

# ESA webinar Unlocking Funding for Zero Debris Innovation & Commercialisation

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Council

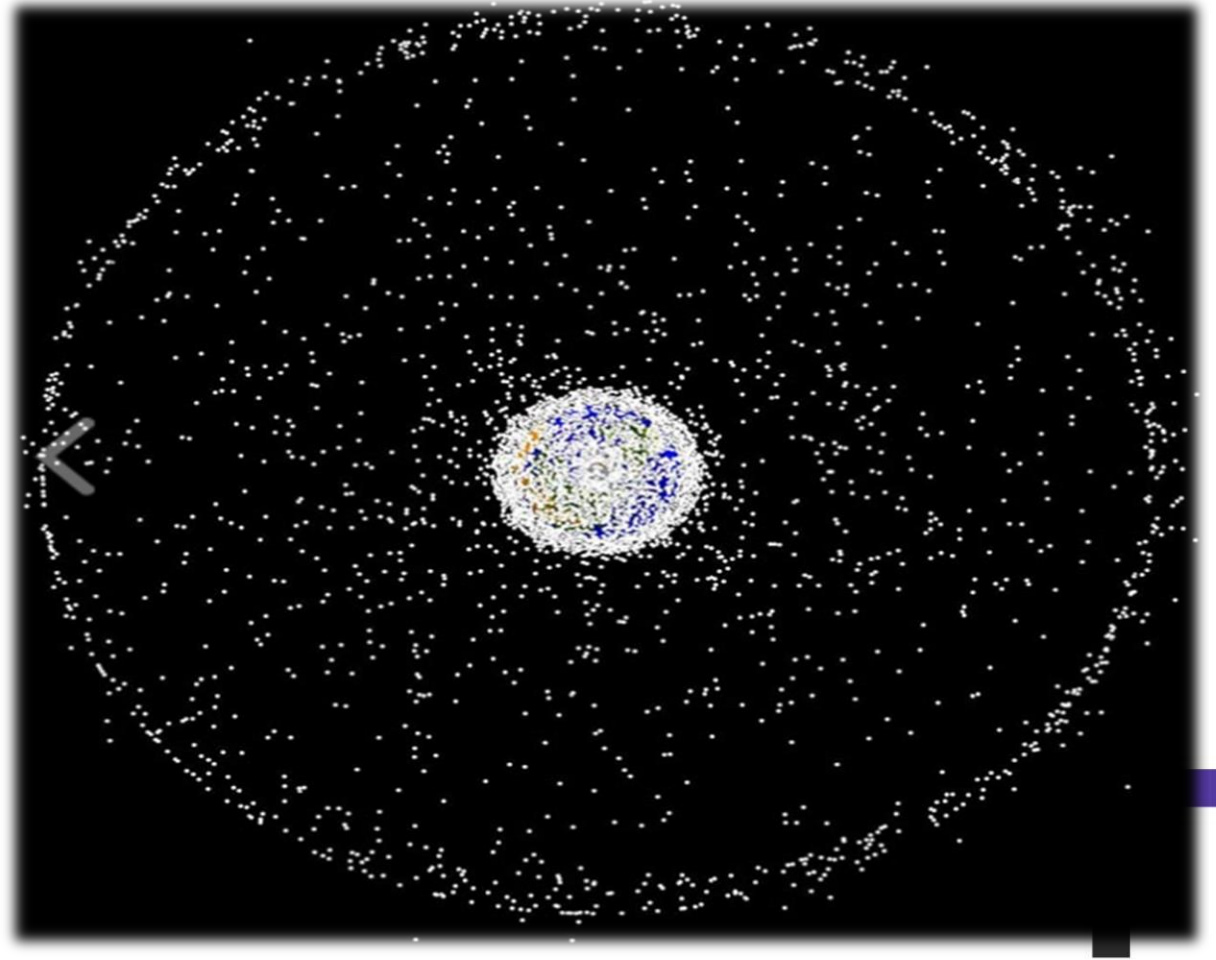


# Introduction



## EIC Introduction

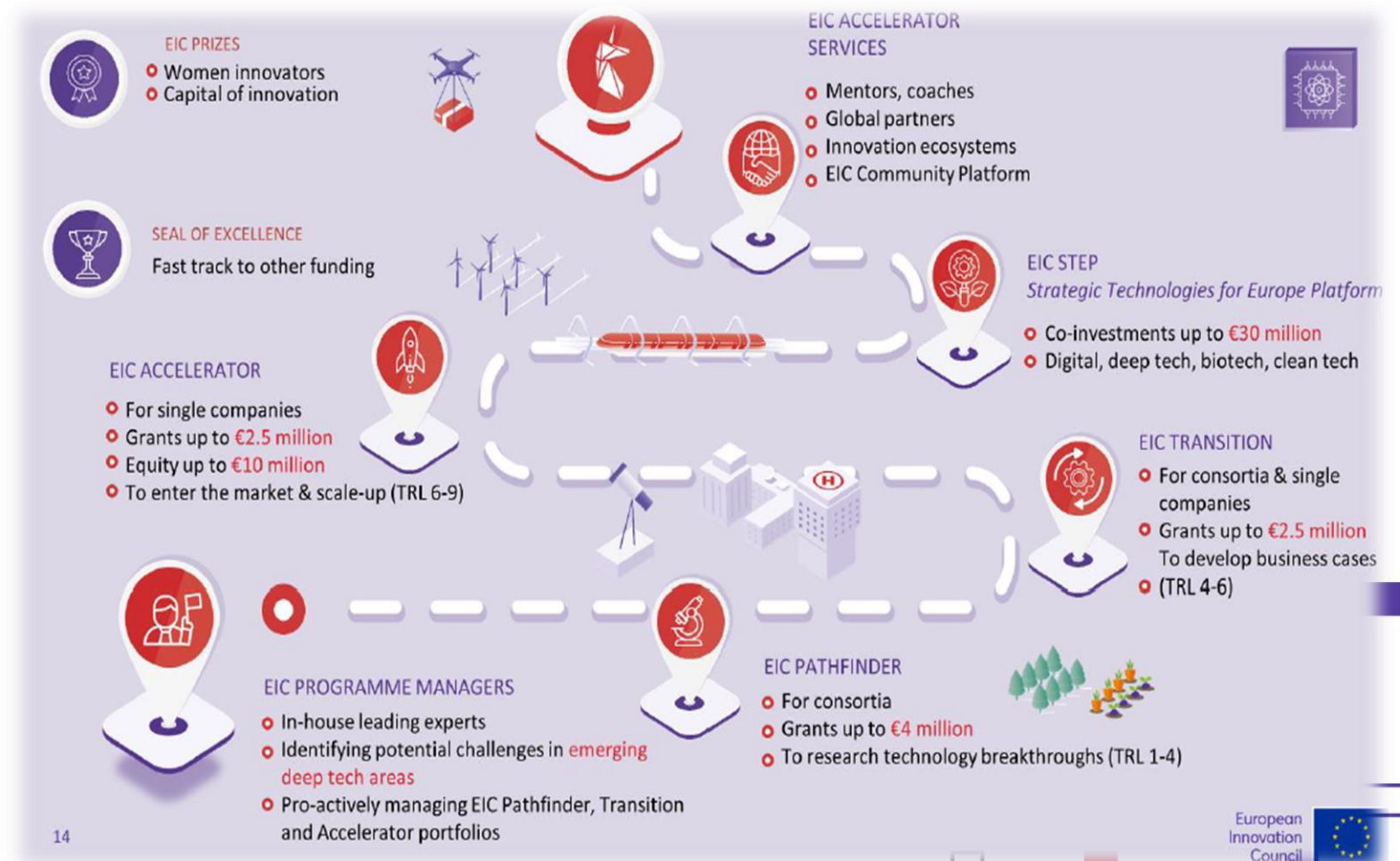
- EIC role in the space industry
- EIC space portfolio
- EIC space roadmap
- EIC WP2025 Accelerator - Innovative in-space servicing, operations, robotics and technologies for resilient EU space infrastructure
- Conclusions



Courtesy: NASA ODOPO, [ARES | Orbital Debris Program Office | Photo Gallery \(nasa.gov\)](#)

# EIC role in the European Space Industry

- EIC funds **game-changing innovations** and **high-risk ideas** of space SMEs & start-ups
- **EIC funds a diverse space portfolio** from low TRL to high
- EIC WP build with opportunities for “top-down” and “bottom-up” projects





# EIC Space Portfolio

Courtesy: RePowerSiC – WP23 ISSEH Pathfinder project

- **Space Debris Sustainability** – tethers for debris removal, space debris monitoring, active debris removal, in- orbit satellite servicing, etc.
- **Enabling Space Technologies** -propulsion technologies, in-space manufactured solar arrays, flat panel antennas etc.
- **Earth Observation & Meteorology** - thermal infrared p/l, precision agriculture, predictive monitoring



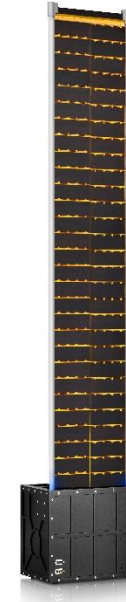
Courtesy: Ice2Thrust- WP23  
ISSEH Pathfinder project



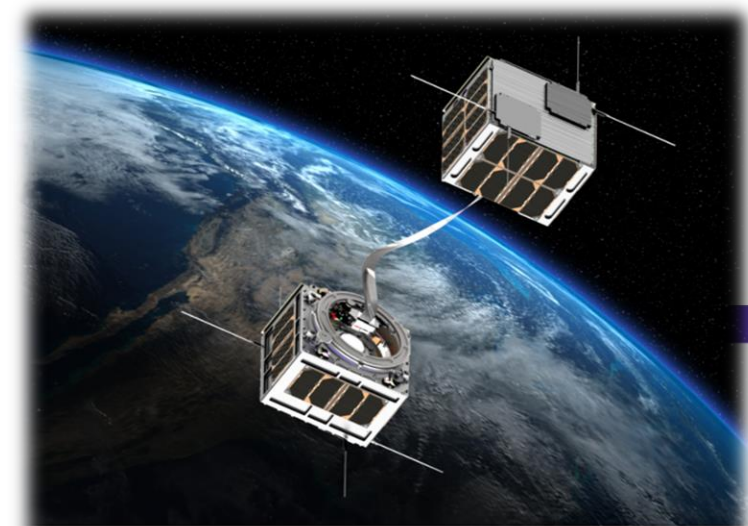
Courtesy: HYPERION EIC Accelerator, ION-X



Figure 5. Example of application of the RePowerSiC technology for space applications.



Courtesy: DCUBED,  
ISM4Europe



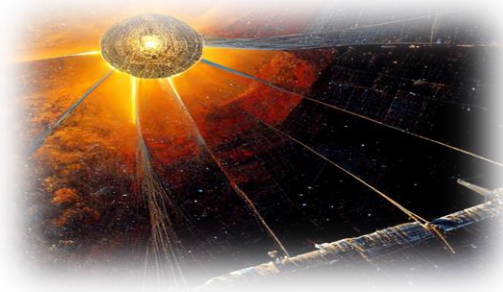
Courtesy: E.T.Pack-F project – EIC Transition

# ELC space technology challenges

## WP 2023

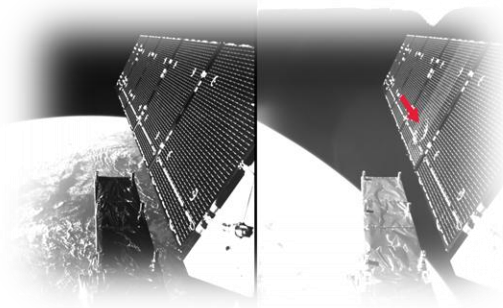
### **Pathfinder (TRL1-4): In space solar energy**

- Collect
- Conversion
- WPT
- In space green propulsion



### **Accelerator (TRL6-9): "Customer driven" innovative space applications**

- S/C inspection
- Collision avoidance
- Collection, recovery & reuse space debris
- IOS,ADR, EoL
- ISAM
- Innovation made in Europe Microgravity platforms



## WP 2024



### **Pathfinder (TRL1-4): Strengthening the sustainability and resilience of EU space infrastructure**

- Space debris mitigation
- Space debris remediation
- In-space recycling and re-use of orbital assets (ISRROA)

## WP 2025



### **Accelerator (TRL6-9): Innovative in-space servicing, operations, robotics and technologies for resilient EU space infrastructure**

- In-Orbit Servicing & Maintenance
- In-space transportation & in-space refueling and recharging, OTV
- Space-based resilience

WP2025 [\(788\) Innovative in-space servicing, operations, robotics & technologies for resilient EU space infra - YouTube](#)

# WP2024 EIC Pathfinder (TRL 1- 4) - Strengthening the sustainability and resilience of EU space infrastructure

## Goal

The challenge address the emerging need for green, compact and affordable de-orbiting solutions and in-space recycling of space debris

- Space Debris Mitigation & Remediation – using very little propellant
- In Space Recycling and Re-use of Orbital assets (ISRROA)
- Game changing innovations for collision avoidance, SSA, tools, etc.

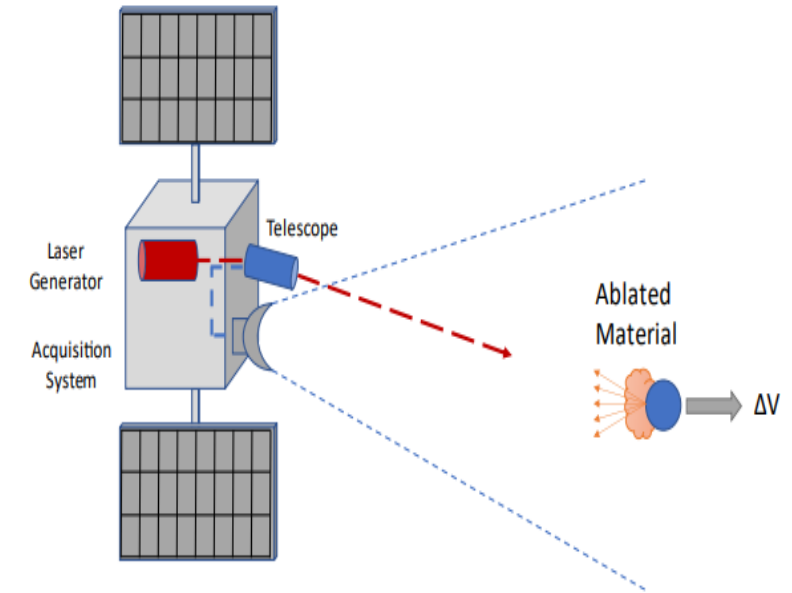


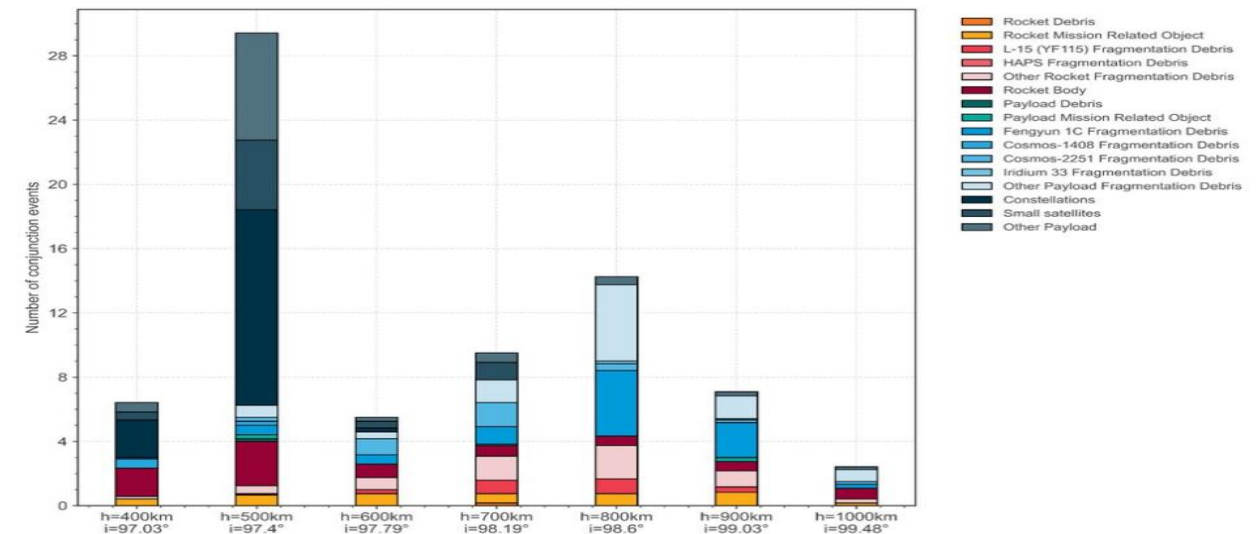
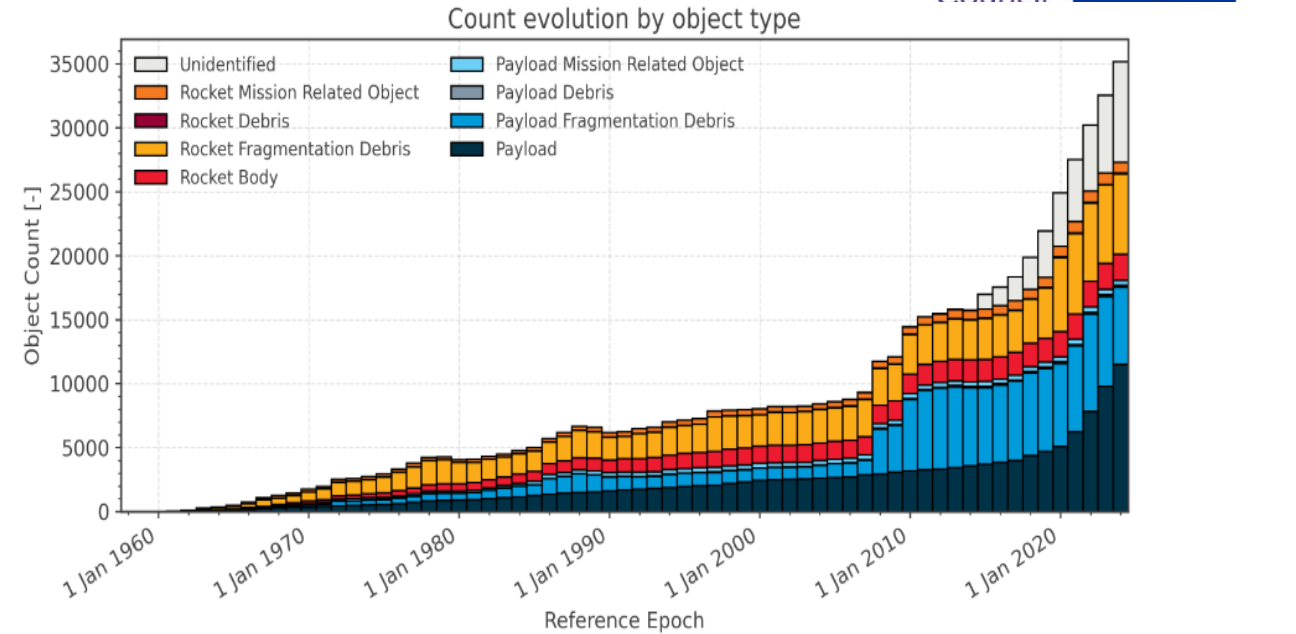
Figure 10. A space-based laser functions similarly to a ground-based laser; however, it requires much less powerful lasers and does not need adaptive optics to correct for atmospheric distortions to the beam.

Courtesy: NASA, L'ADROIT concept

# Protection of the EU Space Infrastructure



- For all debris sizes
- In all Orbits
- From cooperative and non-cooperative objects





# Portfolio Categories

- Category I - Space Debris Mitigation
- Category II - Space Debris Remediation
- Category III - In-space Recycling and Re-use of Orbital Assets (ISRROA)

SPP1: Mitigation

SPP2: Remediation

SPP3: ISRROA

**Shared components or potential complementarities among  
projects  
On going  
Grant Preparation**

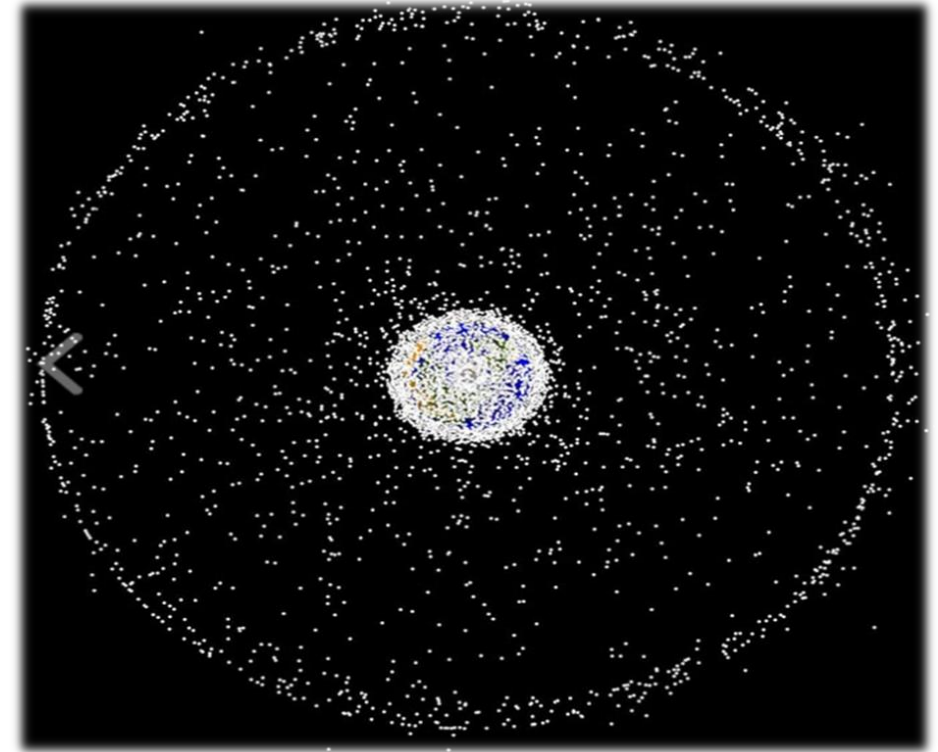




# WP2024: Strengthening the sustainability and resilience of EU space infrastructure



- Very strong interest Cat.I space debris mitigation
- Strong proposals in Cat.II space debris remediation
- Expressed complementary to the ISOS program and ISAM



Courtesy: NASA ODOPO, [ARES | Orbital Debris Program Office | Photo Gallery \(nasa.gov\)](#)

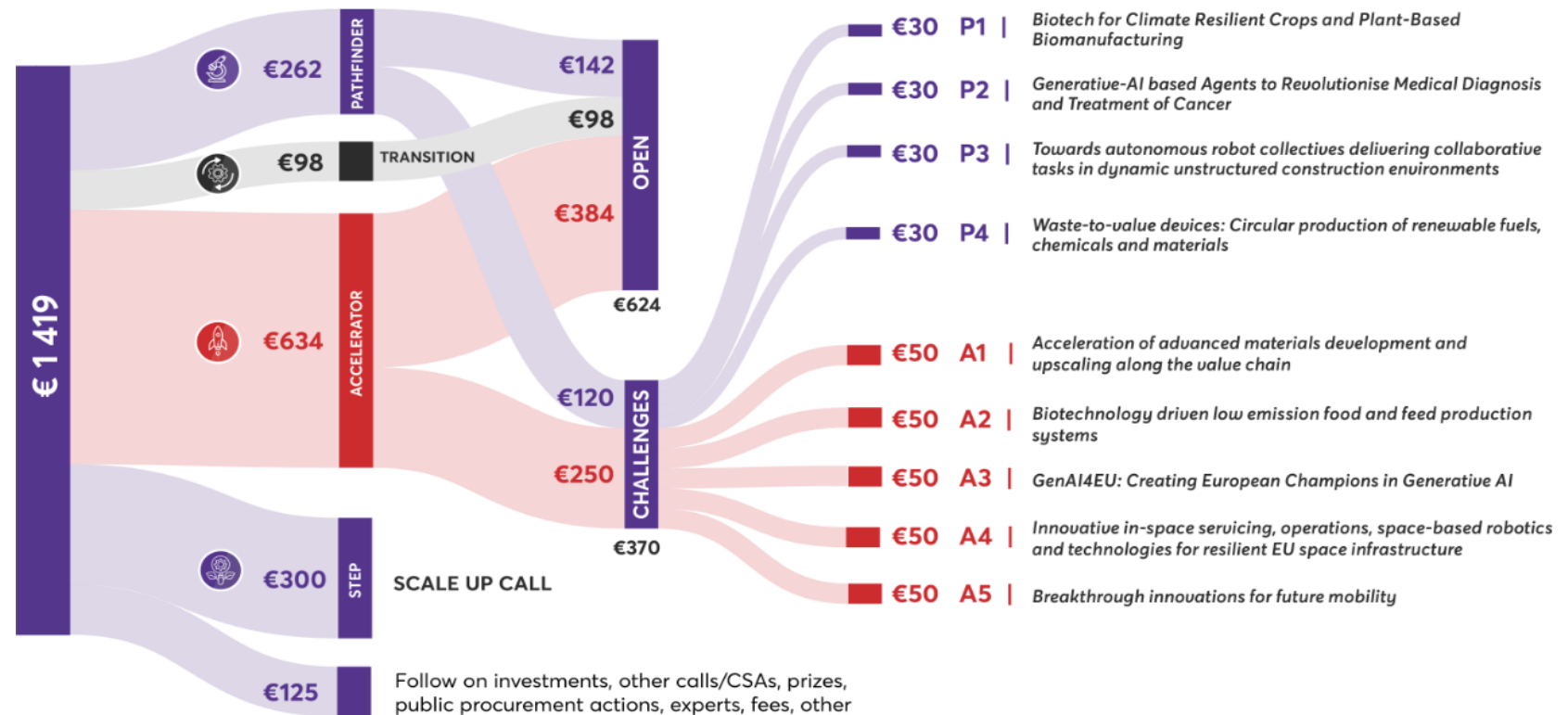
# WP2025 Innovative in-space servicing, operations, space-based robotics and technologies for resilient EU space infrastructure

## Indicative Budget

- EUR 50 Million

## Deadlines

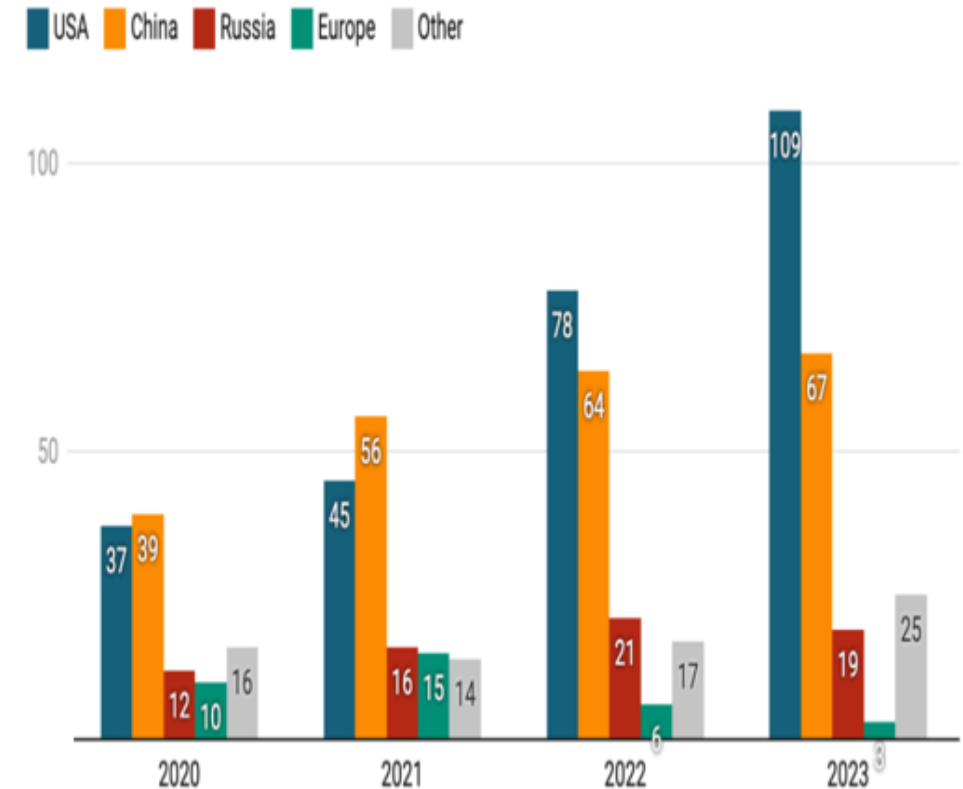
- 1<sup>st</sup> October 2025



# Background



- Current satellites are designed, build and launched in space, not to be serviced, repaired, upgraded or refuelled in space
- Satellites are discarded only due to the depletion of fuel
- Launch anomalies, deployment failures, fuel leaks
- Increased need to keep orbital slots and extend lifetime of satellites
- Threats- signal spoofing, jamming, RF interferences, space debris collision, denial of service, intrusion, radiation, data interception
- Capabilities emerging in non-EU countries with flight proven life extension missions (MEV-1, MEV-2, etc.) for GEO satellites



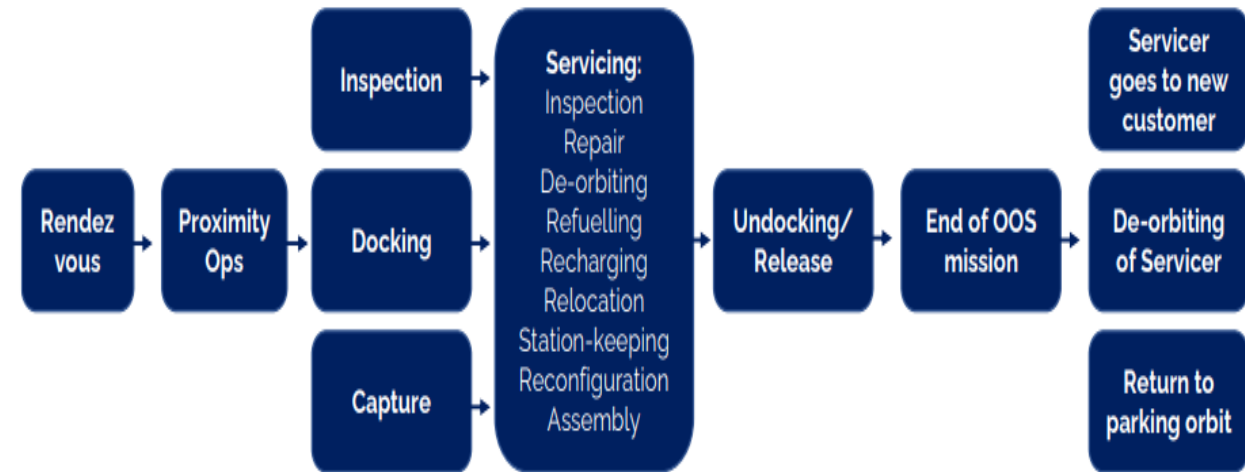
Data extracted: Payload, Jonathan McDowell, 15/01/2024

In 2023 were launched more than 2,664 objects

# WP2025 Innovative in-space servicing, operations, space-based robotics and technologies for resilient EU space infrastructure



- **In-Orbit Servicing & Maintenance** - Proximity Ops, Rendezvous, capturing, in-space robotic manipulations, maintenance, in-space assembly and operations
- **In-space transportation** & in-space refueling/recharging, Orbital Transfer Vehicles (OTV), etc.
- **Space-based resilience** – space-based cybersecurity for satcom, navigation, Earth Observation and In Orbit servicing missions.



Courtesy: ESPI, OSAM State of Play and Perspectives on Future Evolutions, 2023



# EIC WP2025 information



- **WP 2025** - [EIC 2025 work programme - European Commission](#)
- **Short intro to the challenge** - [Innovative in-space servicing, operations, robotics and technologies for resilient EU space infrastructure - European Commission](#)
- **Accelerator Deadline** - 1<sup>st</sup> October 2025



Courtesy: ESA image Copernicus Sentinel-3A satellite in 2017

# Conclusions



- “Bottom-up” projects for space debris mitigation, space based SSA,
- AI/ML algorithms considered in most of the proposals in Cat.I
- Active debris removal robotic arms, grippers, laser ablation technologies
- Limited number of proposals for In Space Recycling of Space Debris



Courtesy: NASA Orion image taken the 28/11/2022, imagery of the Earth and Moon together from its distant lunar orbit, including this image on Nov. 28, 2022, taken from camera on one of the spacecraft's solar array wings.