



Workshop on Space Challenges with Member States representatives

On 23 September 2022, [Stella Tkatchova](#), the EIC Programme Manager (PM) for space systems and technologies, organised a workshop to the EIC challenges under her umbrella to invited representatives from European Union Member States and European Union Associated States. The virtual workshop was moderated by Keith Sequeira who opened the discussion by explaining the novelty of the role of Programme Managers as EIC's in-house experts, who are working in their respective area of specialisation, giving support to the European R&D&I ecosystem. He further gave a brief overview of the purpose of EIC's challenge based funding schemes.

Programme Manager Tkatchova introduced the approach she undertook in selecting the space-related future challenges. Namely the 2023 EIC Pathfinder challenge *In-space solar energy harvesting for innovative space applications*, and the 2023 EIC Accelerator one *Customer-driven, innovative space technologies and services*. She elaborated on how she defined these challenges, through analysing the portfolio of EIC space-related projects, performing Horizon scanning activities and collaborating with DG DEFIS. The above challenges are purposely narrow-defined to avoid overlaps with other European Commission funding mechanisms and to foster innovation in a niche area of research and innovation.

Representatives from European Union Member States and European Union Associated States delivered valuable contributions to PM Tkatchova. They were interested in hearing more about the interaction between the EIC, DG DEFIS and ESA and budget allocation for the EIC Pathfinder and Accelerator programmes. They were also interested in the *portfolio consideration*, as an instrument which could alter the ranking of the applicants, if one project contributes extraordinarily well to the portfolio built by a PM. The Member State representatives suggested to include explanations about this instrument in the next challenge guide. Lastly, they pointed to the importance of cybersecurity, a remark which PM Tkatchova fully supported, especially when considering interoperability. She then closed the session by presenting her future challenge ideas and went on to ask the Member State representatives for their input on their national short-term, medium-term and long-term needs in their space industry domains.

For any question to Programme Manager Tkatchova, please reach out to EISMEA-D.02@ec.europa.eu.



Backing visionary entrepreneurs

Stela Tkatchova
EIC Programme Manager for Space Systems
23/09/2022

European Innovation Council and SMEs Executive Agency

Disclaimer: The views expressed in this presentation are the sole responsibility of the author and do not necessarily reflect the views of the European Innovation Council and SMEs Executive Agency.



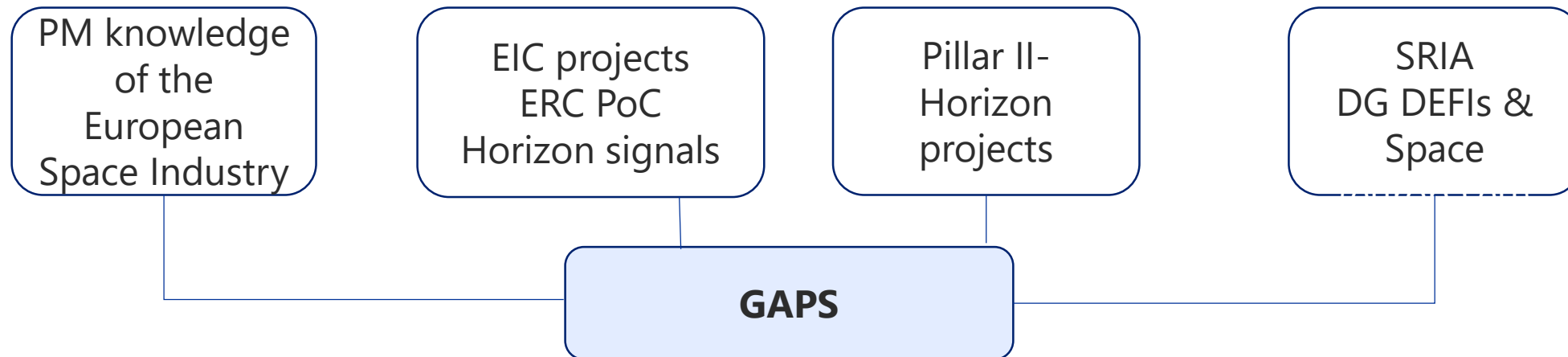
Agenda

- EIC Space challenges proposal for WP 2023
- EIC Initial GAPS examples
- EIC Space Projects
- WP2023 Challenges Proposal in consultation
- AOB





Space topics selection for WP 2023



Guiding Principles-Pathfinder

- Ambitious science/radically new technology
- Innovation (TRL)/Safety & Reliability
 - Risk Assessment
 - EU tech sovereignty

Guiding Principles-Transition

- Mature Innovation (TRL)/Safety & Reliability
- Initial analysis of the potential markets
 - Proof of Concept (PoC)
 - EU tech sovereignty

Guiding Principles - Accelerator


- Innovation (TRL)/Safety & Reliability
- Time to market/New markets creation/Economies of Scale
 - Risk Assessment
 - EU tech sovereignty



EIC Initial GAPS examples

- The **challenge** is that the **EU lacks user driven** in orbit servicing, recycling satellite capabilities and unified space debris management services
- Current satellites are built so that they **cannot be easily serviced nor recycled**
- Power failures are **40%** of the reasons for satellite failures
- **Need** for increased in-space mobility, payload capacity and cost-efficient propulsion
- **Explosions in orbit**, due to left-over energy- fuel and batteries-onboard spacecraft and rockets is the biggest contributor to the space debris problem (ESA)
- Lack of **in-space debris recycling capabilities**
- Emergence of In Orbit Satellite servicing industry in the US with an estimated need to service up an increased number of satellites

<p>Copernicus Earth Observation (EO) and monitoring based on satellite and non-space data. Nr.1 world provider of space data an information.</p>	<p>Galileo Global satellite navigation and positioning system (GNSS). 10% of the EU GDP is enabled by satellite navigation.</p>	<p>EGNOS Makes navigation signals more accurate and reliable. Operational in 300+ airports in 23 countries.</p>	<p>SSA Space situational awareness, monitors and protects space assets. Providing surveillance and tracking services to 129 European satellites.</p>	<p>EU GOVSATCOM Secures satellite communications for EU security actors.</p>
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WP2023 Challenges Proposal

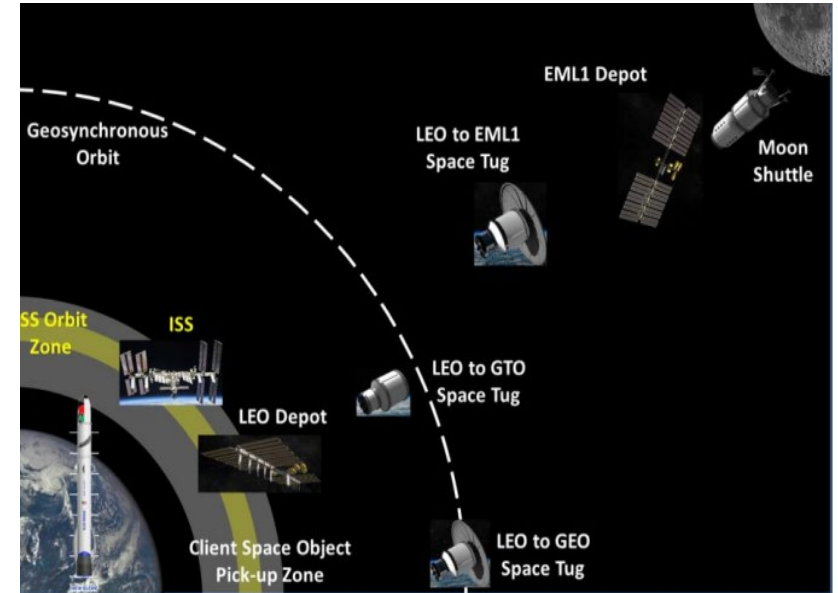
- **EIC Pathfinder** - In-space solar energy harvesting for innovative space applications

Preparing for the long term Future

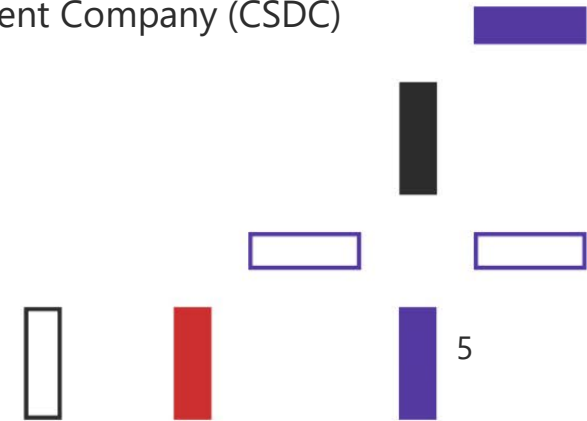
- **EIC Accelerator** - Customer-driven, innovative space technologies and services

Future market opportunities

Disclaimer: This document presents draft ideas of the EIC work programme 2023. This draft has not been adopted or endorsed by the European Commission and may not in any circumstances be regarded as stating an official position of the Commission.



Courtesy: Development Company (CSDC)





Rationale

- Urgent need for clean and renewable energy sources in space for example for in-space mobility for space debris removal or future IOS/ADR and EOL activities
- Green propulsion for increased payload capability and resulting in potential fuel cost savings for satellite owners
- In-space utilisation of energy for different space applications
- Urgent need for strategic autonomy for renewable energy resources in space

Expected impacts

- **Research impacts** - mastering renewable solar energy supply for 365 days per year, developing in-space efficient solar power collection, storage, innovative solar power conversion methods, wireless power transmission between in-space harvesting devices and s/c (e.g. autonomous space tugs), innovative “green” solar harvesting antennas, mastering new methods for in-space propulsion of spacecraft e.g. solar electric space tugs or on-board spacecraft photovoltaic cells
- **Innovation impacts** - breakthrough technologies for wireless power transmission of energy, energy beam pointing and control, developing eco-friendly and innovative for space transportation or spacecraft orbital corrections.
- **Strategic impacts**- EU strategic autonomy, potential fuel cost savings, reduce greenhouse gas emissions and leadership in space clean energy solutions. increased competitiveness and autonomy of EU space industry for On Orbit Assembly and Manufacturing (OSAM) and green propulsion

Satellite owners will improve in-space mobility, extend the lifetime of their s/c, decommission their old satellites and potentially generate fuel cost savings





Relevance to EU policies and initiatives

- Strategic Research and Innovation Agenda for EU-funded Space research supporting competitiveness [guidance-document horizon-cl4-2021-space-01-12_en.pdf \(europa.eu\)](#)
- EU Approach to Space Traffic Management - [join 2022 4 1 en act part1 v6.pdf \(europa.eu\)](#)
- Shaping & securing THE EU'S OPEN STRATEGIC AUTONOMY by 2040 and beyond

Source	Clean	Safe	Reliable	Base-load
Fossil Fuel	No	Yes	Decades remaining	Yes
Nuclear	No	Yes	Fuel Limited	Yes
Wind Power	Yes	Yes	Intermittent	No
Ground Solar	Yes	Yes	Intermittent	No
Hydro	Yes	Yes	Drought; Complex Scheduling	
Bio-fuels	Yes	Yes	Limited Qty – Competes w/Food	
Space Solar	Yes	Yes	Yes	Yes

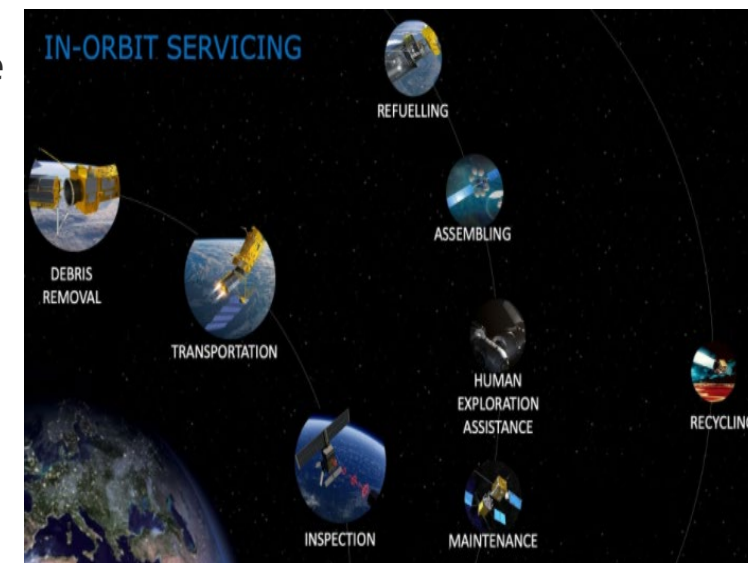
Courtesy: National Security Space Office



Rationale

Europe cannot easily inspect and service its satellites in different orbits. Europe is facing the **challenge** of not being able to easily service and protect its own EU Space infrastructure. It is exposed to the risk of losing its strategic autonomy over its own space assets and reducing the competitiveness of its space industry.

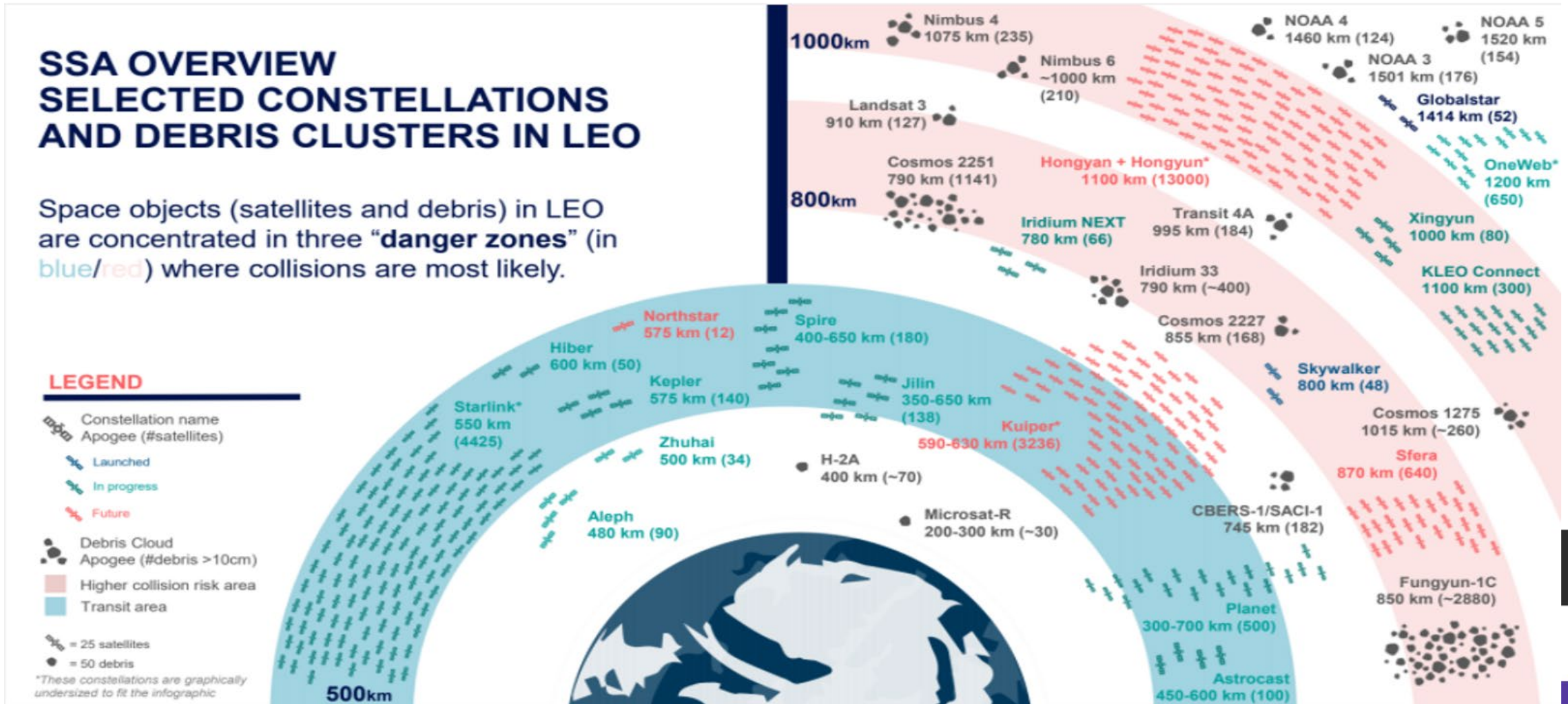
- Current satellites are built so they cannot be serviced or parts cannot be re-used and **deployment failures** aren't serviced.
 - The number of dysfunctional satellites is increasing
 - IOS and SSA market size expected to reach a range of \$4.4 Billion and \$6.2 billion by 2030 according various market studies
 - After 2030 with the retirement of the ISS, Europe will not even have access to its own microgravity platform to fly its experiments and will have to pay to private commercial space stations
 - Europe lacks "customer-driven" *in orbit servicing, re-use/recycling satellite capabilities and unified space debris management services.*
 - EU satellite owners will have to pay to foreign companies for in orbit satellite servicing
- The opportunity is to use smallsats/cubesats and nanosats to test and develop technology innovations for in-orbit satellite servicing.



Courtesy: ESA



How do we develop interoperable, scalable, affordable, autonomous and cost-effective solutions in order to protect and service EU space infrastructure?





Expected impacts

- **Research impacts** – EU to be able to inspect, protect and service its spacecraft and develop EU servicing and re-use/recycling capability for servicing EU space infrastructure and contribute to the reduction and management of space debris
- **Innovation impacts** – breakthrough innovations resulting in cost-savings due to the re-use of components or propellant cost-savings for satellite owners, maturation of scientific and technological solutions for IOS and re-use/recycling of old satellites, affordable modular satellites, innovative propulsion for space tugs, common interfaces standards, simplified maintenance of aging satellites
- **Economic impacts** – EU companies will generate new contracts from new markets, cost-savings for satellite owners, affordable and cost-effective on orbit satellite servicing technologies in benefit for the EU space economy. The new creation of an innovative in-space servicing (IIS) industry will result in economic and market spillover effects.
- **Competitiveness impacts** - to develop innovative technologies for Earth observation, navigation, satellite communications (SATCOM), space science, space situational awareness (SSA) and in-space logistics and lead to increase competitiveness of EU space industry for On Orbit Assembly and Manufacturing (OSAM)



Courtesy: NASA On-Orbit Satellite Servicing Study

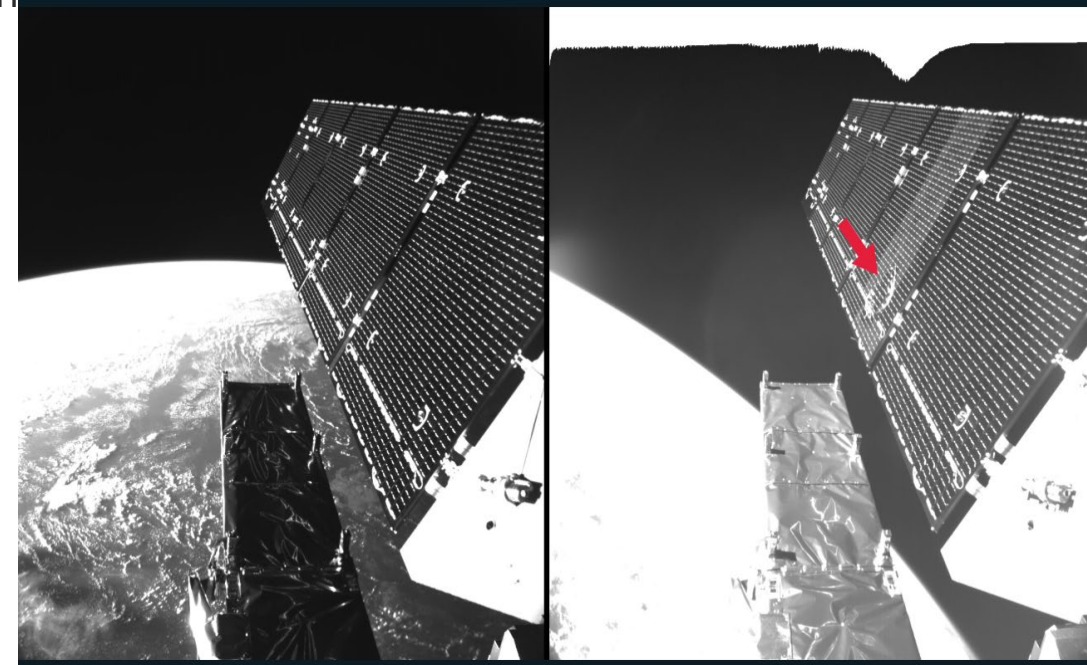


Relevance to EU policies and initiatives

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- EU Approach to Space Traffic Management - [join 2022 4 1 en act part1 v6.pdf \(europa.eu\)](#)
- Shaping & securing THE EU'S OPEN STRATEGIC AUTONOMY by 2040 and beyond

Synergy/ complementarity with other EU programmes

- EU R&I High Level Roadmap/On-orbit Operations
- EU In-Orbit Demonstration and Validation initiative (IOD/IOV) – space SME's will be able to fly their h/w using the IOD/IOV opportunity provided by the EC
- Horizon-CL4-2021-SPACE-01-12 Future space ecosystem- R&I on new scalable satellite platform concepts and building blocks increasing the degree of satellite modularization of the topic
- Horizon-CL4-2023-SPACE-01-13: Future Space Ecosystem and Enabling Technologies (RIA)

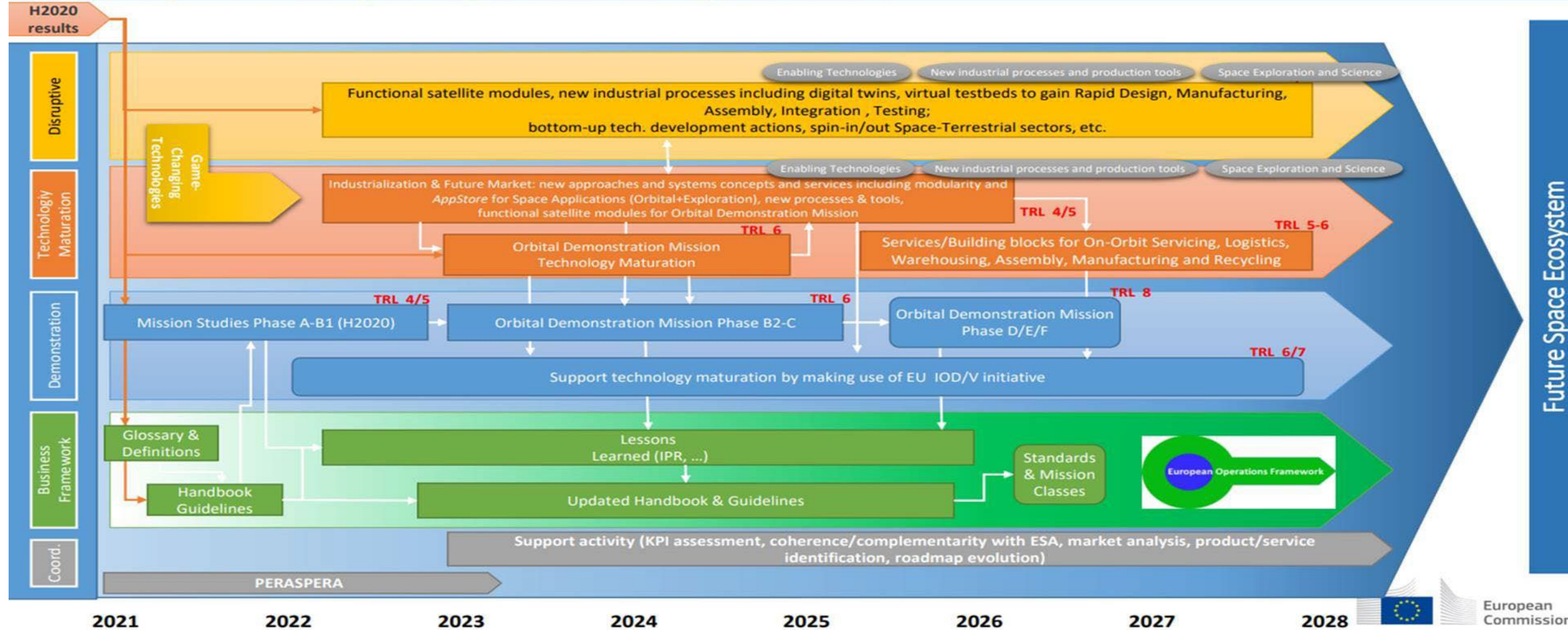


Courtesy: ESA – Sentinel 1

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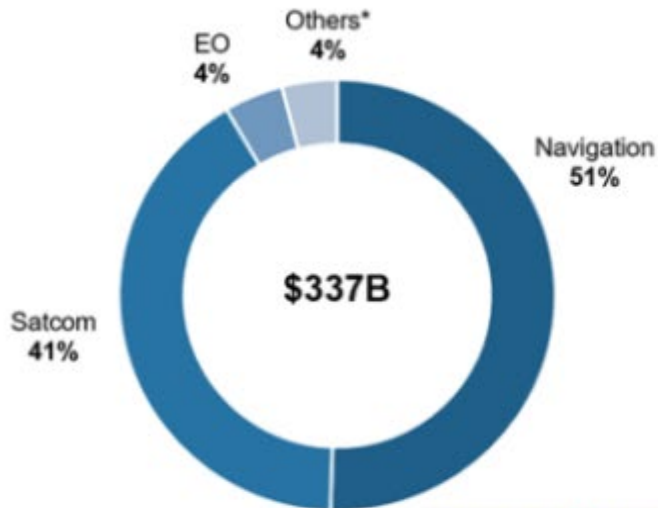
EU Space R&I High-level Roadmap Future Space Ecosystem/On-Orbit Operations





- What are the medium term and long-term needs of your countries for future space-related challenges in EIC Work Programs?

Space market by application



Euroconsult

* Includes other commercial activities such as SSA, space logistics and technology demo missions.

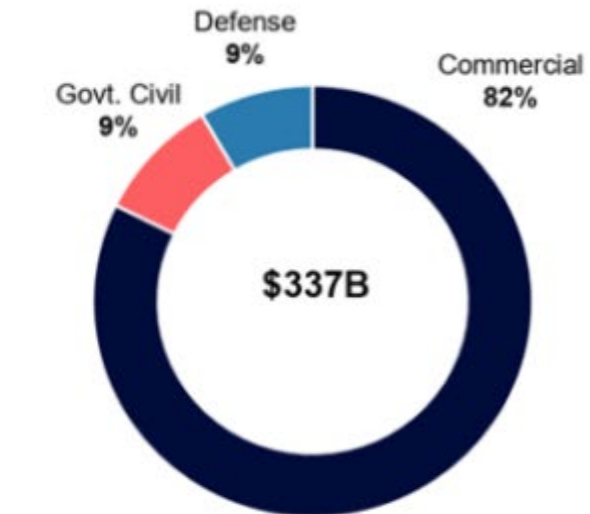
Space market value chain



● Commercial ● Gov. civil ● Defense

*Including end user terminals

Space market by client type

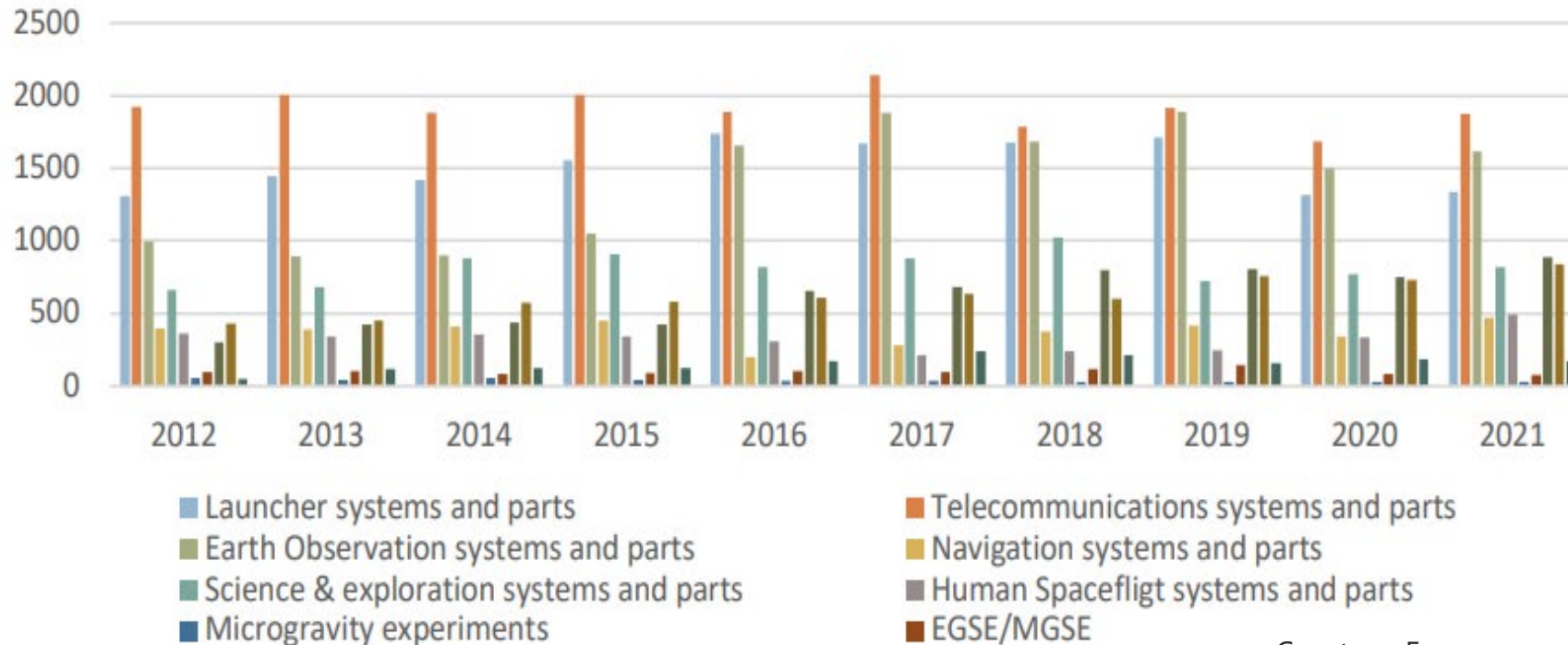


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- What are your national needs in the space related domains?

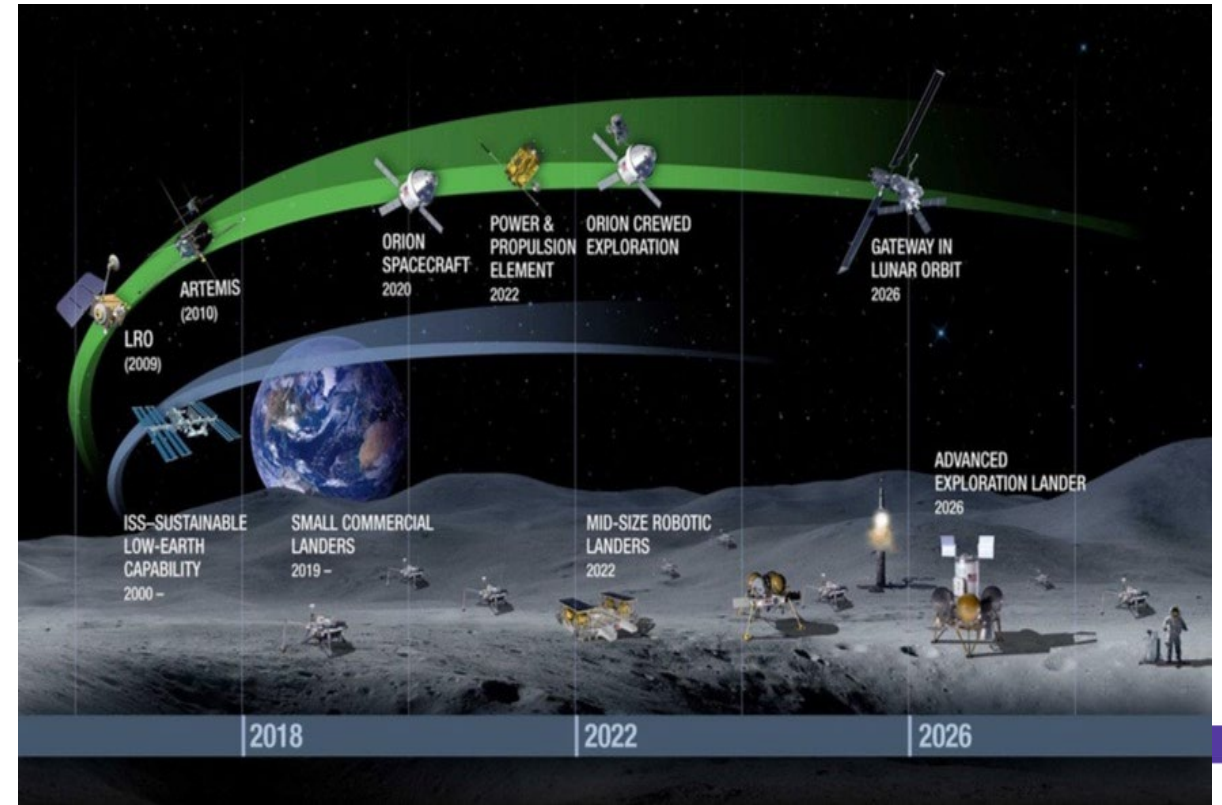
Sales by product segments, details (M€)



Courtesy: Eurospace



- Will you be ready to participate as national MS experts to further meetings to discuss space related topics for the EIC?
- Will you be ready to share your ideas/recommendations for synergies between space and terrestrial related topics?
- What are your short-term, medium-term and long-term national needs for space-related topics in exploratory research (EIC Pathfinder), demonstration (EIC Transition) and commercialisation (EIC Accelerator)?



Courtesy: NASA





Thank you!

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