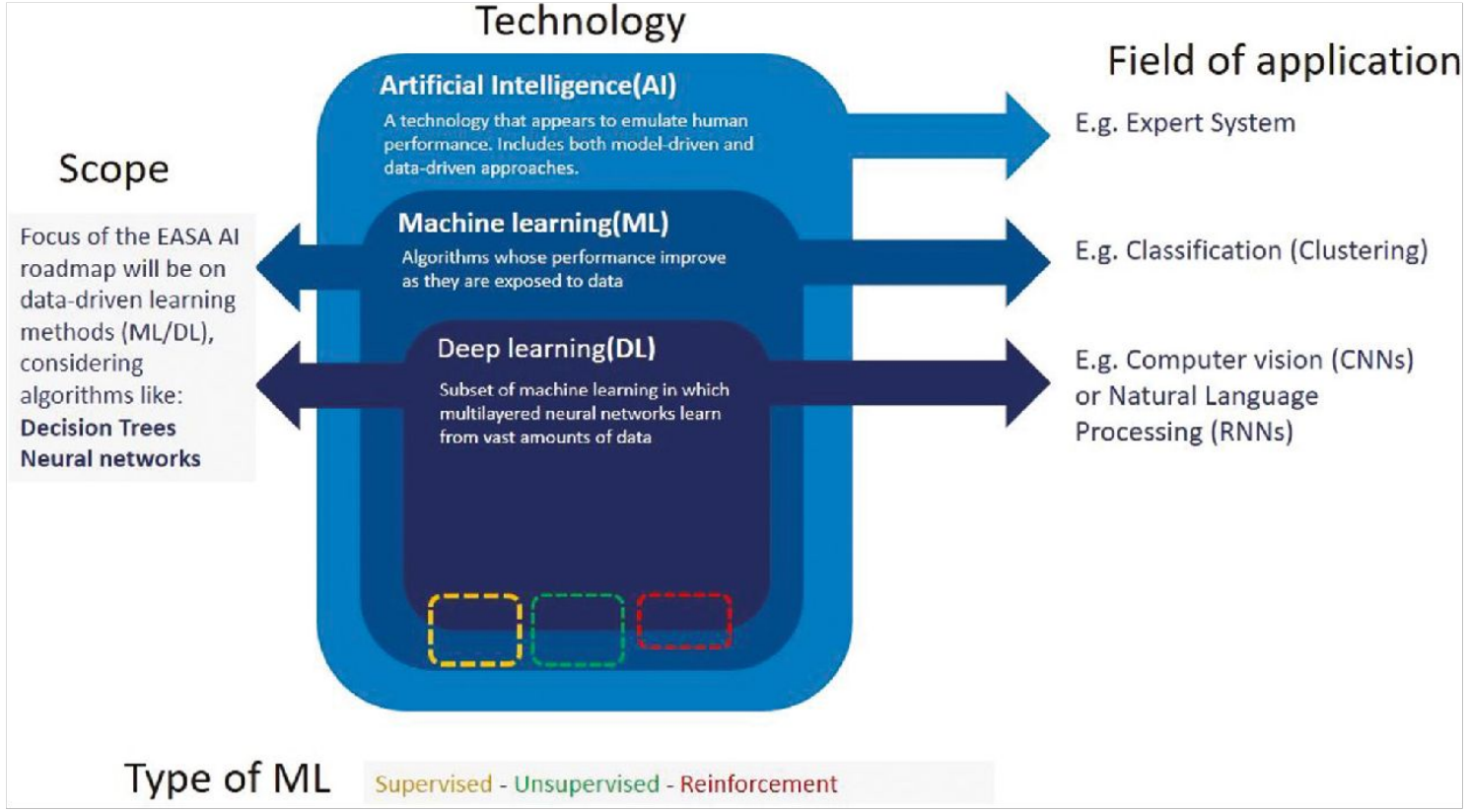
AI-Driven Full Autonomous Flight



Source: EASA

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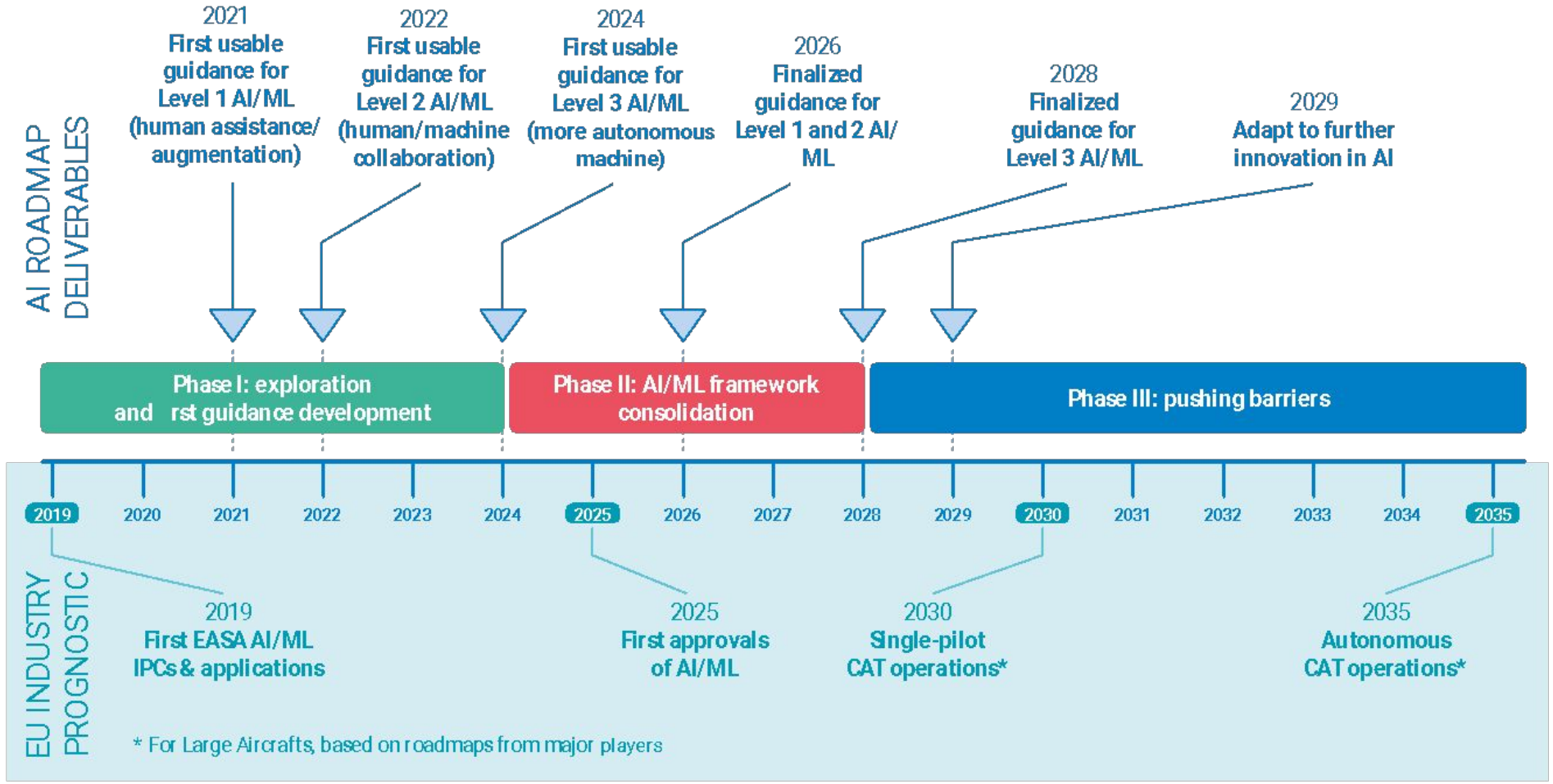
Authority Roadmap for AI Certification



Source: EASA

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AI/ML Levels

Level 1 AI/ML: assistance to human	Level 2 AI/ML: human/machine collaboration	Level 3 AI/ML: more autonomous machine
• Level 1A – Routine assistance • Level 1B – Reinforced assistance	• Level 2A – Human performs a function / Machine monitors • Level 2B – Machine performs a function / Human monitors	• Machine performs functions with no human intervention in operations. Human is in the loop at design and oversight time

Source: EASA

Aviation Trustworthy AI

Aviation Trustworthy AI

Learning Assurance

Trusting in data and processes…

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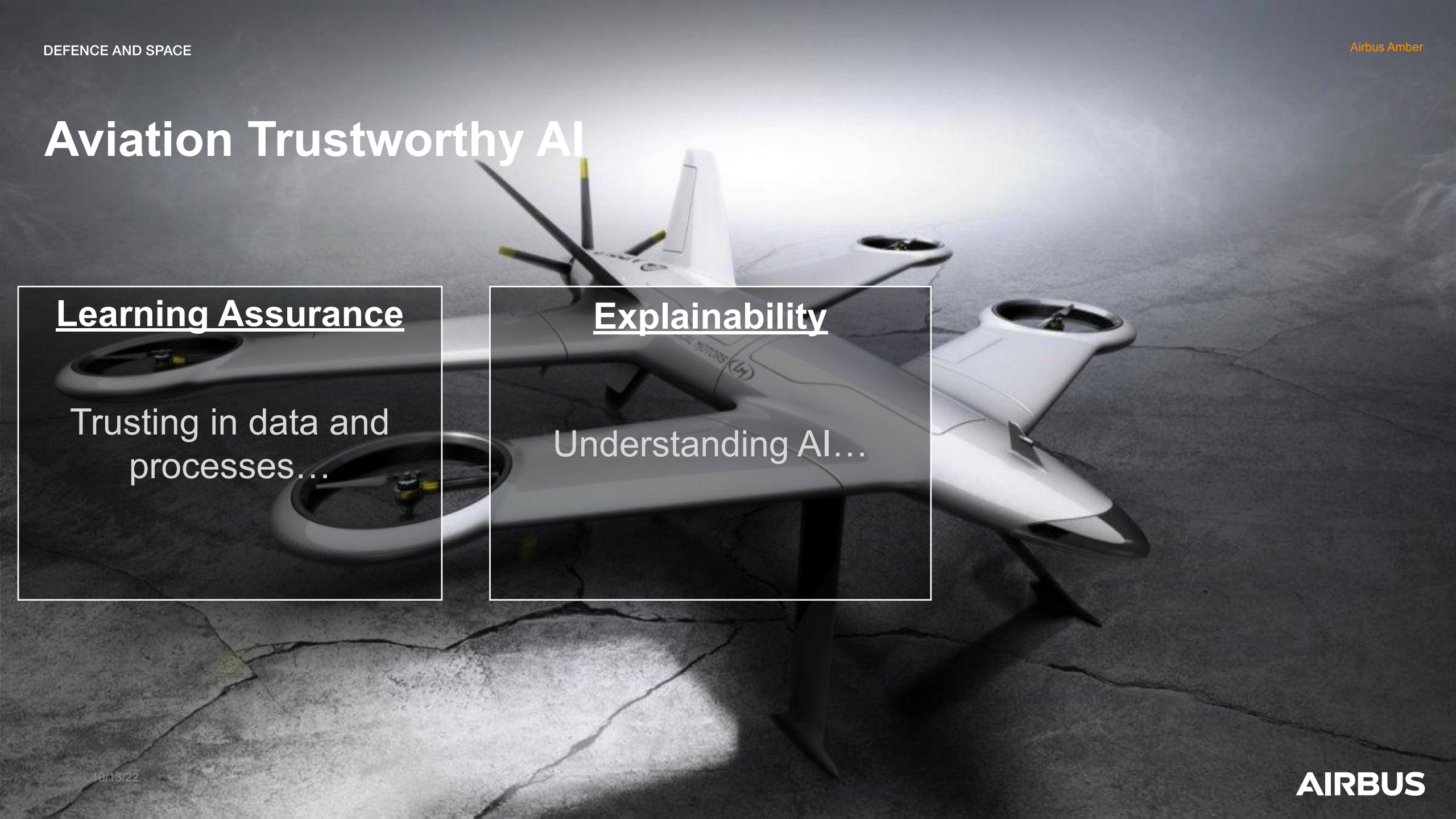
Aviation Trustworthy AI



Learning Assurance

Trusting in data and processes…

Explainability

Understanding AI…

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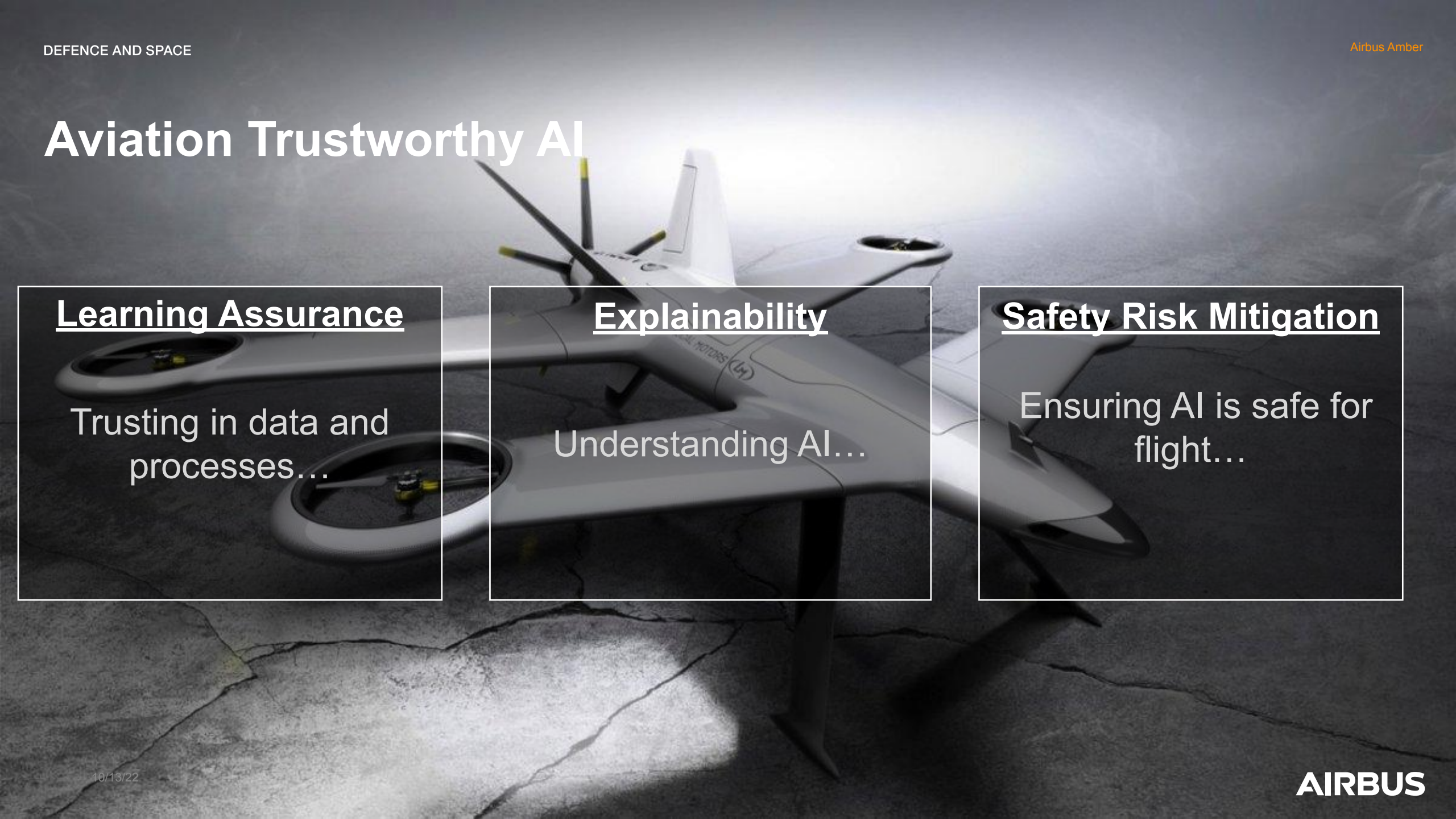
Aviation Trustworthy AI



Learning Assurance

Trusting in data and processes…

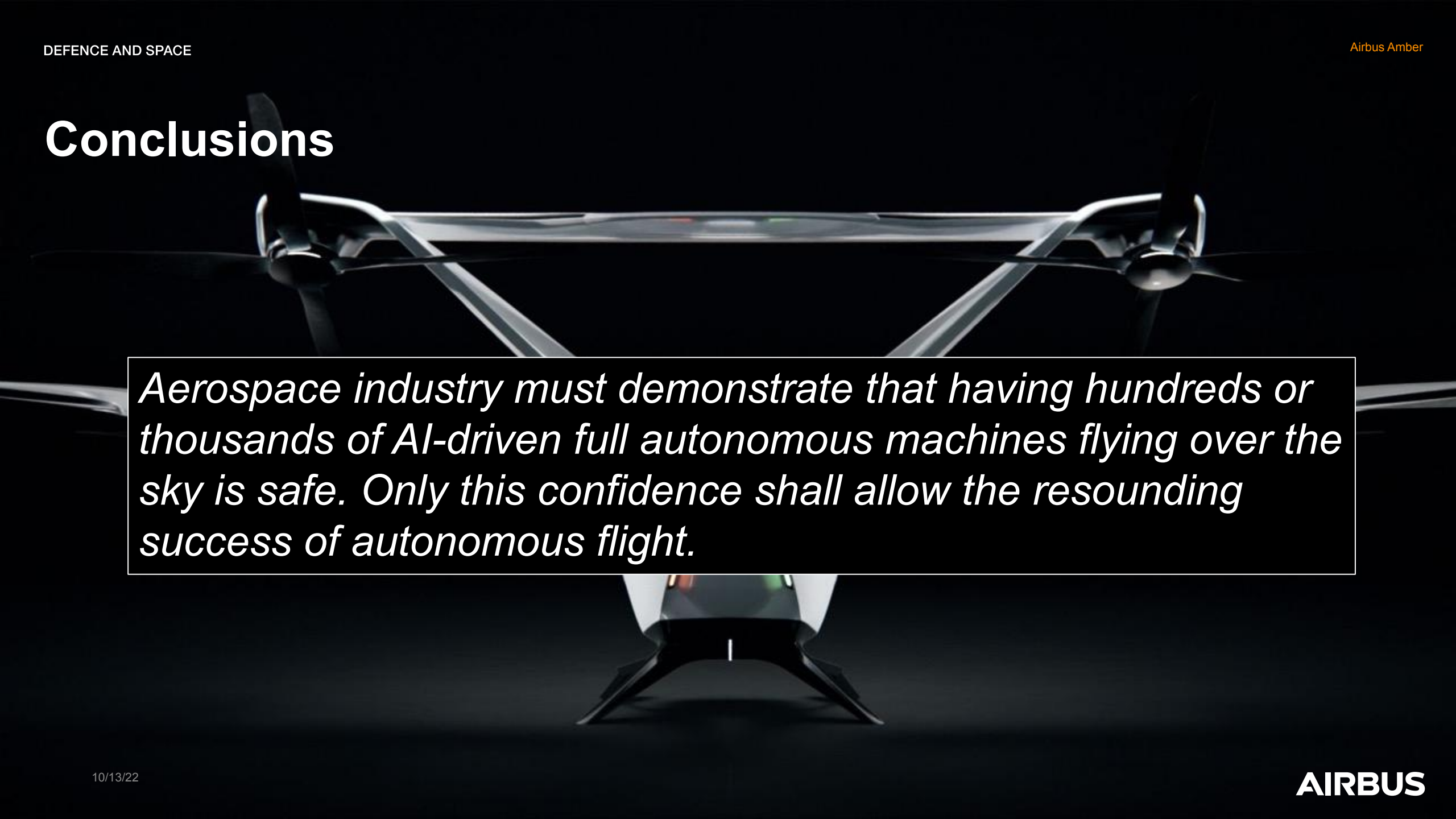
Explainability

Understanding AI…

Safety Risk Mitigation

Ensuring AI is safe for flight…

Conclusions



Aerospace industry must demonstrate that having hundreds or thousands of AI-driven full autonomous machines flying over the sky is safe. Only this confidence shall allow the resounding success of autonomous flight.

Thank you

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