

Real Smart Airbus & Generative Design

By **Greg Ombach**

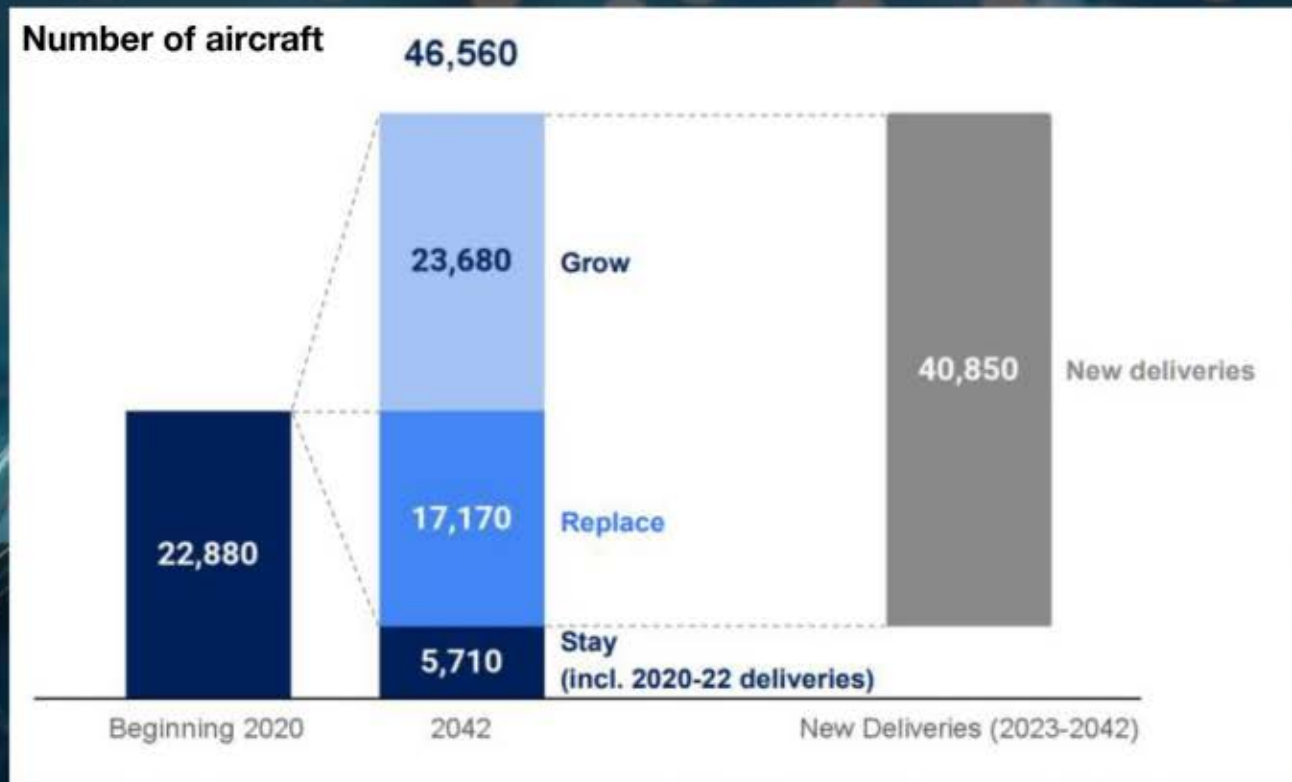
Head of Airbus Disruptive R&T,
Airbus Senior Vice President

Sogeti Executive Summit 2024
25.10.2024



AIRBUS

+40.000 Aircraft in the next 20 years

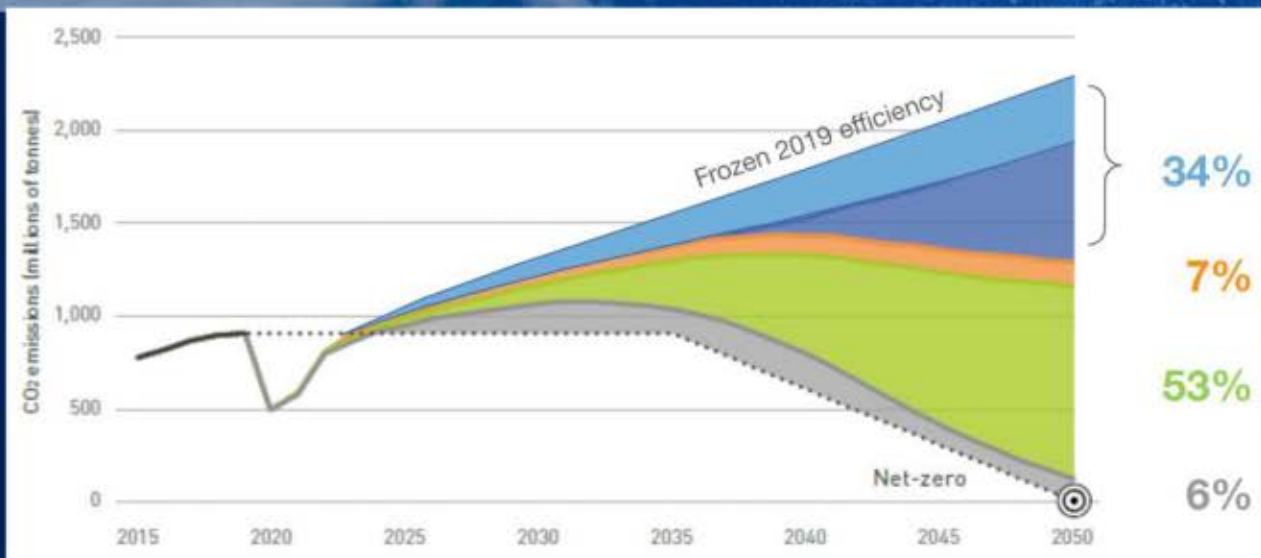


76% of the demand between 2022-2040 are linked to SMALL category

Airbus Global Market Forecast 2021 - 2040

Roadmap to reach net zero by 2050

For decarbonisation
in 2050 multiple
solutions are required



Latest
generation
aircraft



Operations and
Infrastructures



Sustainable
Aviation Fuels



Disruptive
technologies



Market-based
measures

| All start with **Big Data**



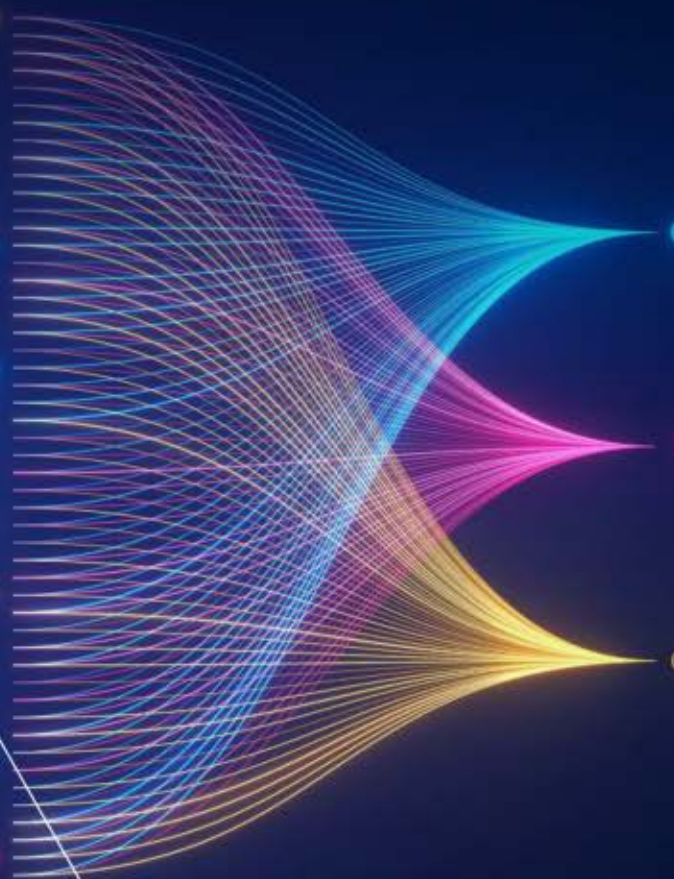
Design &
Engineering



Maintenance



and more



Perceive / Observe

Computer Vision, Pattern recognition,
Times series analysis, Natural Language
processing

Predict / Forecast / Orient

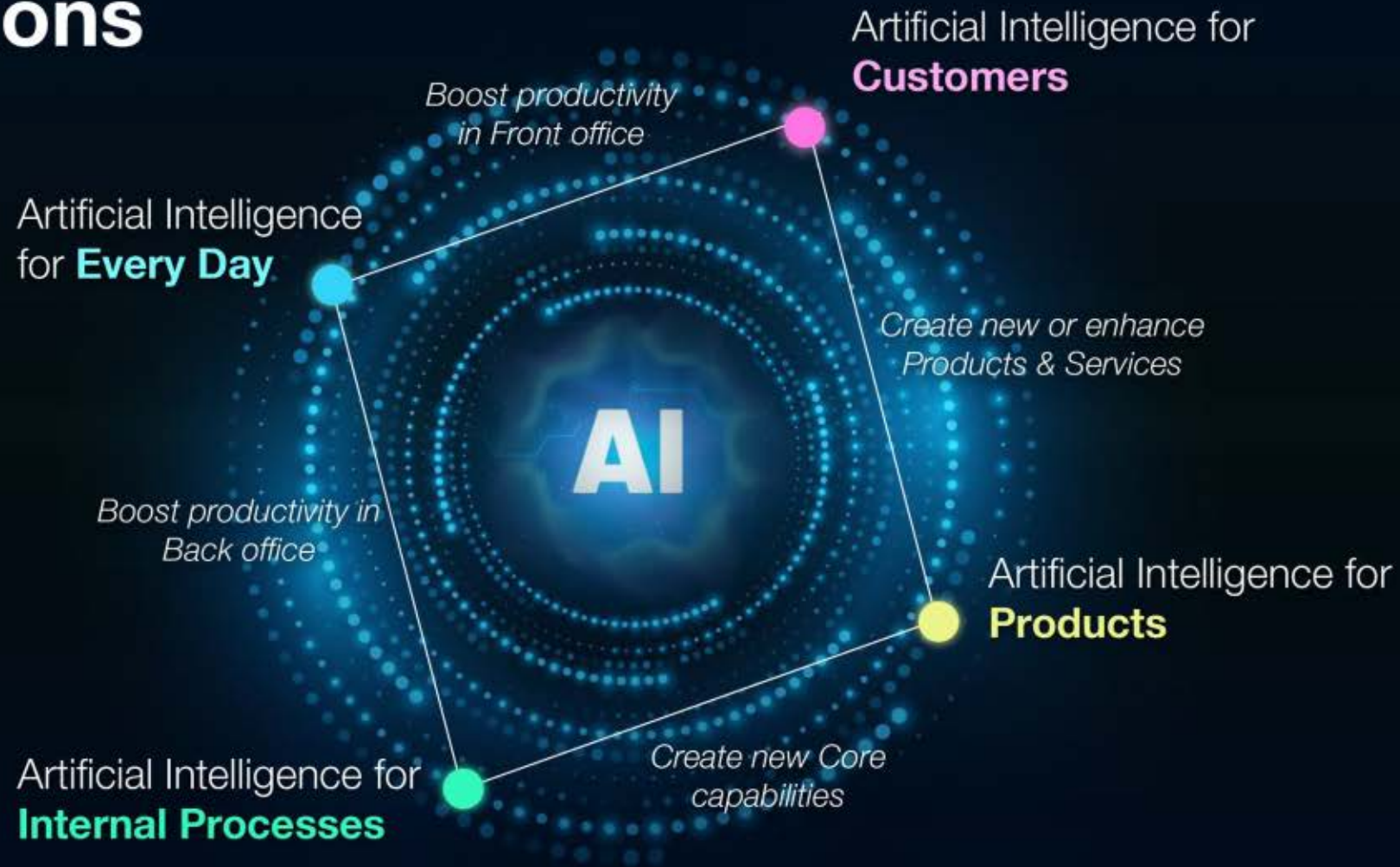
Hybrid Modelling, Generative AI

Decide/Act

Decision making

2.5 TeraBytes per day
Airbus A350 Data generates

Data & Artificial Intelligence **Applications**



Real Smart

Airbus challenges



Deliver **current product portfolio**



Support **Operational Effectiveness**



Develop **Next Generation Products & Services**

... enhanced by **Generative Design**

Leverage Partnership & Startups solutions for non-core expertise / technologies



Forbes

How Venture Client Units
Are Revolutionizing
Corporate Innovation

Computer Vision & Generative AI for Operational Effectiveness



Computer Vision

- Performance Data during Production operations
- Quality assurance
- Foreign Object damage detection
- Support Manual operations

Leading to improve Planning & Quality

**Intelligent
Shop Floor Quality
Management**

with  **Retrocausal**

**Safety Enhancement
System**

by **Airbus China R&D and
Innovation Center**

**Visual Intelligence
for Assembly**

by 

Predictive Intelligence for Optimization & Anticipation



Planning Data analysis



**scenario management and
business intelligence** simulations



**Predictive Capacity Planning
for Manufacturing** to support

decision-making and hence
securing supply chain

+10% Rate readiness increase

Timely & accurate volumes of
orders

Play with data for Enhanced Services with **skywise.**



11,700

Aircraft
connected



Health Monitoring & Fleet Reliability
for operational efficiency



44,000+

Airbus & Airline users



Predictive Maintenance
to anticipate the future



400

Internal data sources
connected

11% of time saved during heavy maintenance
checks due to non routine tasks

20% of time saved for each data analyst or data
scientist in the airline

Play with data for **Enhanced Space Services**

Leverages **Artificial Intelligence** and **Machine Learning** for **Space Imagery**

- Understand complexity at global scale and the unpredictable

- Digital twin of the globe

- Enhance the visual rendering of imagery

From 30cm resolution

Pléiade NEO

to 15cm resolution

by leveraging AI & ML

AIRBUS

Future Aircraft Design

Artificial General Intelligence



Design Future Components

Bionic Partition

Generative Design to mimics nature, by starting with Design Goals, and explore millions of design choices, testing configurations and learning from each iterations.

Airbus's bionic partition use 100% 3D printing



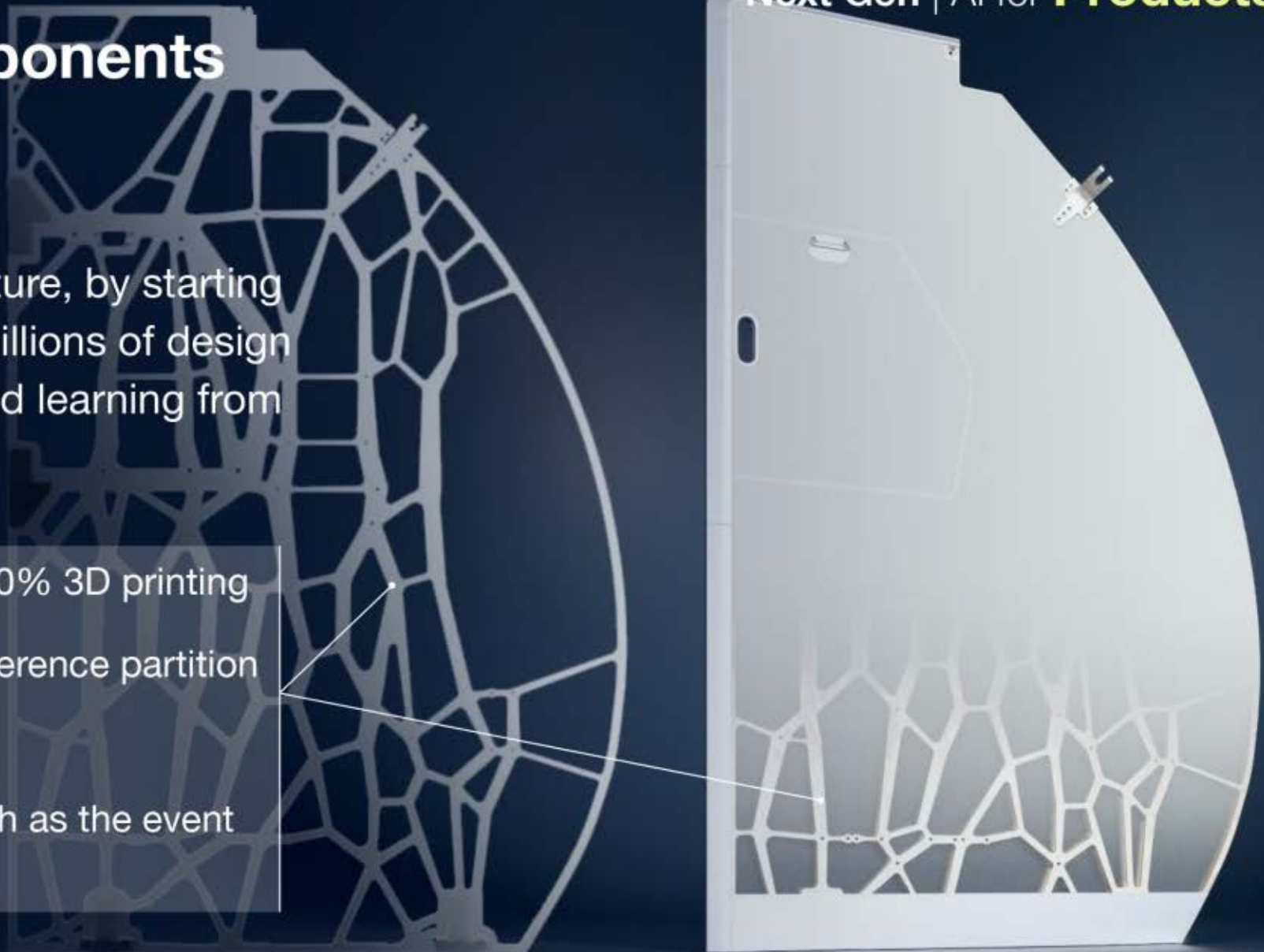
30% weight reduction to the reference partition



50% Recurrent Cost reduction



Respect safety requirement such as the event of a crash with the force of 16g



Smart Automation



Increase **Safety** & **Operations Efficiency**

- Understand and interact with air traffic, weather, performance, and more
- Optimise flight plans & trajectories
- Autonomous taxi, take-off and landing

OPTIMATE

Assist pilots to perform an optimised mission on an Airbus Commercial aircraft with connected virtual assistant & overridable protections

VERTEX

Simplification of VTOL-craft mission, enabling a non-pilot using very simple and intuitive devices to control the flight of an helicopter

Synthetic Data & Digital Twins for Machine Learning

Data acquired during
real flight

Create Digital Twins

Wide variety of conditions recreated
using generative image synthesis



V&V coverage of
operational domain

Massive data expansion

+

Synthetic data

(factor of 100 ... 1,000)

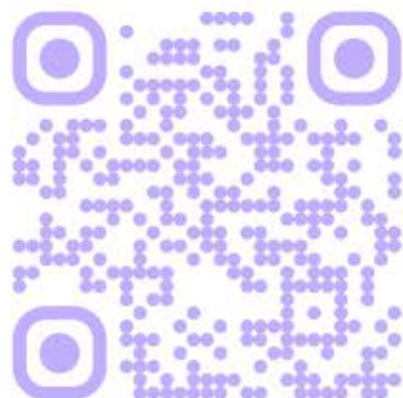
Nvidia
V100 & H100

AIRBUS

Prepare the Future



PROJECT
42



↑ Contribute to
the Future!

Research to ...

Understand
Anticipate

the acceptance of Technology,
Sustainability and Change by Society

thanks to ...

Advanced
Multi-agent Model

leveraging new Artificial Intelligence
techniques, Psychology and Sociology

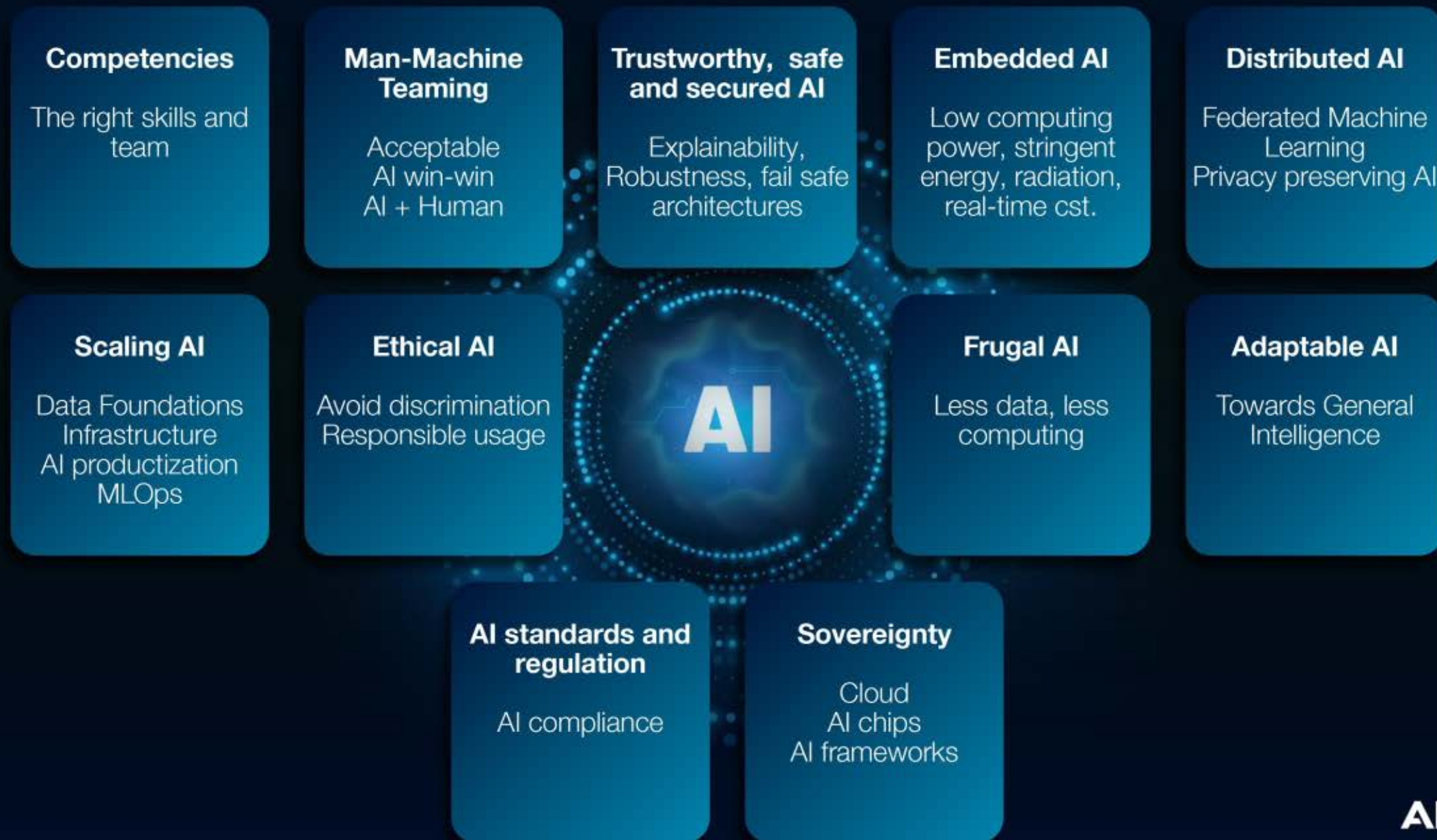


allowing ...

Human-Centric
Design approach

make products that are in phase with
Societal expectations & Emotions

| Artificial Intelligence **Common challenges**



Airbus & BMW Quantum Computing Challenge 2024



9 companies and
6 universities / RTOs



are coming from all
over the world!

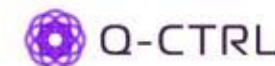


15 Finalists, Announced in
London on June 6

Smart Coating



Towards an Efficient &
Sustainable Supply Chain



Predictive Aeroacoustic &
Aerodynamic modeling



Enhanced Autonomy

QUANDELA QuanIT



Host



Partners



AIRBUS



Dr. Grzegorz
Ombach

*Head of Airbus Disruptive R&T,
Airbus Senior Vice President*

Thank you!



AIRBUS