

# TRANSFORMATIVE TECHNOLOGIES for SPACE

**Session Chair:** Bianca Hoersch, ESA Chief Digital Officer

## **Speakers:**

Alison Lowndes, NVIDIA

Heike Riel, IBM IoT

Damian Borth, University St Gallen

Claire Melamed, Data4SDG

Marino Fragnito, Arianespace

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## *Technological advances*



# Key Technologies

## Digital Transformation

Artificial intelligence  
on-board & on-ground

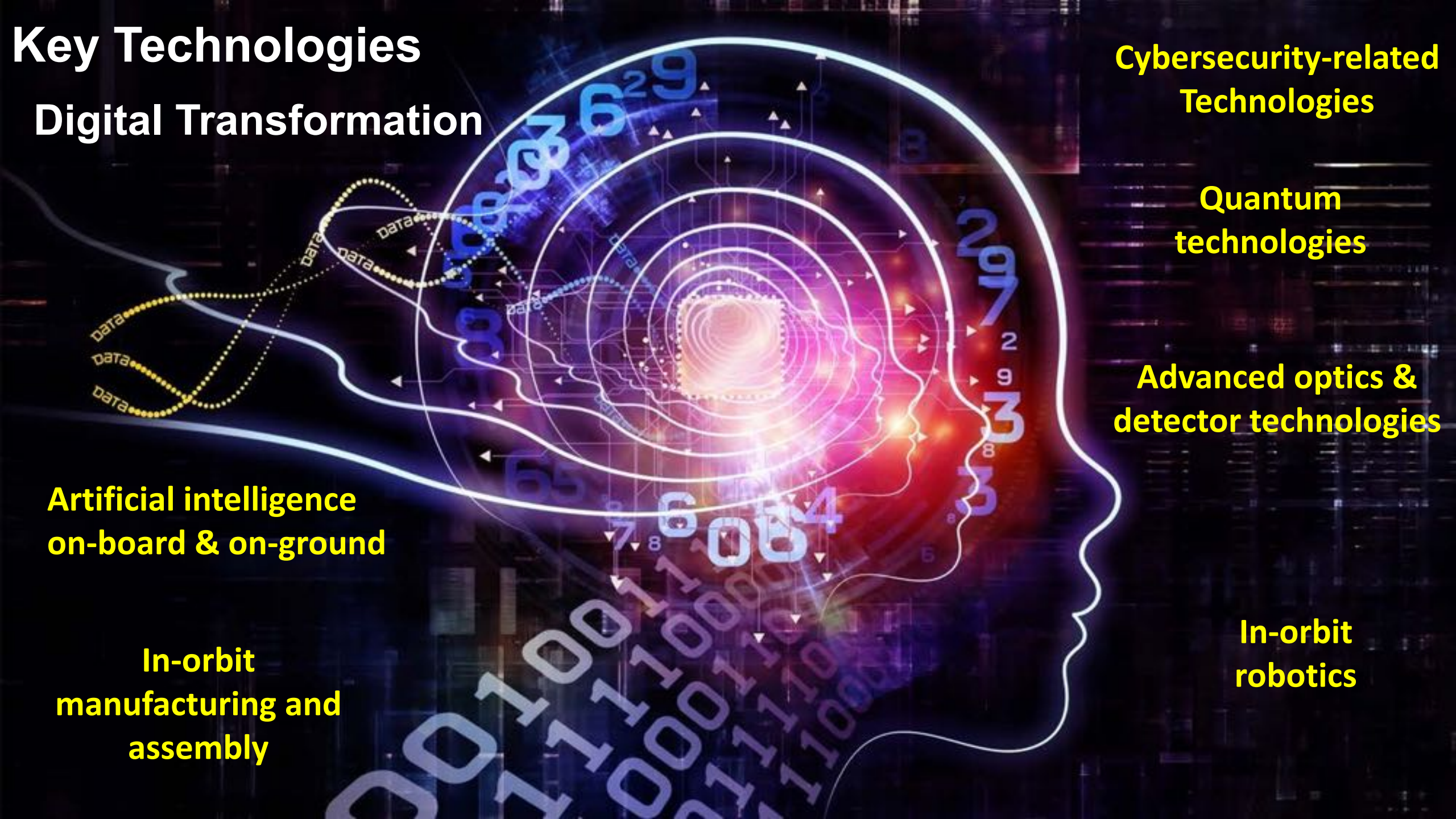
In-orbit  
manufacturing and  
assembly

Cybersecurity-related  
Technologies

Quantum  
technologies

Advanced optics &  
detector technologies

In-orbit  
robotics





# TRANSFORMATIVE TECHNOLOGIES for SPACE





Alison Lowndes  
**NVIDIA**



Heike Riel  
**IBM Research**



Damian Borth  
**DFKI**



Claire Melamed  
**Data4SDG**



Marino Fragnito  
**Arianespace**



to lead, not follow.

1. Where do you expect the most disruptive technology based changes in ESA and the space sector in Europe?

2. Where do you see ESA to support you in future?

- Data?
- Reference missions/quality reference? Calibration? Certification?
- Technology Development - TRL advance?
- Seed funding?
- Partner?
- Provider of Space safety&Security?

Which technology will be THE one with the most impact in coming 5 years for Space, seen from your domain? And why?

- ML/AI
- Quantum computing/encryption
- Blockchain
- Autonomous things
- Augmented analytics
- Additive manufacturing
- Nanomaterials
- Digital Engineering – Digital twins
- Others?



Gartner predicts that in 2021, AI augmentation will generate \$2.9 trillion in business value and recover 6.2 billion hours of worker productivity.

- How will our traditional Space jobs change?
- What is your recommendation for the young generation to prepare for the job market?

Gartner predictions indicates that in 2020 there will be more citizen data scientists that professional data scientists and growing.

- How can an organisation like ESA contribute in practical ways to help and to leverage those citizen data scientists?
- How do your companies involve the citizen data scientists?
- How shall we combine AI and people in 2030?

# Seed Questions



Look beyond Industry 4.0/Space4.0 era:

What will be the key components of Space5.0?

