

EU Space R&I - Future Space Ecosystem In-Space Services

Towards sustainable and value-added In-Space Services

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Horizon Europe,
a programme of the
European Union



Future Space Ecosystem

And why its important for the European Union to invest in it.

The EU Future Space Ecosystem (FSE)

Enable industrialisation and new services in space with intelligent solutions and concepts

The **Future Space Ecosystem** is a highly automated, flexible, sustainable and economically viable space infrastructure enabling growth of innovative applications and competitive services

Resilience of space assets

- ✓ Establishment of services for maintenance & upgrade
- ✓ Enhanced flexibility, security and scalability

Non-dependence on technology & capability

- ✓ Key technology maturation
- ✓ Support to game-changing approaches and solutions
- ✓ Contribution to standardisation activities



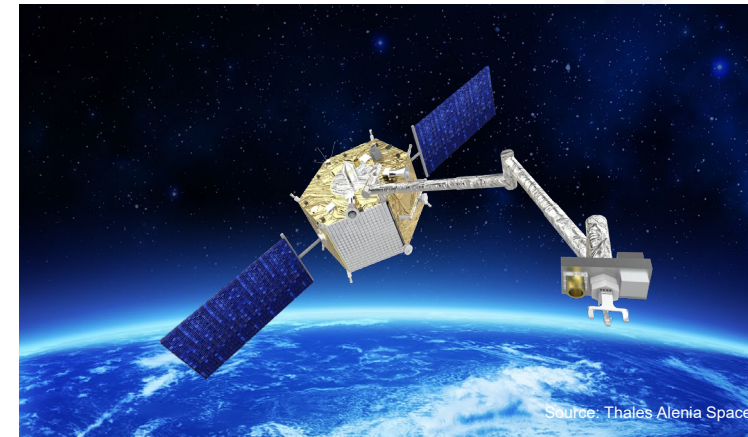
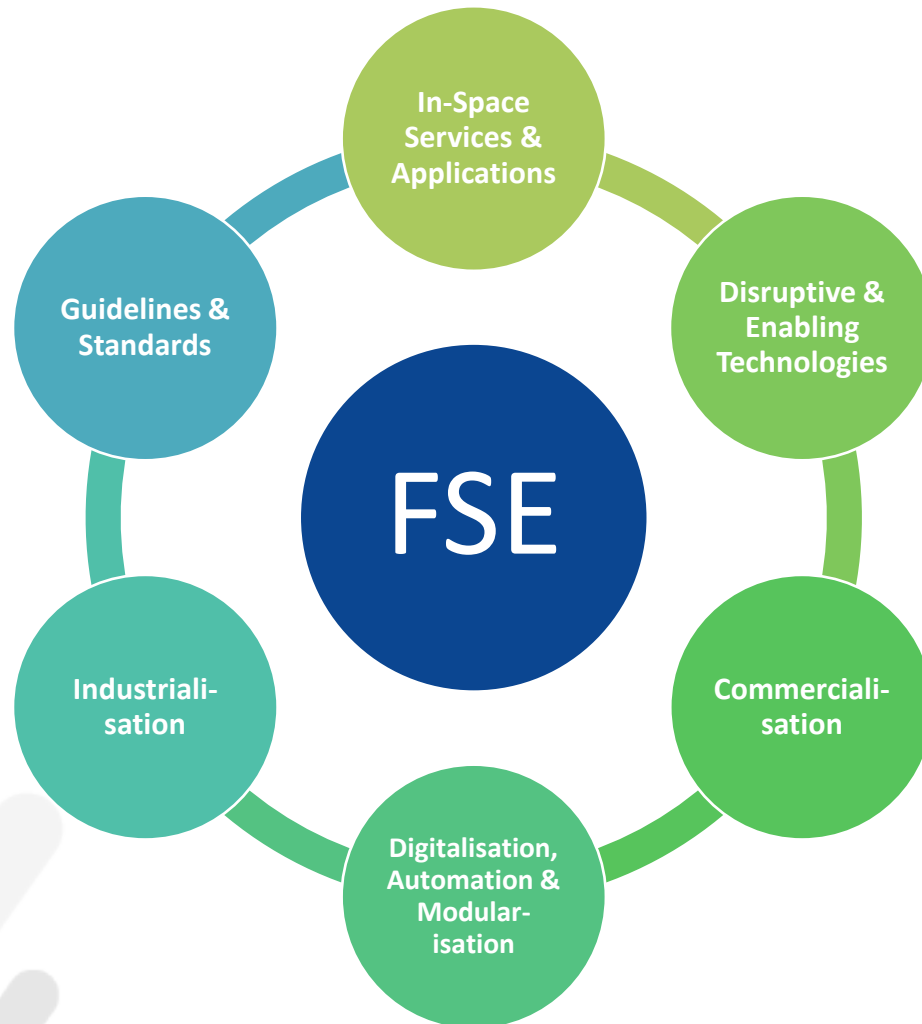
Sustainability & protection of the space environment

- ✓ Reduction of space debris and use of resources
- ✓ Active debris removal
- ✓ Promotion of re-usability

Competitiveness

- ✓ Support to customer-driven ideas and NewSpace actors
- ✓ Creation of confidence in & visibility for EU actors
- ✓ Fostering of new commercial and value-added services

The FSE scope in the EU Space R&I Programme

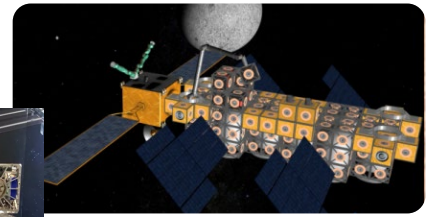
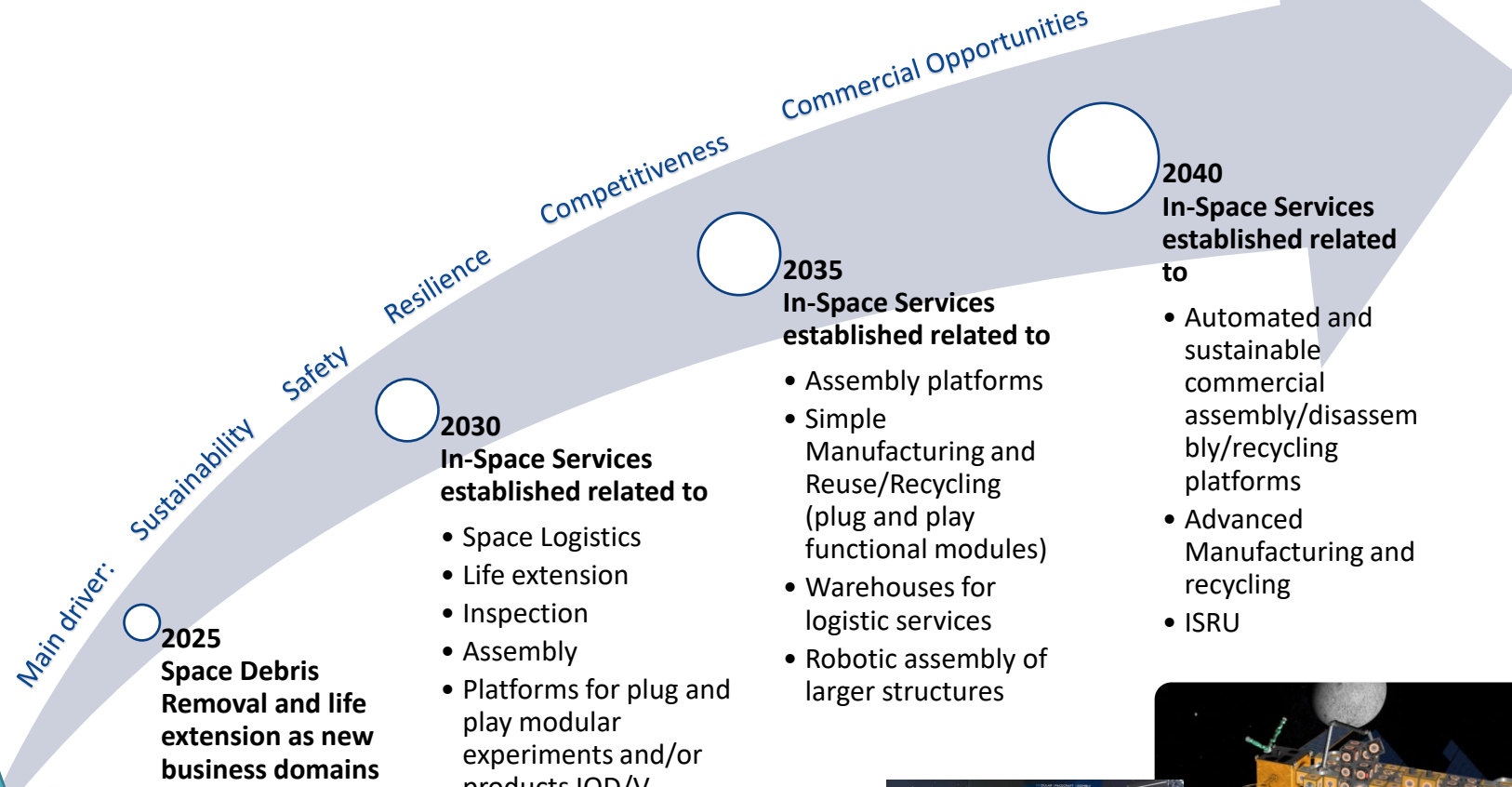


Diverse range of activities

- Support the **introduction of OSAM*** capabilities for the EU
- **Preparing European industry and space infrastructure for new markets** by fostering new commercial and value-added in-space services and related technologies
- Contribute to **EU non-dependence**
- Increase **resilience and sustainability of EU space infrastructure**
- Strengthen **EU competitiveness**

Towards the future space ecosystem

Future Space Ecosystem:
A highly-automated, flexible, sustainable and economical viable space infrastructure, implemented circular economy, allowing innovative applications and competitive services to grow.

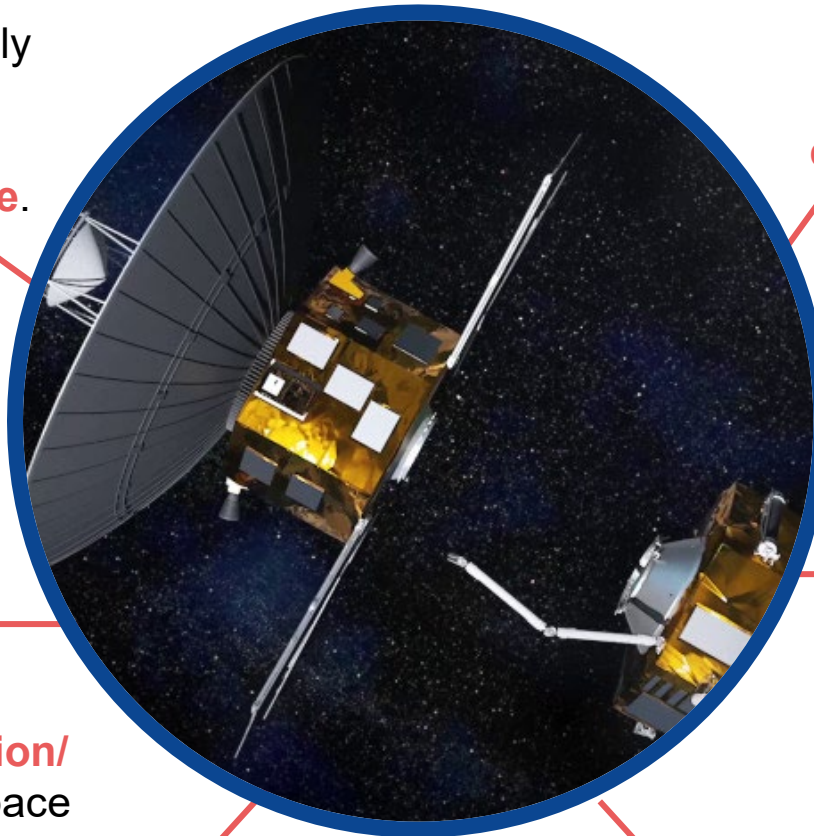


A paradigm shift in space: Industrialisation and value-added services

Future space ecosystems will largely benefit from **sustainable, flexible, modular, highly automated and maintainable space infrastructure**.

Mass-customisable infrastructure elements, different design philosophies and construction kit/AppStore principle **reduce costs, time-to-market and enable multi-mission and reusability**

Challenges such as **debris mitigation/removal** for the protection of the space ecosystem will benefit from in-space services and sustainable design concepts.

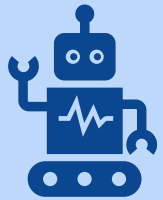


The availability of **on-orbit servicing solutions** will allow Europe to compete in a global context and will **enhance commercial opportunities**.

Robotic technologies, coupled with the adoption of new industrial processes, modularity, digitalisation, automation and AI will be key.

Enabling technologies and innovative satellite concepts will change the way space assets are designed, produced, tested, transported and operated.

FSE activities in H2020/HE



Technology & concept development

Key Building Blocks for OOS have been developed in H2020*

Space Robotics, Electric Propulsion and other **enabling technologies for in-space services**

New concepts for on-orbit services

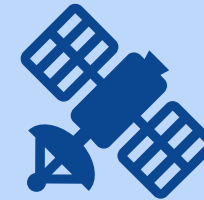
New system concepts and building blocks increasing the degree of satellite modularisation, automation and autonomy



Framework

European Operations Framework (EOF)

- to foster industry, SME, research and new space entrepreneurs
- to create visibility on OOS and to boost market generation
- to support technology exploitation



OOS orbital demonstration mission

2020 Competing OOS Mission studies Phases A/B1

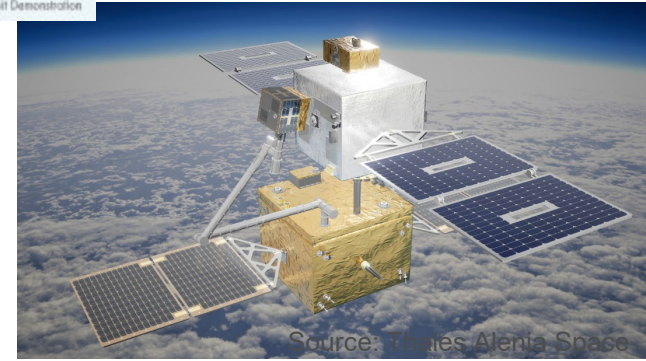
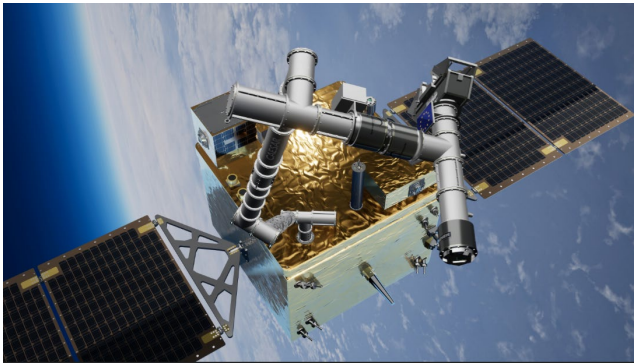
2022 Selected OOS Mission study Phases B2/C

2025-2027 OOS Orbital Demonstration Mission Ph D/E/F



FSE OOS orbital demonstration mission

Tentative illustration of the mission concept



Source: Thales Alenia Space

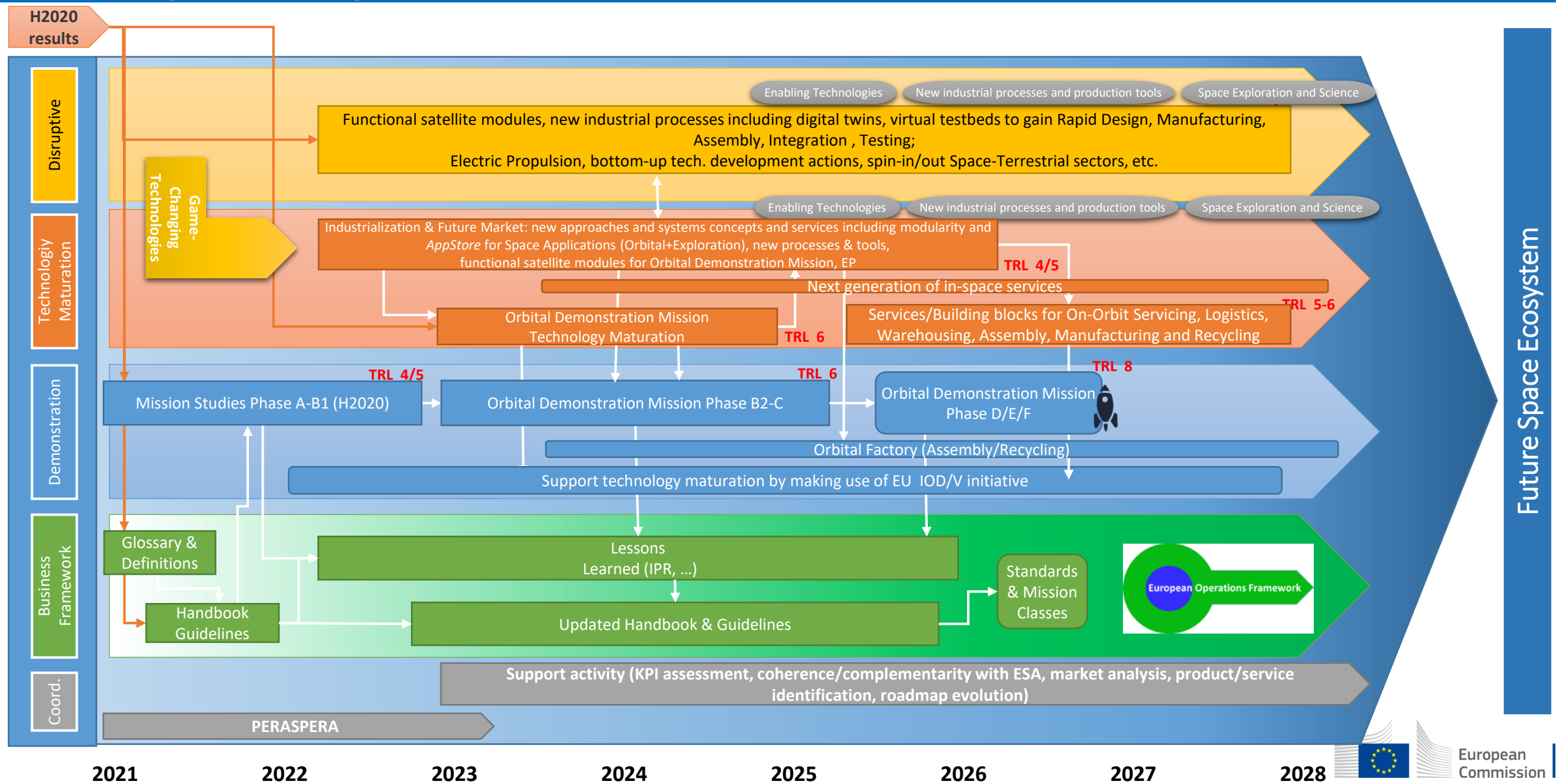
A **servicer demonstrator** fitted with the most up-to-date technologies of **robotics, autonomy** and **rendezvous...**

...capturing a **dummy** **“unprepared” client** through its Launch Adapter Ring for **station keeping...**

... then demonstrating **docking, refuelling** and **assembly** to pave the way to **new generations of space infrastructures**

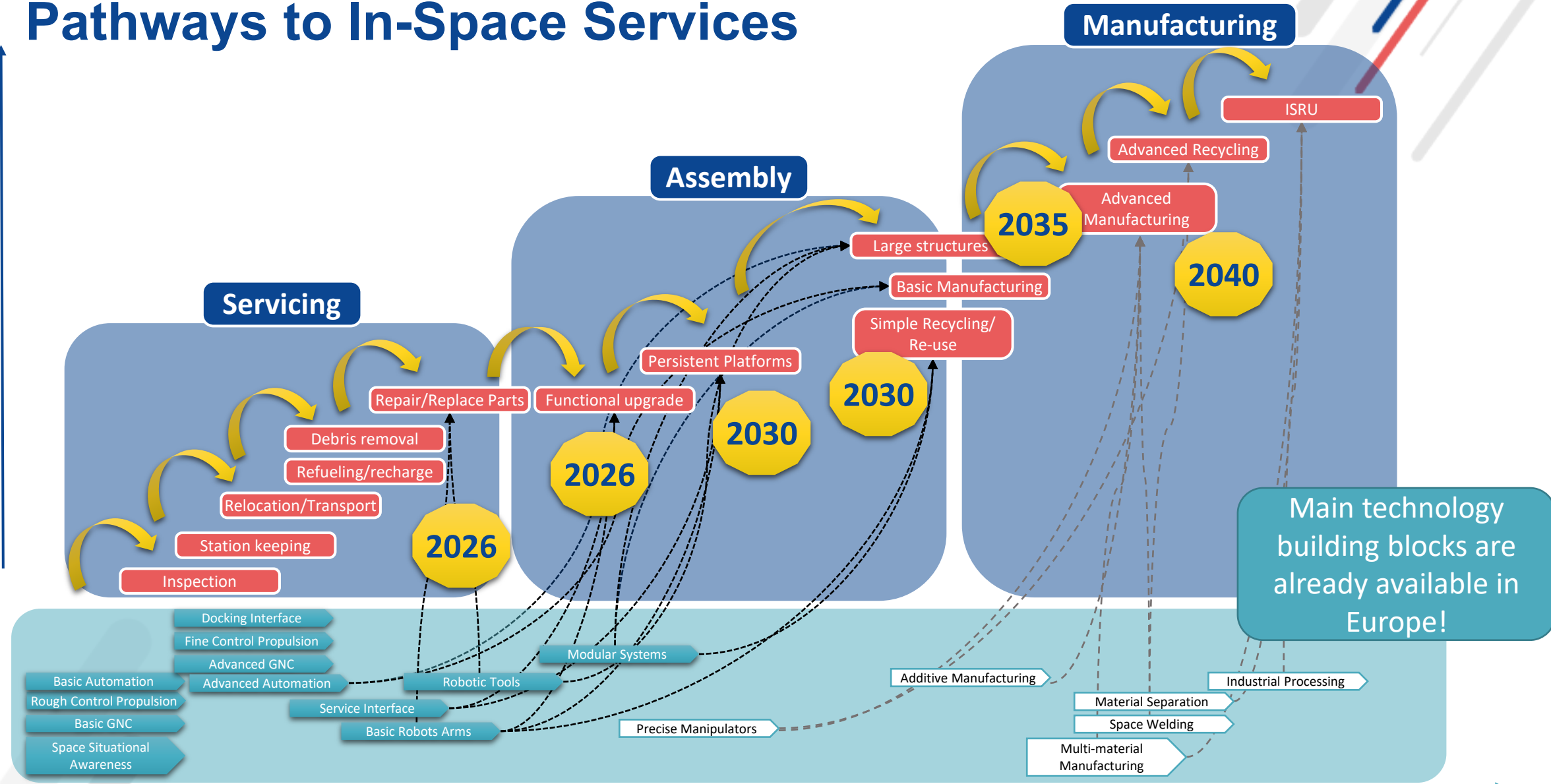
Future Space Ecosystem

01/2022



Pathways to In-Space Services

Diversity of in-space services



Complexity of operations and system technology



#EUSpaceResearch



EU Space R&I - Future Space Ecosystem

Any questions?



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Gateway to
EU Space R&I

