Airbus Amber

EU-RISE

EUROPEAN ROBOTICS FOR SPACE ECOSYSTEMS

The Future of European Robotics for Space Ecosystem

IAC 2024

14 October 2024

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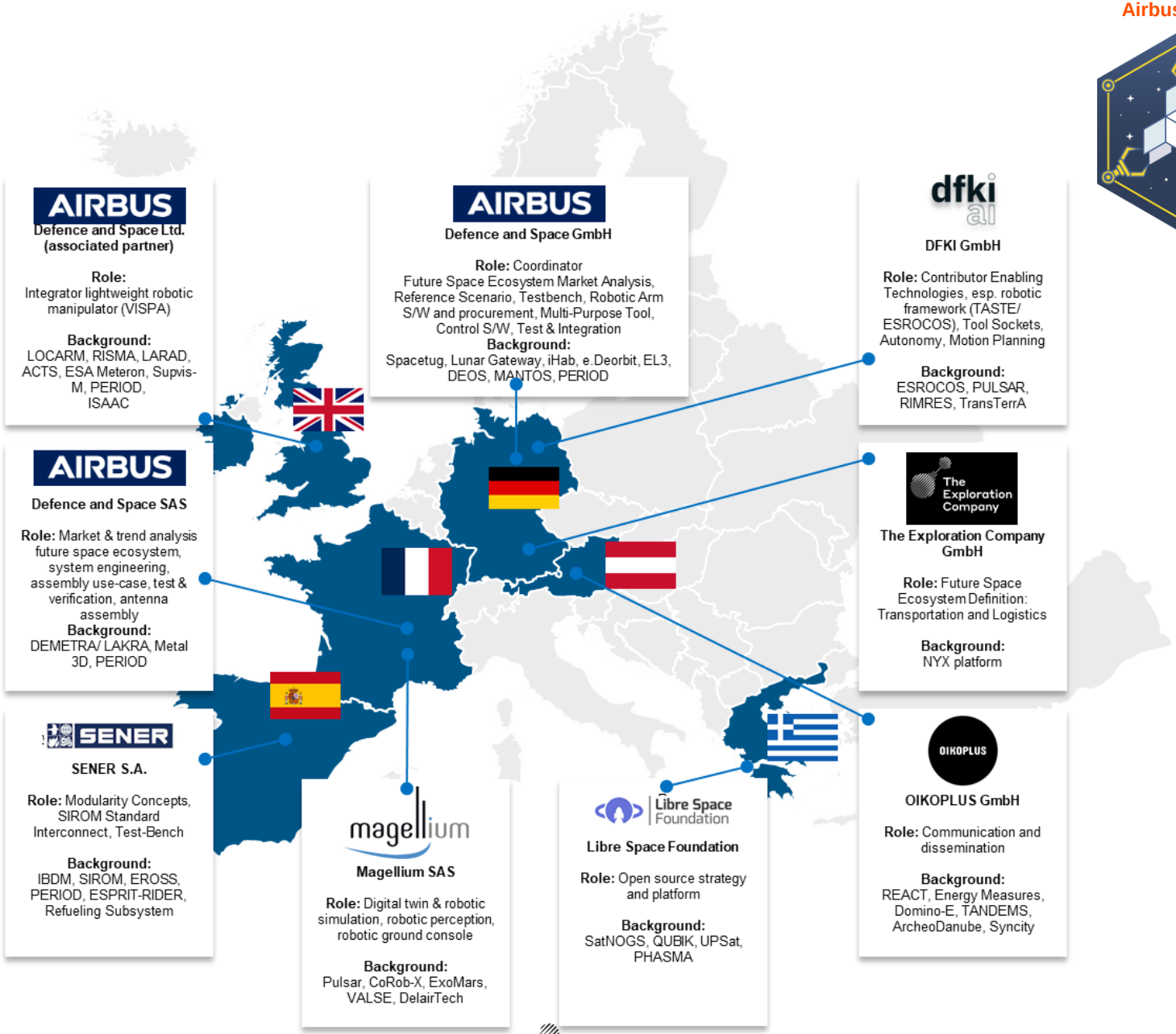
The EU-RISE Consortium

Competencies:

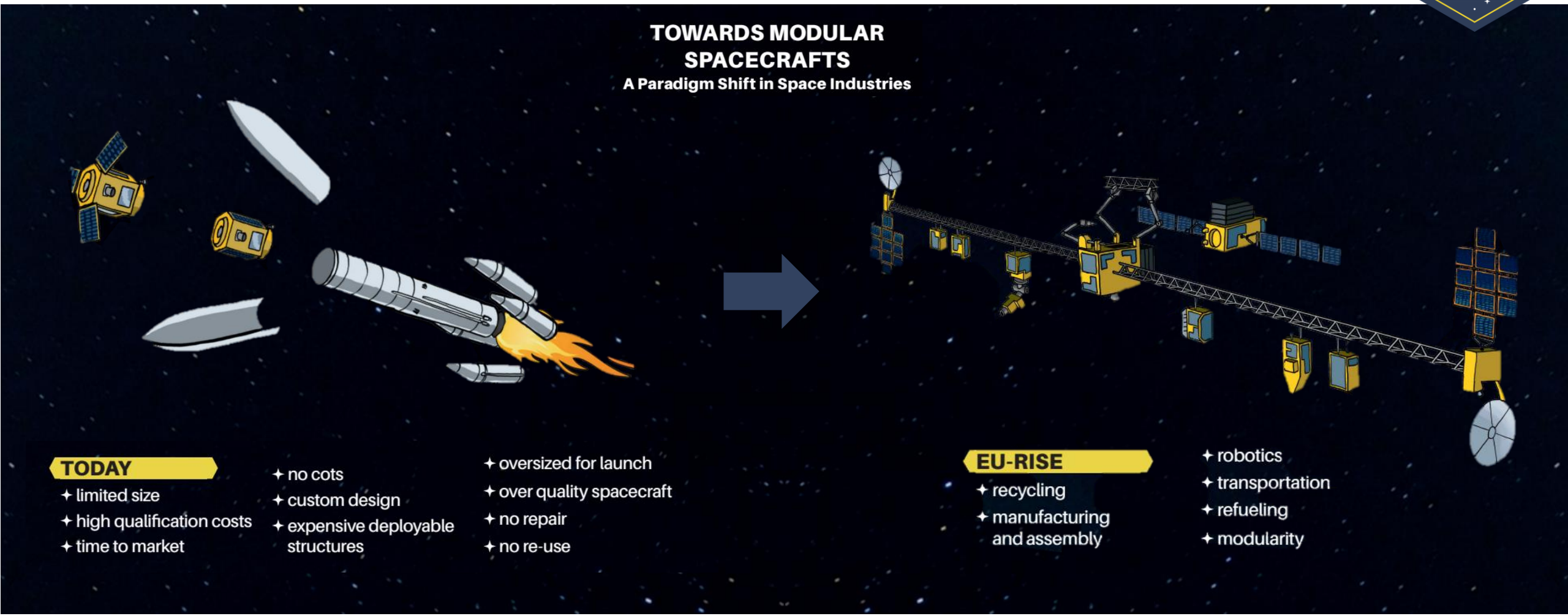
- Space Systems
- Transportation Systems
- Modular Systems
- Robotic Manipulation
- Robotic Interfaces
- Flight Software Frameworks
- Application Software
- Simulation

Project info :

- 24 month duration
- 9 partners over 6 country



Motivation for the project



Main Topics for this Project

Two main workstreams :

FUTURE SPACE ECO-SYSTEM

1. **Market assessment** to identify important services, the competitive landscape and the market volume
2. Assessment of needed **capabilities** to provide these services
3. Definition of a system concept's composed of **existing elements to realize** the capabilities
4. Definition of a **open source approach** to strengthen the european capabilities

ENABLING TECHNOLOGIES

5. Definition of requirements and **system architecture** for the a **End2End demonstrator**
6. Adaptation and maturation of building blocks to **meet the demonstration needs**
7. **Integration of all building blocks** into the End2End demonstration
8. **Verification** of functionalities and **validation** on a realistic assembly and reconfiguration task

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Future space ecosystem - Methodology

01

Market assessment

- Identify the market trend and cluster of applications relevant for the future space ecosystem with a focus on robotics.

02

Mission capabilities identification

- Identification of the mission capabilities needed to cover the future space ecosystem missions and market.

03

Functions selection

- Definition of the functional building blocks needed to cover the missions capabilities.

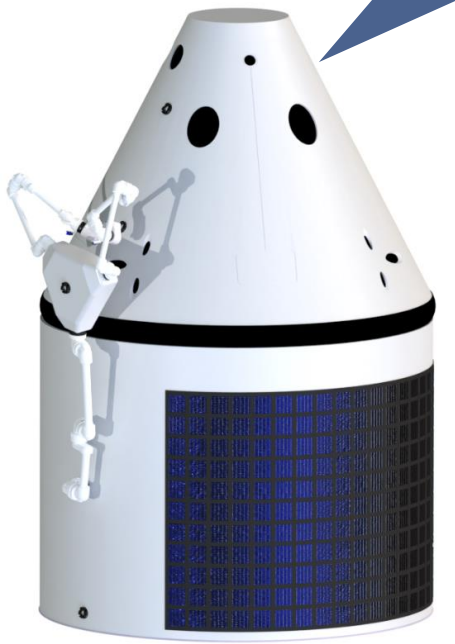
04

Concept definition

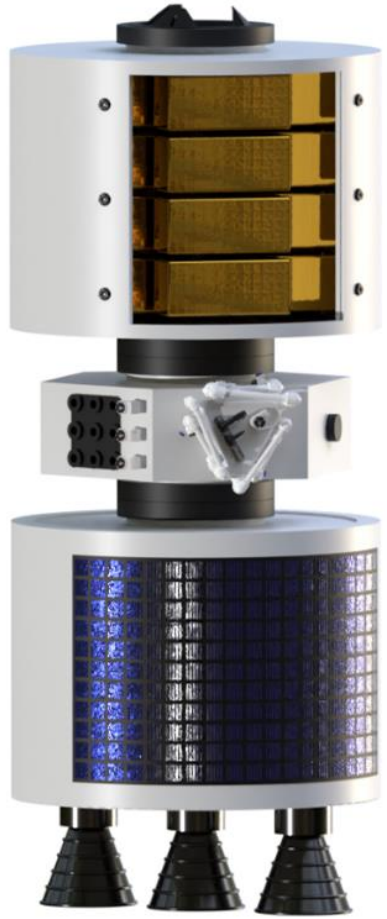
- Conceptual design definition with implementation of these functions into systems that can address the future space ecosystem market.

Definition of two concepts to covers the future space ecosystem market. Both concepts are equipped with robotic systems

Re-usable by re-entry
Short/mid term



In-orbit modular
Long term



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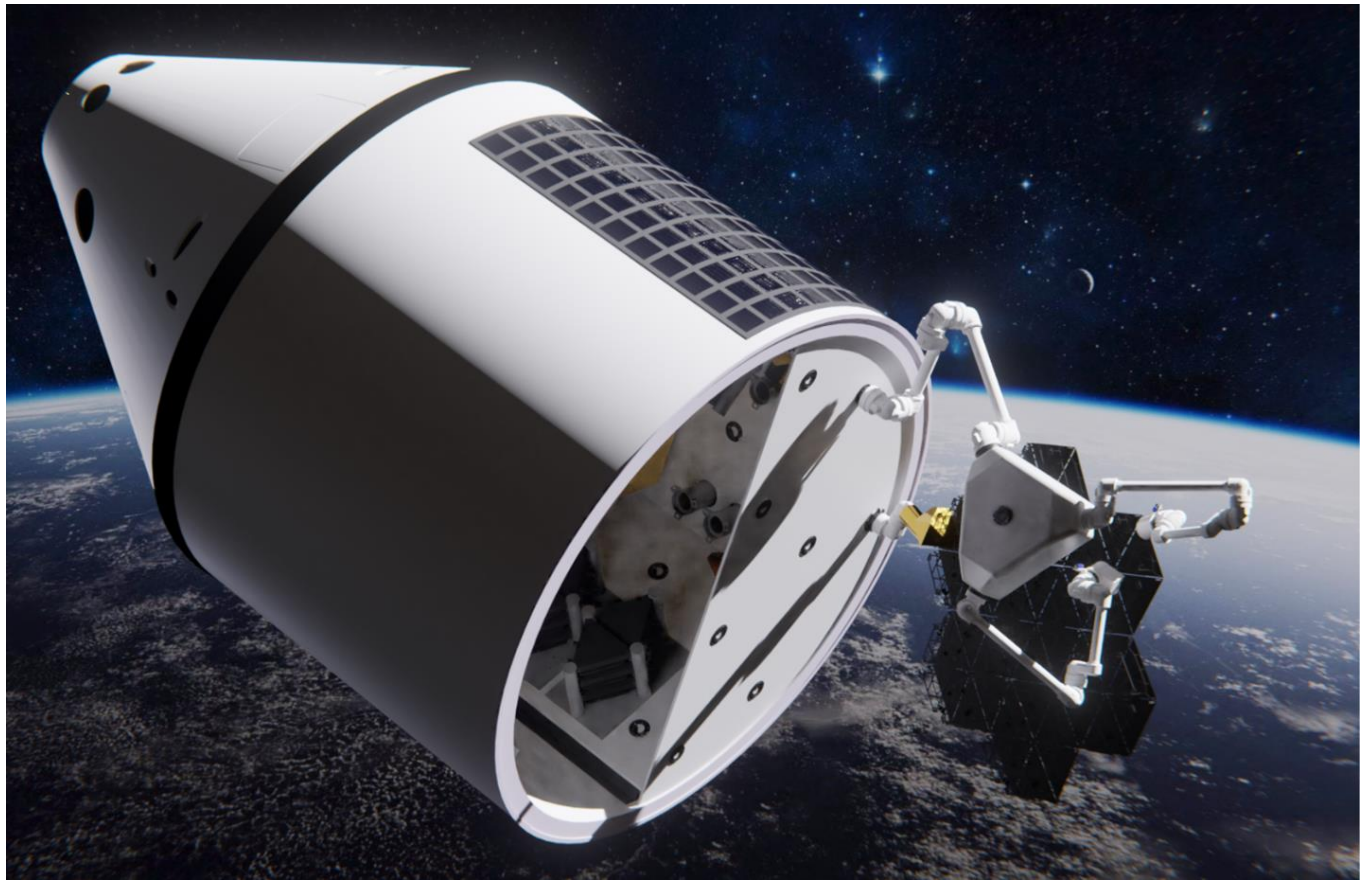
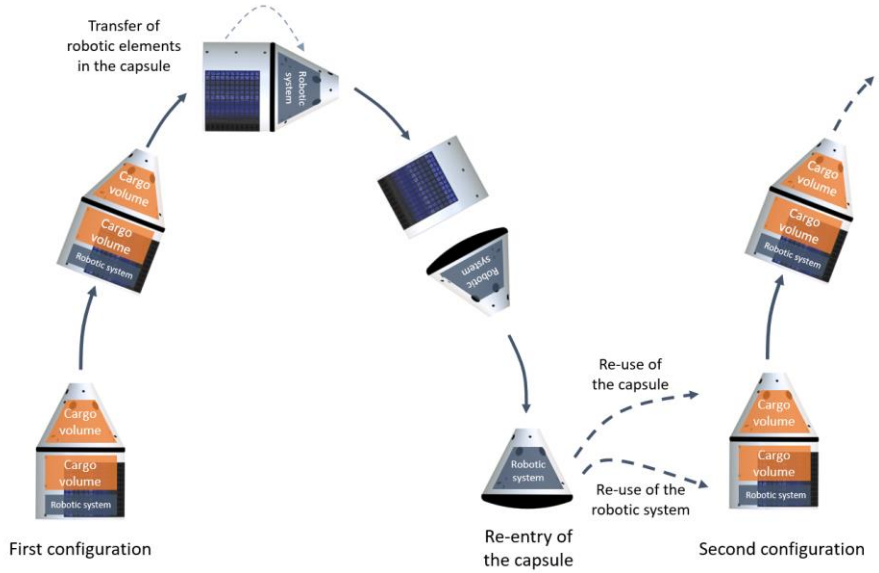
Future space ecosystem – Re-usable by re-entry concept





The robotic system elements are reused from one mission to the other

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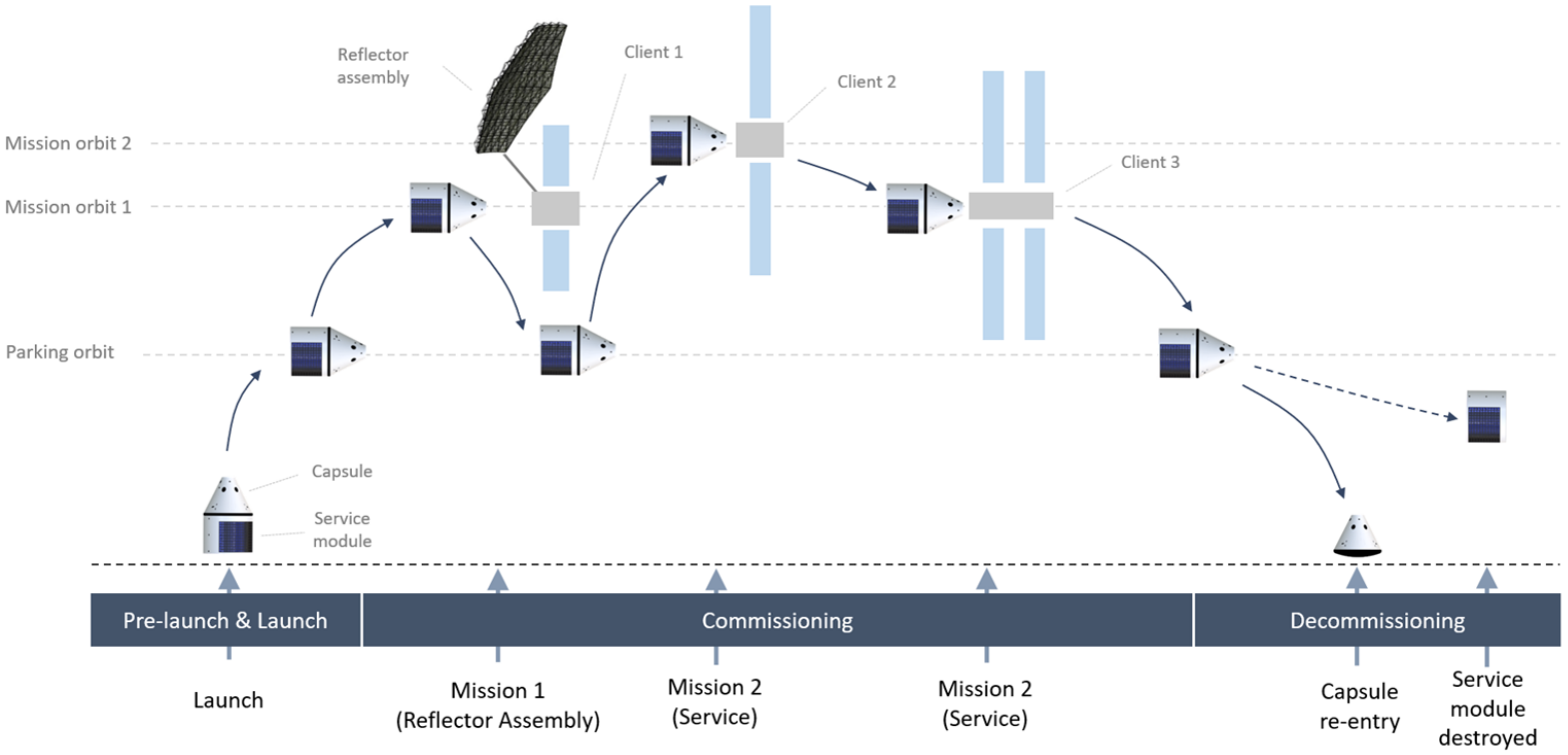
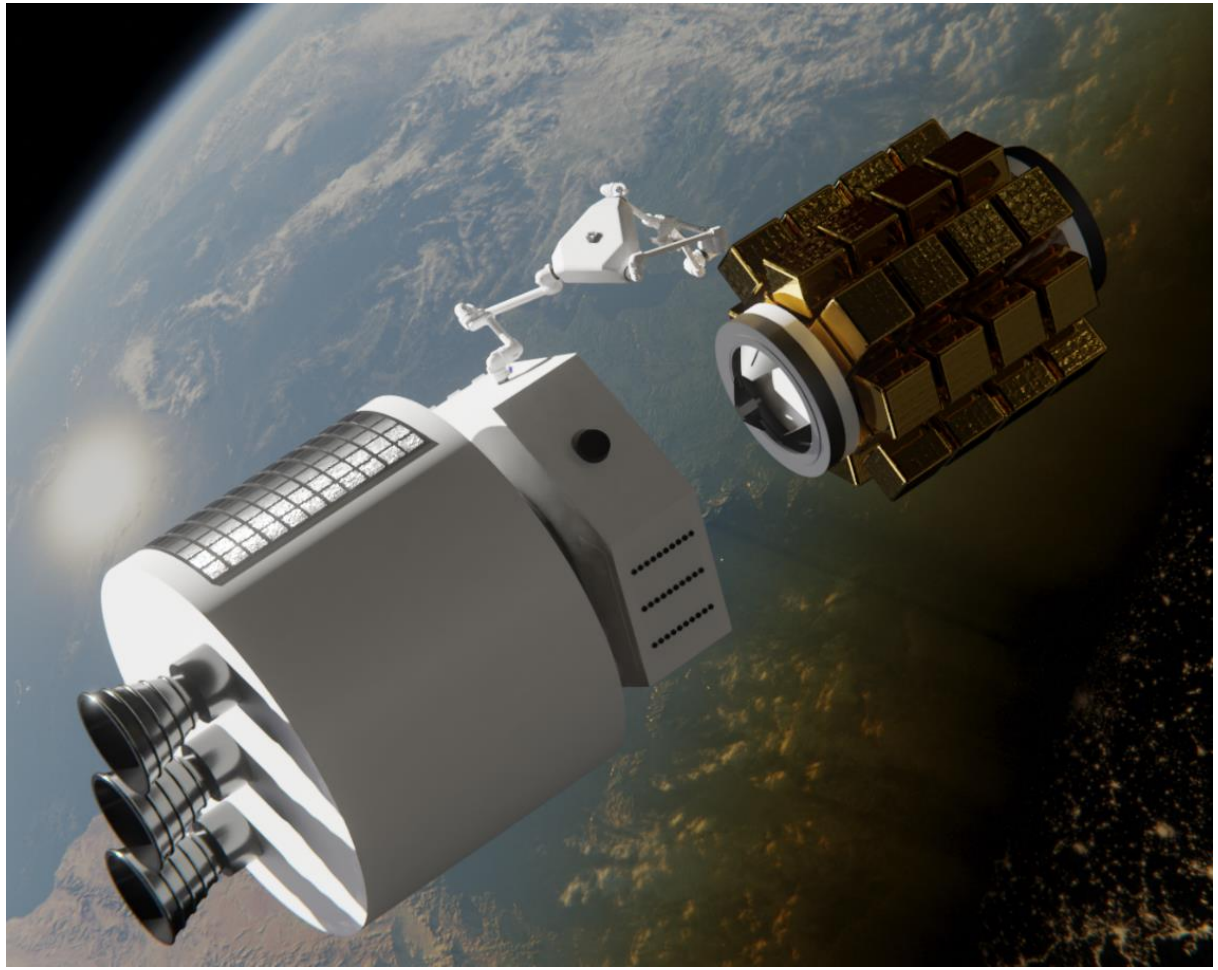
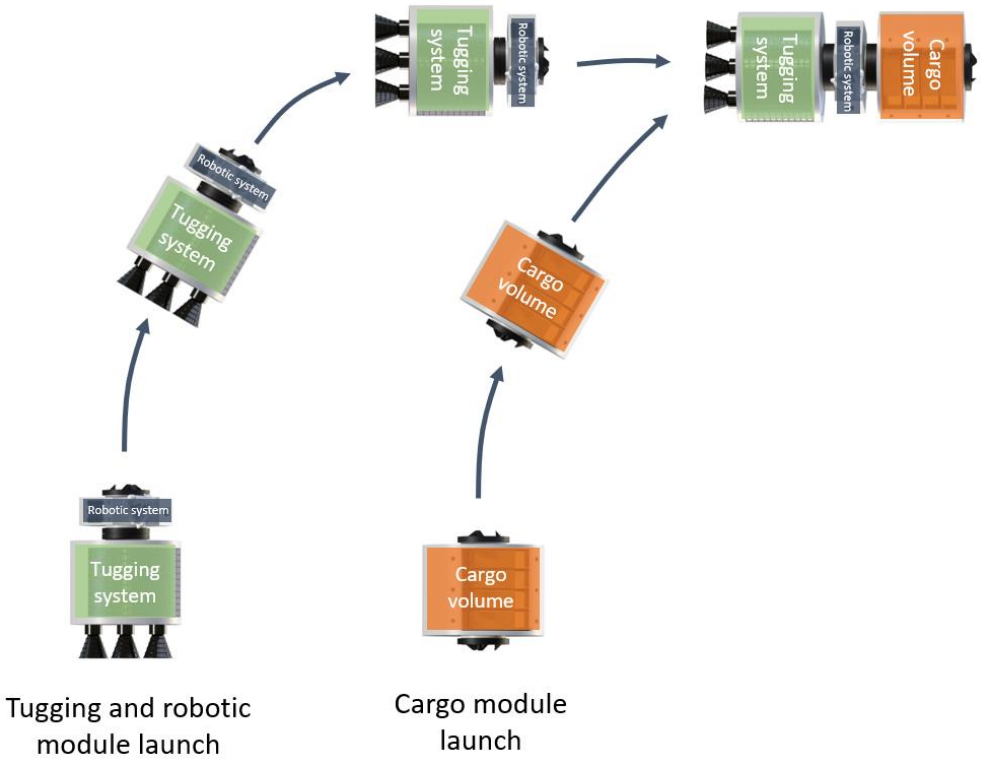
Future space ecosystem – Re-usable by re-entry concept

CONOPS



Future space ecosystem – In Orbit Modular concept

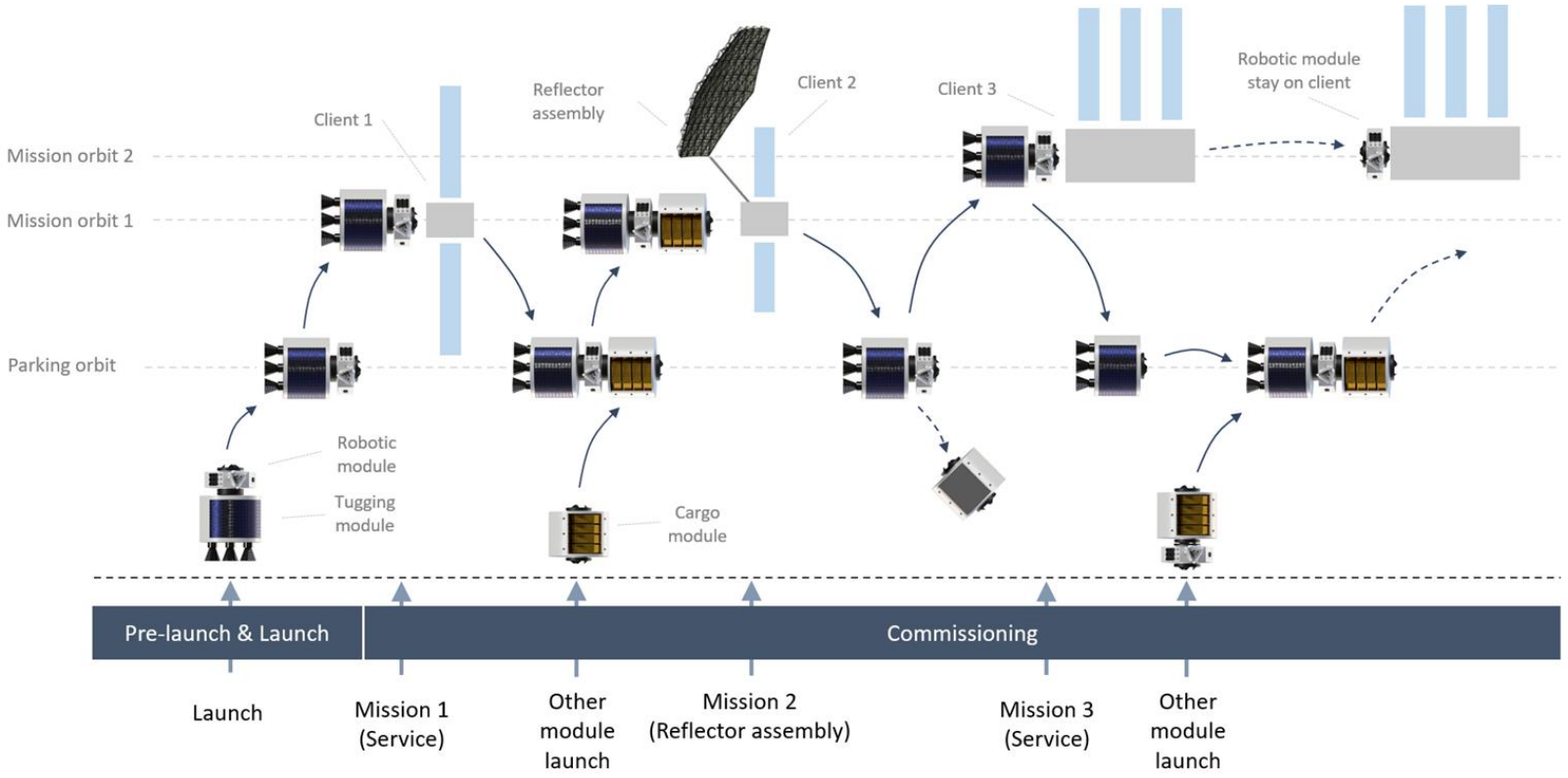


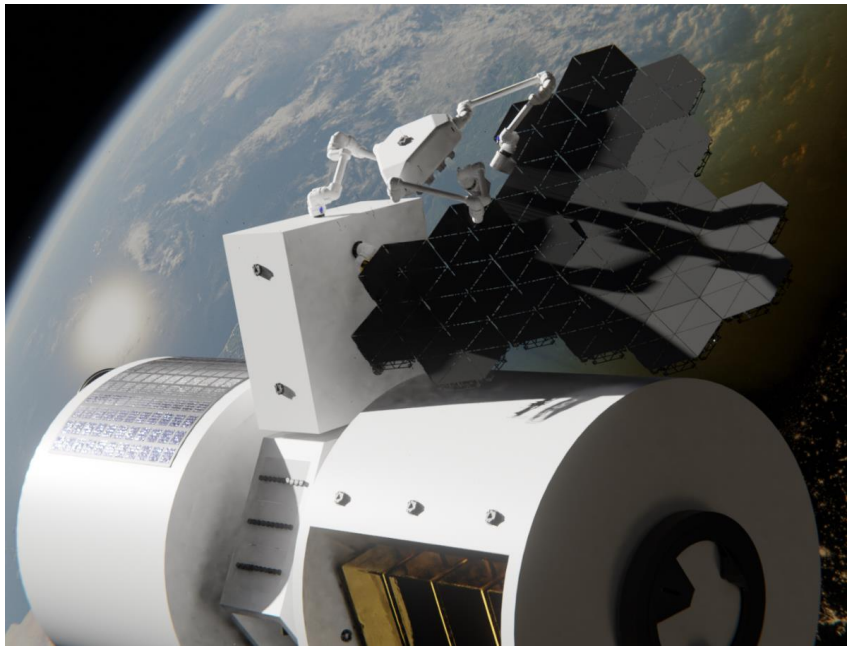


Each module is specialized for a given range of mission capabilities. The modules are assembled together in space.

Future space ecosystem – In Orbit Modular concept

CONOPS



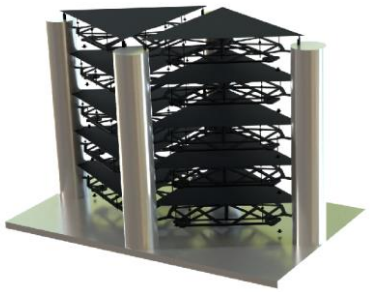


Future space ecosystem – Robotic technologies

Vision system

Standard interfaces

Robotic control unit



Workbench

Physical building blocks

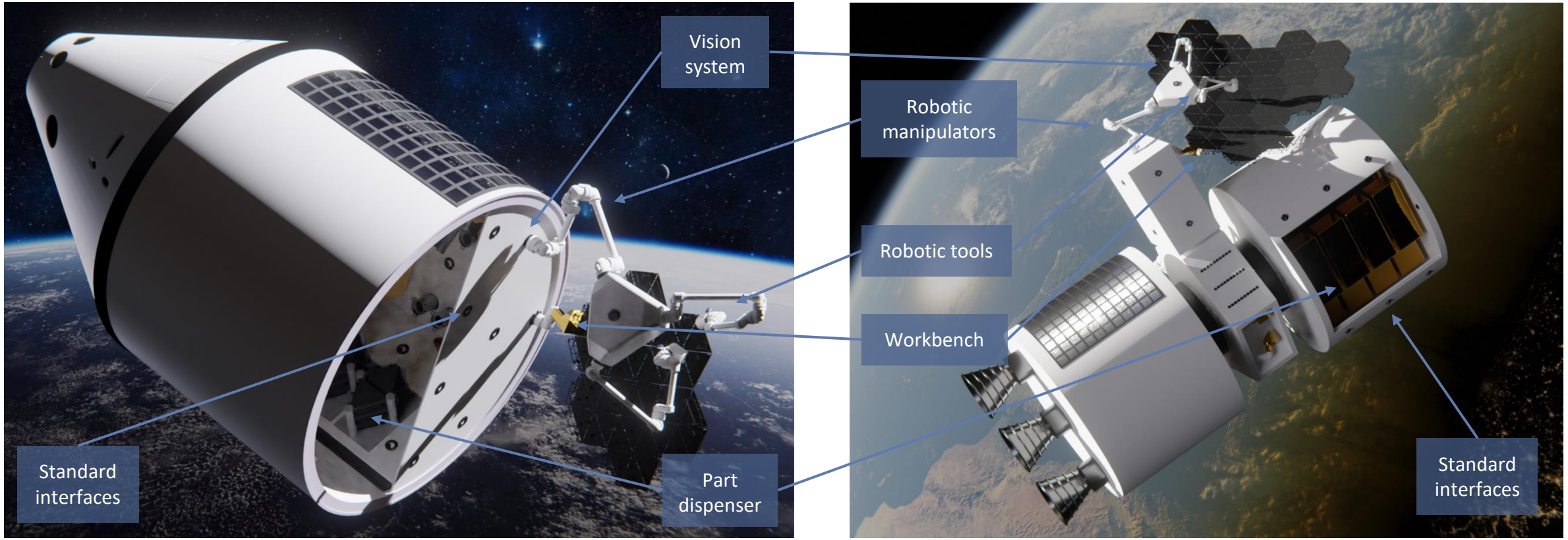
Part dispenser

Robotic manipulators

Robotic tools

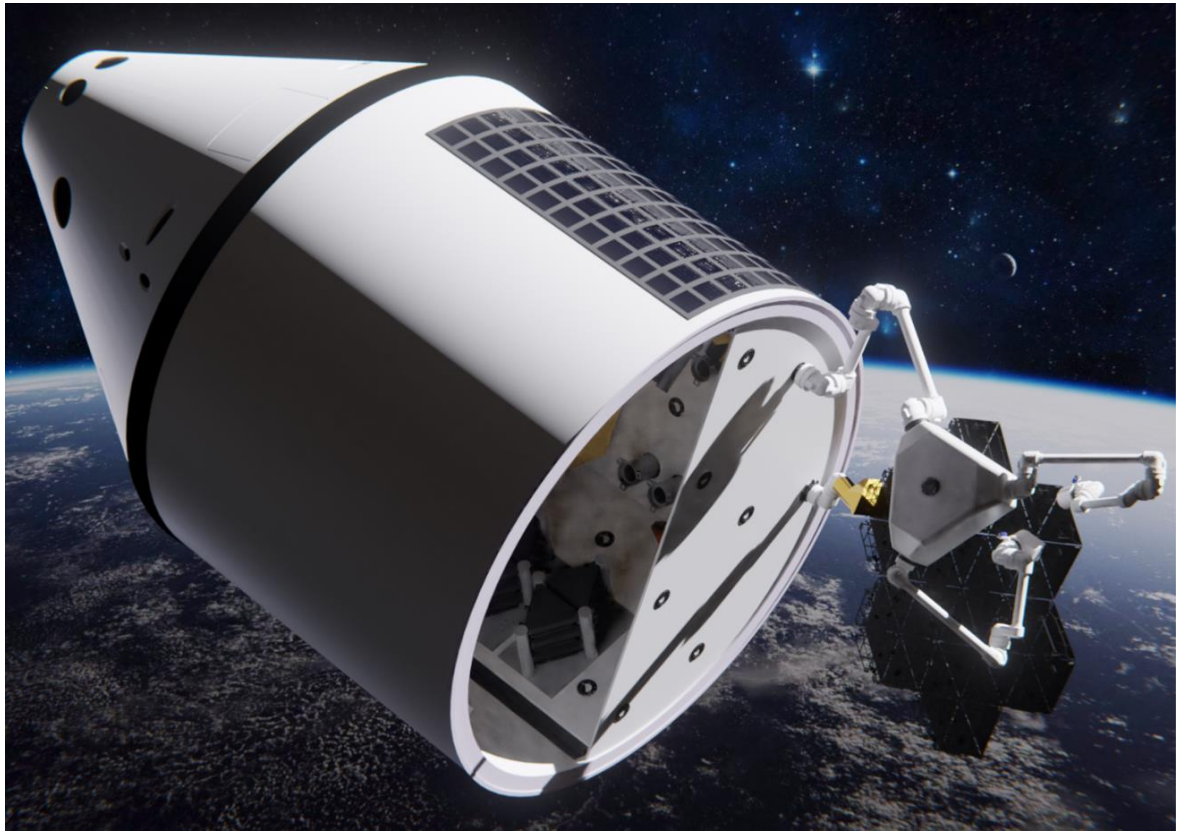
Future space ecosystem – Robotic Technologies

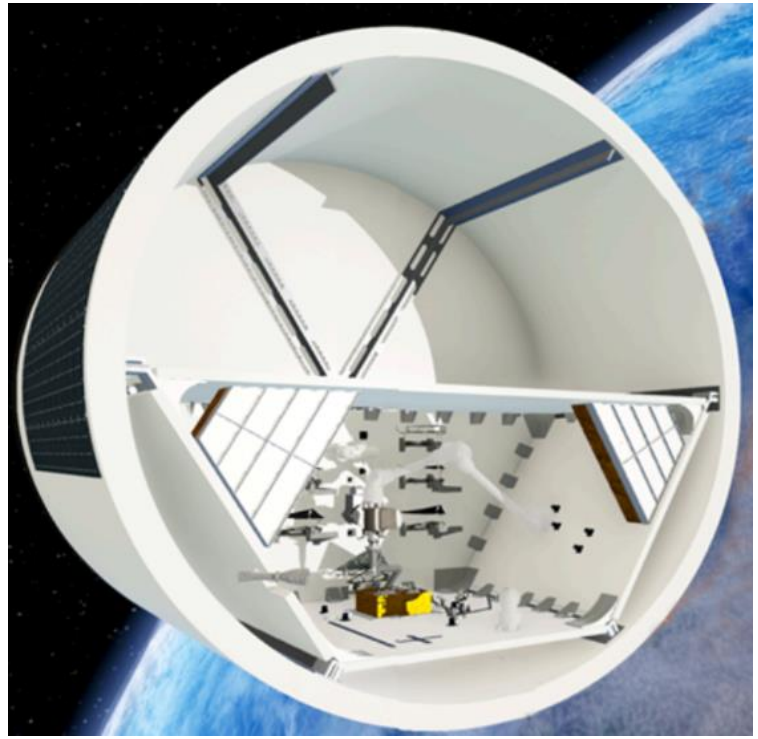
All the robotic technologies are developed with a modular approach in order to be compatible with different kind of ISAM/OOS missions and different kind of concepts.



The Vision for the End2End Demonstrator of EU-RISE

- Follow EU-RISE concept: “Re-usable by re-entry” of the first workstream.
- Simplify setup towards a first IOD (without climbing robot) and demonstrate important technologies.

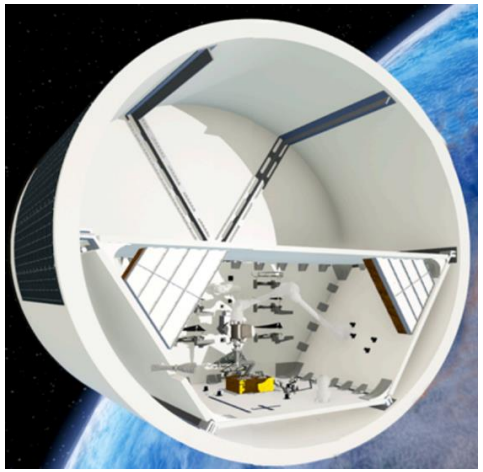


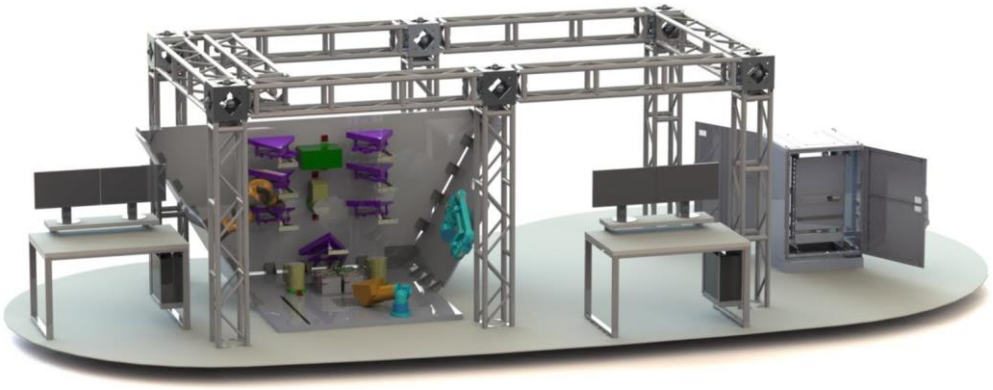


DEMARLUS

The Vision for the End2End Demonstrator of EU-RISE

- Demonstrate main robotic technologies: Arm, tools, assembly parts, robotic S/W, operations.
- Use relevant laboratory environment under 1g.
- Gravity compensation necessary for space-arm VISPA.



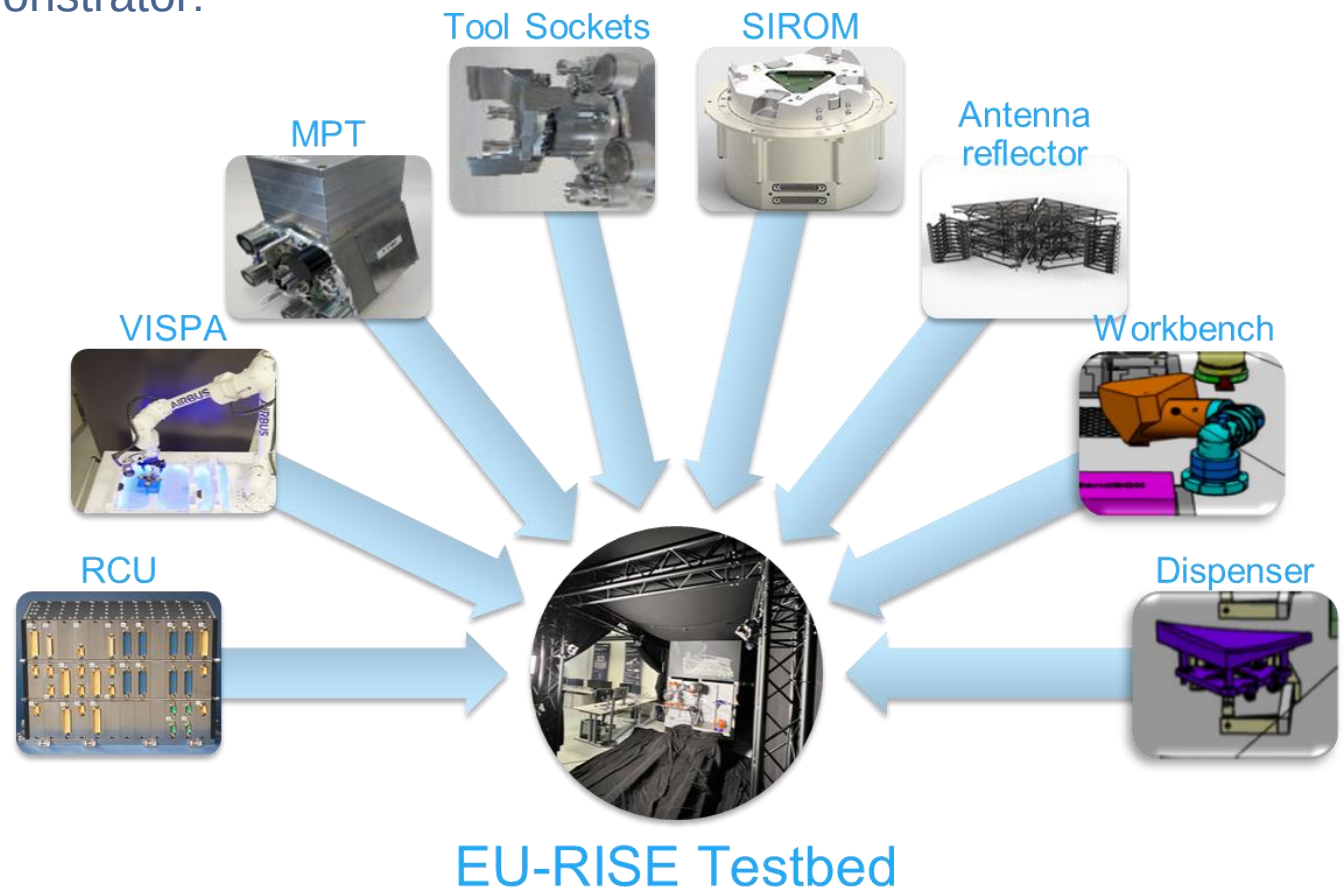


DEMARLUS like layout

In orbit services layout

Main H/W Elements of EU-RISE End2End Demonstrator

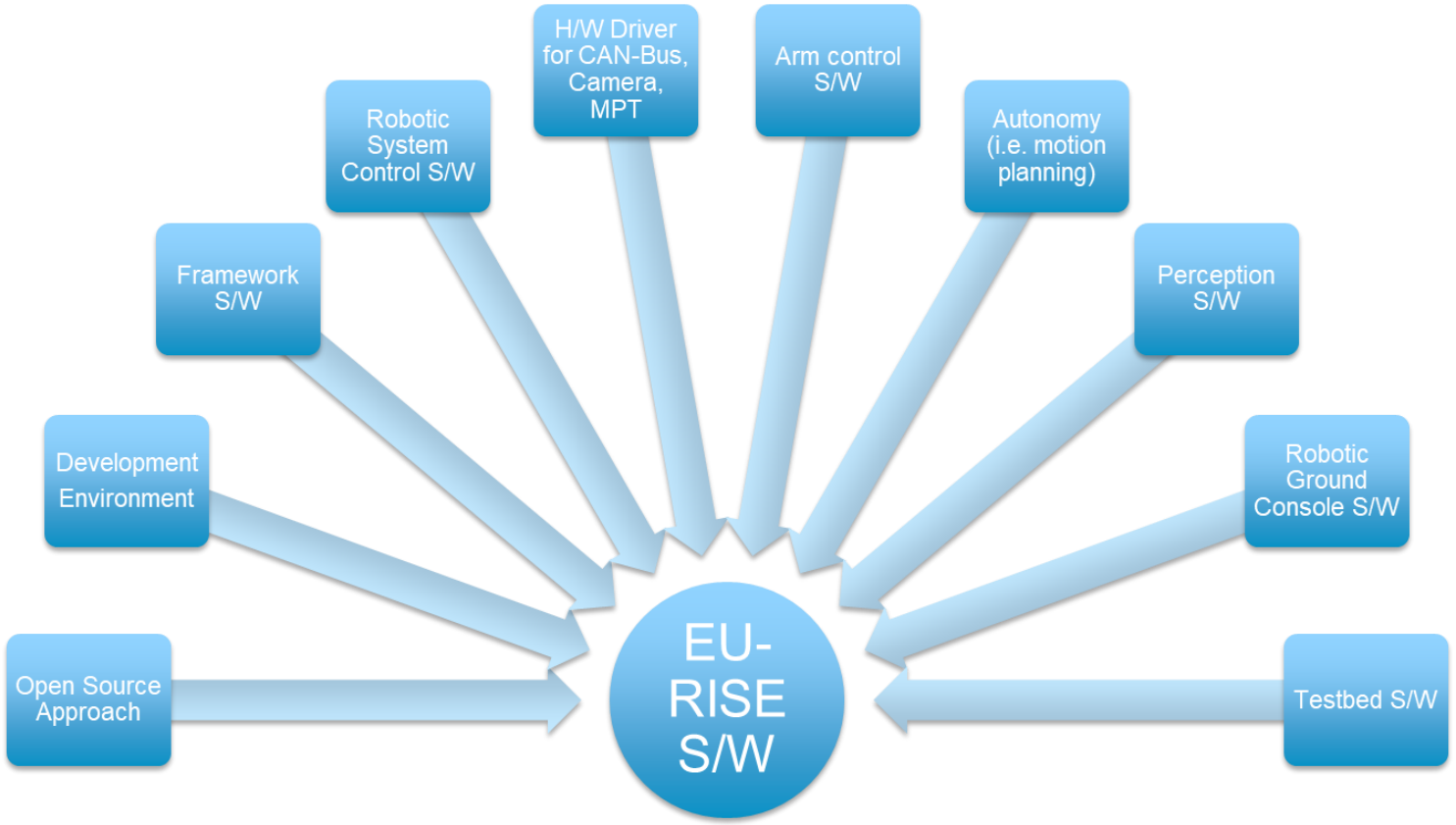
- The following H/W building blocks shall be further maturated and/or integrated for the first time into a complete lab demonstrator:



Main S/W Elements of EU-RISE End2End Demonstrator

- The following S/W building blocks shall be further maturated and/or integrated for the first time in an integrated ISAM application scenario:

- Open source strategy will be developed with Libre Space Foundation!



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EUROPEAN ROBOTICS FOR SPACE ECOSYSTEMS

Conclusion

EU-RISE aims to establish a European capacity for on-orbit services and in-space manufacturing to promote industrialization and business in space, while supporting low-cost missions and a sustainable, circular economy in space.
It will develop new technologies and concepts for space systems and services, enabling in-orbit demonstration/validation and maturation of key technologies contributing to Europe's independence in space technology development.
Overall, the project's influence on Europe is varied and extensive, encompassing economic growth, job creation, technical innovation, and environmental stewardship. By developing a European ISAM capacity and defining the future space environment, Europe can position itself as a global space industry leader while also paving the road for a more sustainable and prosperous future.

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Thank You!

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