European Innovation Council

Backing visionary entrepreneurs

Stela Tkatchova
EIC Programme Manager for Space Systems
Stela.Tkatchova@ec.europa.eu

14/04/2023

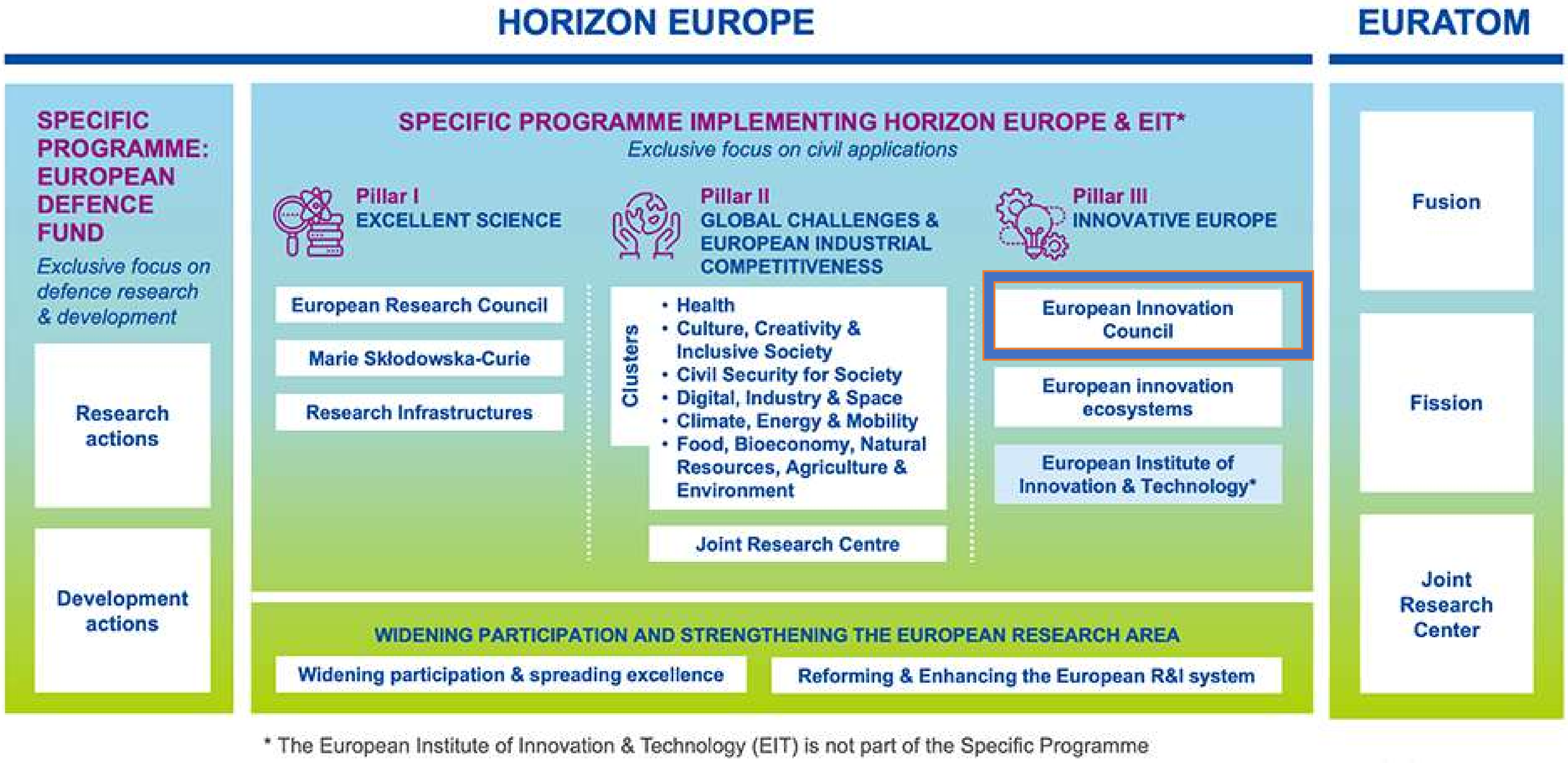
European Innovation Council and SME Agency

Introduction

- **EIC role in the EU space industry**
- **EIC Space Portfolio**
- **EIC Space Challenges**
  - Pathfinder TRL1-4- In-space solar energy harvesting for innovative space applications
  - Accelerator TRL6-9 - "Customer Driven" innovative space technologies and services
- **EU Programmes Complementarity**
- **Conclusions**

Courtesy: ESA

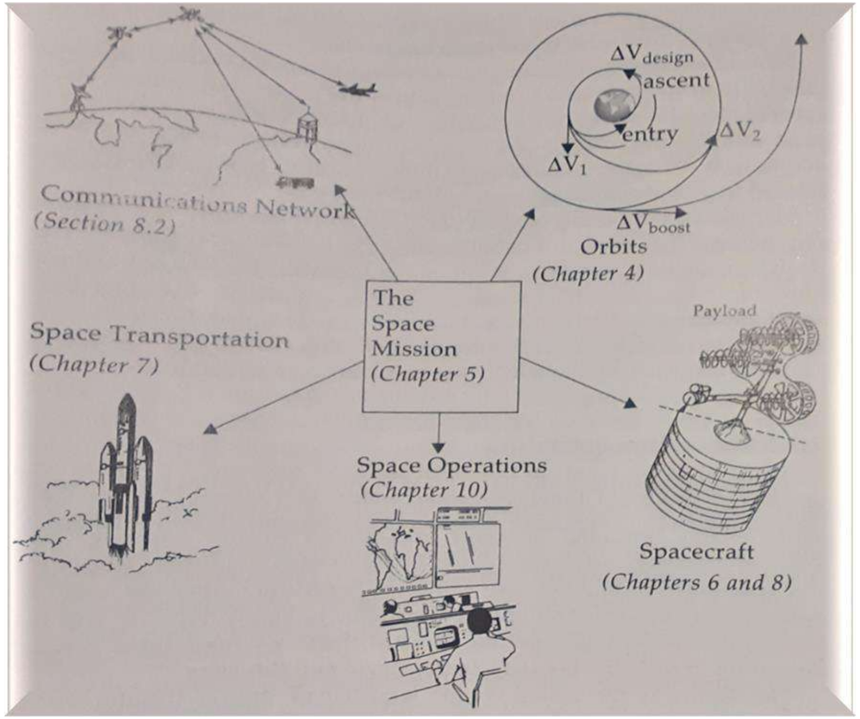
Horizon Europe Structure



EIC role and space portfolio

- EIC funds game-changing innovations and high-risk ideas of SMEs & start-ups

- The EIC supports them in the process of high-risk innovation, demonstration and commercialization with transversal EIC Pathfinder, Transition and Accelerator programs



Courtesy: ISU, Keys to Space

EIC Programs

European Innovation Council

Pathfinder (TRL1-4)
- **For consortia**
- Early stage research on breakthrough technologies
- **Grants up to €3/4 million**

Transition (TRL 4-6)
- **For consortia and single entities**
- Technology maturation from proof of concept to validation
- Business & market readiness
- **Grants up to €2.5 million**

Accelerator (TRL 6-9)
- **For individual SMEs**
- Development & scale up of deep-tech/ disruptive innovations by startups/ SMEs
- Blended finance (**grants up to €2.5 million; equity investment up to €15 million or above**)

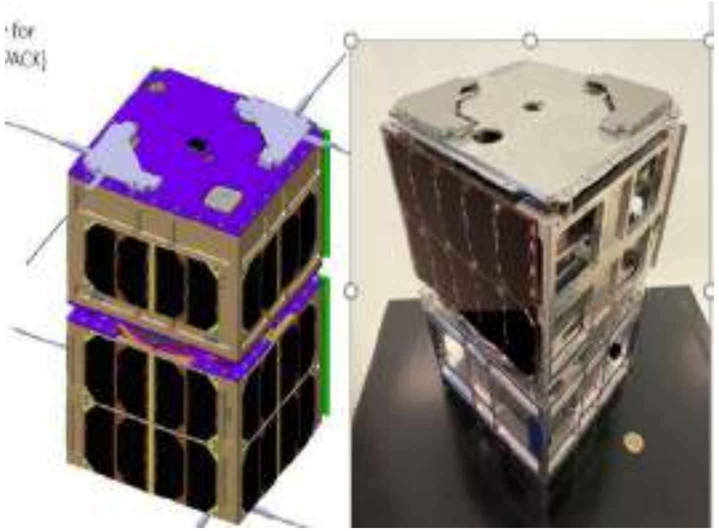
- Focus on **breakthrough, game-changing, market-creating, deep-tech**
- **Mainly bottom up** complemented by targeted funding on strategic technologies/ challenges
- Steered by **EIC Board** of leading innovators (entrepreneurs, investors, researchers, ecosystem)
- **Business Acceleration Services** (coaches/ mentors, corporates, investors, ecosystem)
- **Pro-active management** (roadmaps, reviews, re-orientations, etc) with EIC Programme Managers
- **Fast track access** to Accelerator for results from EIT, EIC Pathfinder,

EIC Space Projects Examples

- E. T. PACK - free passive de-orbiting device for space debris removal based on a eletrodynamic tether.
- Business Model for Orbital Maneuvering Device (BMOM)
- Magnetohydrodynamic Enhanced Entry System for Space Transportation (MEESST) research in the use of High Temperature Superconductors.

Courtesy: E.T.Pack project – EIC Pathfinder

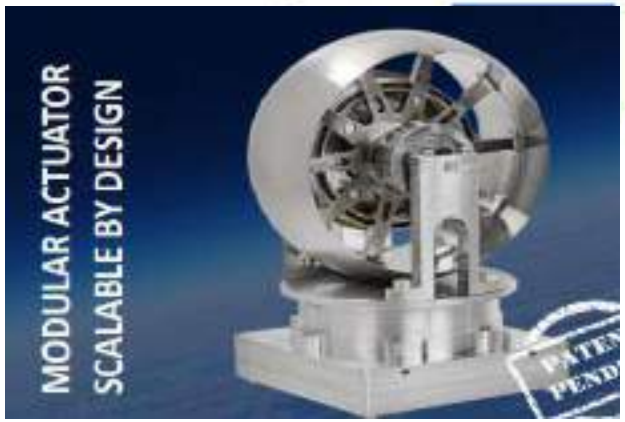
Courtesy: MEESST project – EIC Pathfinder



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

EIC Space Projects Examples

- SATAGILITY-GO2MARKET- innovative next-gen space actuator technology for spacecraft between 50kg to 300kg
- EMBRACE II - groundbreaking alternative iodine propellant for CubeSats
- CASSIOPEE - optical observation stations using collision prediction algorithms for space debris
- CropCloud – use of Earth observation data and AI algorithm for precision agriculture.



Courtesy: Veoware

Courtesy: THRUST ME

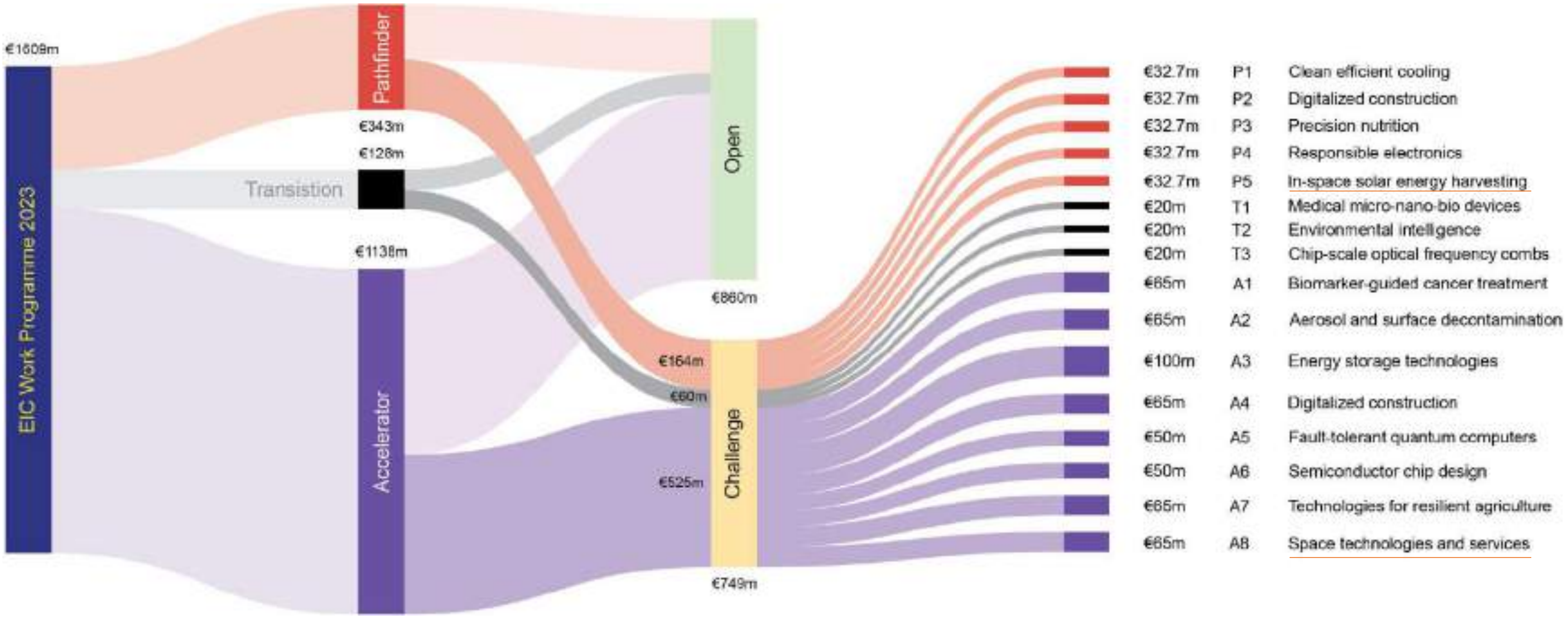
Courtesy: Share My Space

Global recognition of EIC Space projects

European Innovation Council


Space tethers focus on deorbit and debris mitigation

In 2023 EIC allocates ~€1.6bn to Open and Challenge calls by its Pathfinder, Transition, Accelerator programs



European Innovation Council

EIC WP 2023 deadlines and budgets

European Innovation Council

Accelerator

Open

7 June 2023
4 October 2023

~€611m
(~grant/equity)

Challenges

7 June 2023
4 October 2023

~€523.5m
(~grant/equity)

Pathfinder

Open

7 March 2023

~€179.50m

Challenges

~€163.50m

18 October 2023

Transition

Open

12 April 2023

~€67.86m

Challenges

27 September 2023

~€60.5m

WP2023 Space Challenges

European Innovation Council

Methodology for space topics selection

PM knowledge of the European Space Industry

EIC projects
ERC PoC
Horizon signals

Pillar II- Horizon projects

SRIA
DG DEFIs & Space

GAPS

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

WP2023 Space Challenges

- **EIC Pathfinder (TRL 1-4)** - In-space solar energy harvesting for innovative space applications

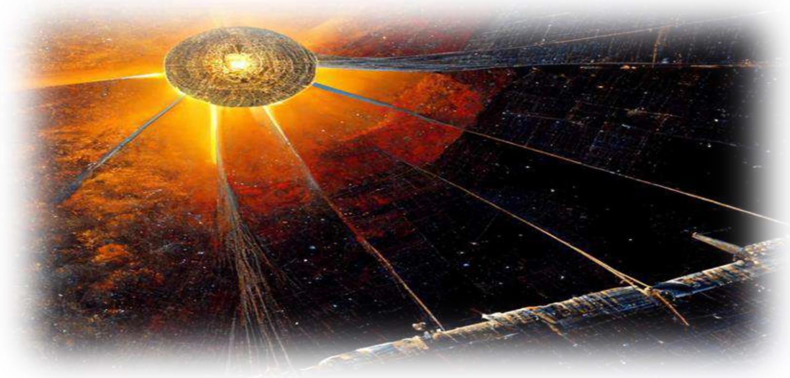
Preparing for the long-term Future

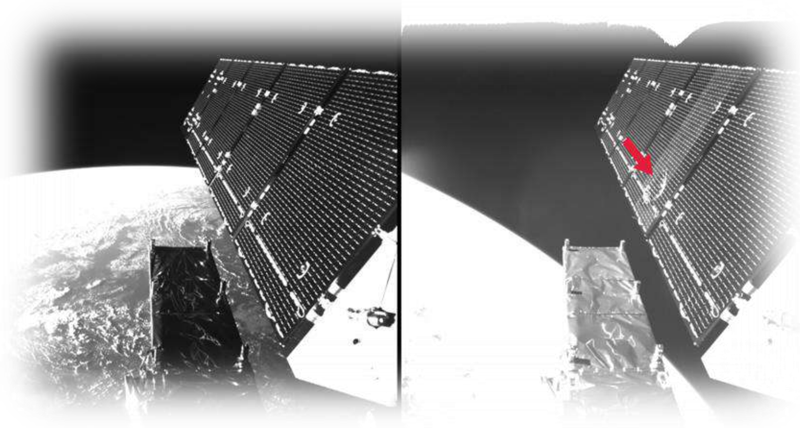
32M Euros

- **EIC Accelerator (TRL6-9)** - Customer-driven, innovative space technologies and services

Future market opportunities

65M Euros





Courtesy: Copernicus - Sentinel 1, ESA

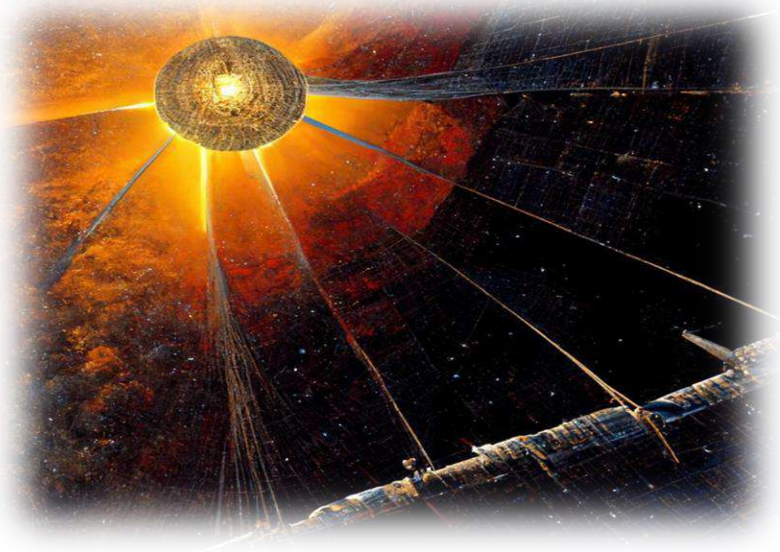
EIC Pathfinder

In-space solar energy harvesting for innovative space applications

WP2023 Space Challenges

European Innovation Council

- **EIC Pathfinder (TRL 1-4)** - In-space solar energy harvesting for innovative space applications



Preparing for the long-term Future

32 M Euros

WP 2023 Pathfinder – Part I

The **EIC Pathfinder (TRL 1-4)**

- funds **research** to develop the **scientific basis** to underpin breakthrough technologies
- supports the **earliest stages** of scientific, technological or deep-tech R&D
- aims to build on new, **cutting-edge directions in science and technology** to disrupt a field and a market or create new opportunities
- realises innovative technological solutions to identify, develop and scale up **breakthrough technologies** and **disruptive innovations** in Europe

European Innovation Council

WP 2023 Pathfinder – Part II

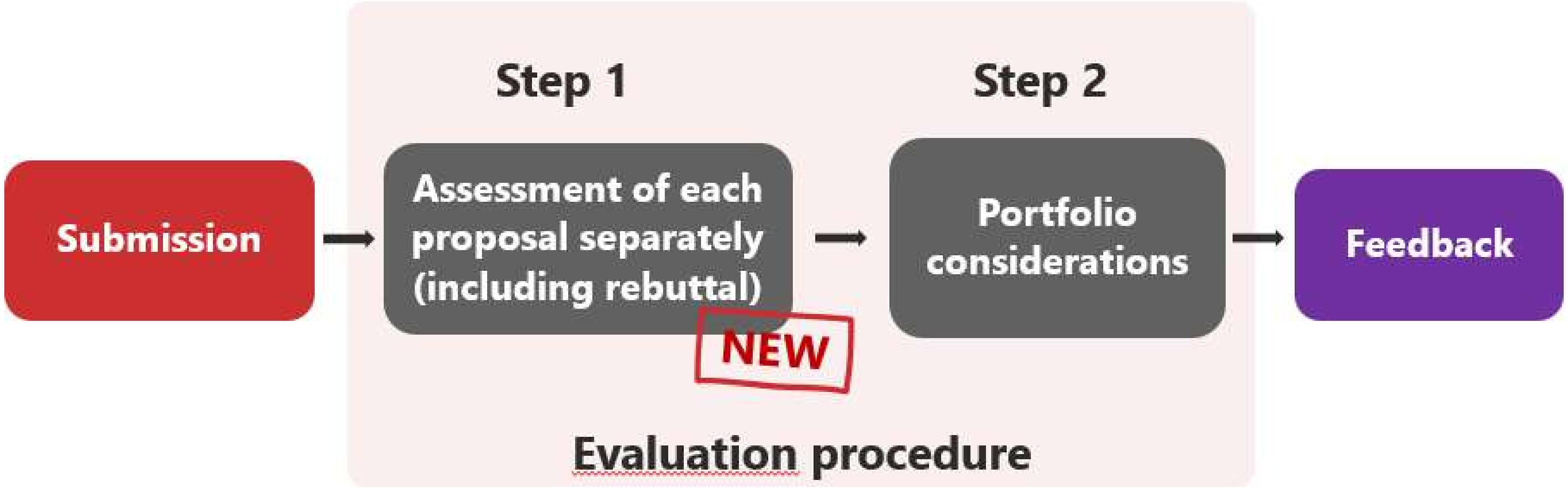
EIC Pathfinder Open → to support projects in any field of science, technology or application without predefined thematic priorities ('bottom-up')

EIC Pathfinder Challenges → to support coherent portfolios of projects within predefined thematic areas with the aim to achieve specific objectives for each Challenge

WP 2023 Pathfinder – Part III

- **Single legal entities** established in a Member State or an Associated Country (mid-caps and larger companies will not be permitted)
- **Consortia of two entities** must be two independent legal entities from two different Member States or Associated Countries
- **Consortia of three or more entities** must include as beneficiaries at least three legal entities, independent from each other and each established in a different country as follows:
  - at least one legal entity established in a Member State; and
  - at least two other independent legal entities, each established in different Member States or Associated Countries.
- The legal entities may for example be universities, research organisations, SMEs, start-ups, industrial partners or natural persons.
- RIA - 100% eligible costs up to **€ 4 million** as appropriate (larger amounts possible, if duly justified)

How does the EIC decide if your proposal will be funded?



Pathfinder calls 2023 – Summary table

European Innovation Council

	Pathfinder Open	Pathfinder Challenges
Total budget	**€179.5 million**	**€163.5 million**
Proposals (indicative)	Up to €3 million	Up to €4 million
Funding rate	100% of eligible costs	100% of eligible costs
Opening	10 January 2023	20 June 2023
Deadline	**7 March 2023** at 17.00 CET	**18 October 2023** at 17.00 CET
Length of proposal	17-page proposal (part B)	25-page proposal (part B)
Applicants	**Consortia** min. 3 partners from 3 different Memer States /Associated Countries (of which at least 1 partner in a Member State)	**Consortia:** • If 2 partners: from different MS/AC, • Min 3 partners from 3 different MS/AC (of which at least 1 partner in a MS) **Single legal entities** in a MS/AC

Background - Part I

- Japan - JAXA solar farms in space by 2030
- Europe- ESA Solaris
- USA - Northrop Grumman's SSPIDR demo
- China – Space solar power station by 2028

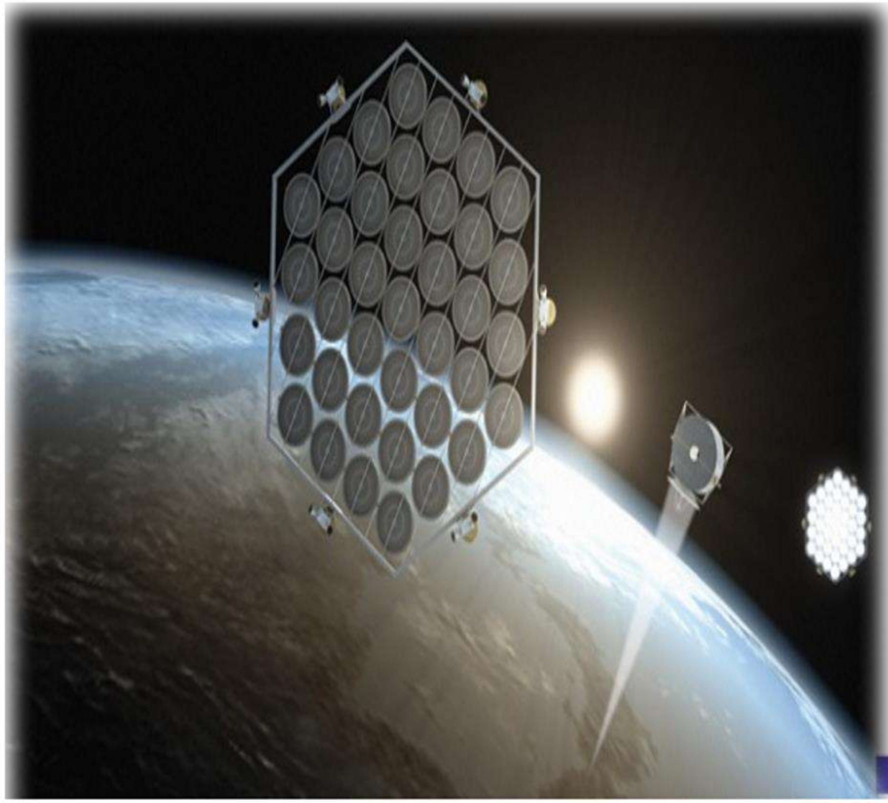
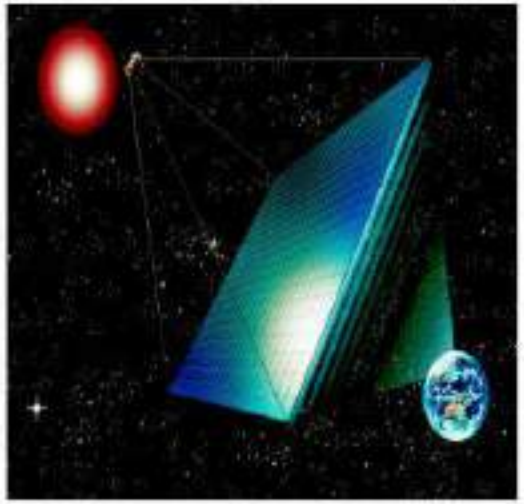


Illustration: John MacNeill (Image Credit: IEEE Spectrum)

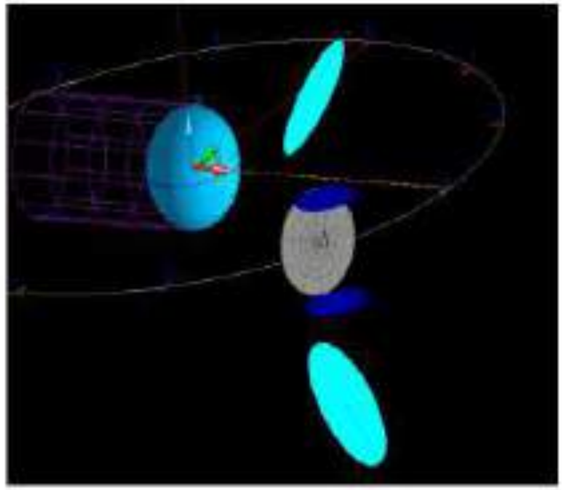
China conducts world's first full-chain, system-wide ground verification for Space Solar Power Station (SSPS) with self-developed OMEGA-SSPS ground test verification system in Xi'an City of northwest China's Shaanxi Province. /Xidian University

Background - Part II

- Solar energy harvesting using small satellites
- Solar energy for powering Smallsats/cubesats
- Various cost-benefit studies and national investments in SBSP



Tethered SPS
(Basic Microwave-type Model)
(Jspacesystems/METI)



Advanced Microwave-type Model
(JAXA/MEXT)

Courtesy: Jspacesystems/METI:Japan Space Systems/ Ministry of Economy, Trade and Industry, JAXA/MEXT:Japan Aerospace Exploration Agency/ Ministry of Education, Culture, Sports, Science and Technology

Identified GAPs

European Innovation Council

- Urgent need for clean and renewable 24hr energy
- Unobstructed by the Earth atmosphere, the Sun is unlimited non-polluting energy source
- In-space solar harvesting WPT in shorter distances and limited safety concerns
- Innovative in-orbit efficient devices for solar energy collection & storage
- Use in-space energy for innovative in- space applications (e.g. ISRU)
- In-space energy utilisation for in-space mobility for space debris removal or future In Orbit Servicing /Active Debris Removal (ADR) and End of Life (EoL) activities
- Green propulsion for increased payload capability and resulting in potential fuel cost savings for satellite owners
- Urgent need for strategic autonomy for renewable energy resources in space

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

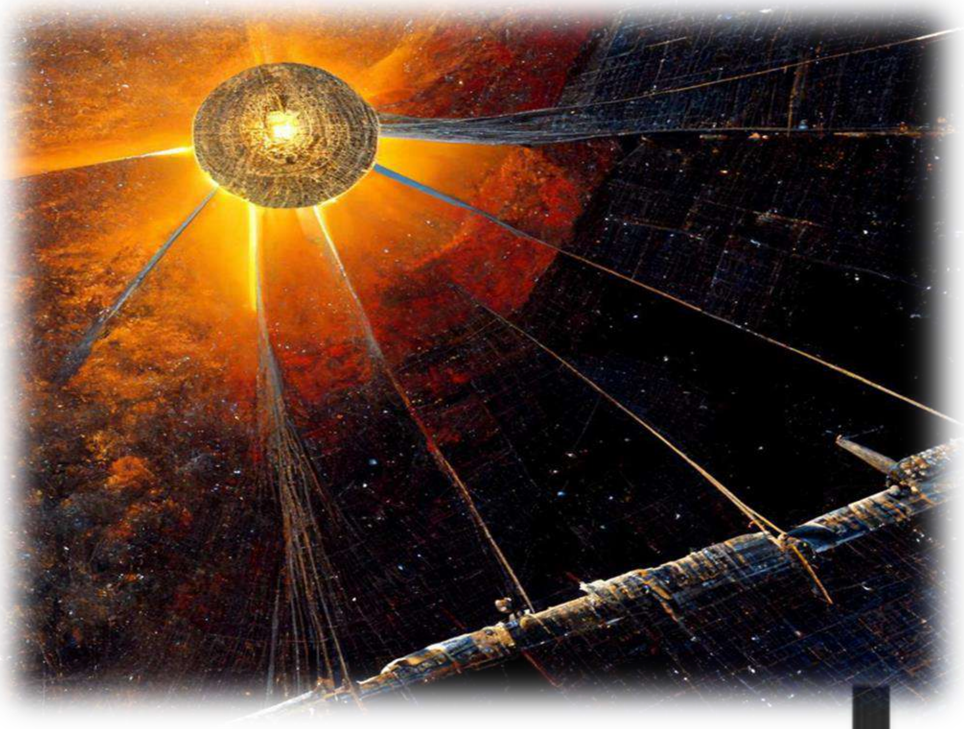
Courtesy: National Security Space Office

In-space solar energy harvesting for innovative space applications

European Innovation Council

Goal

The development of concepts and technologies required for in-space energy harvesting and transmission, and of novel propulsion technologies that will use such harvested energy.

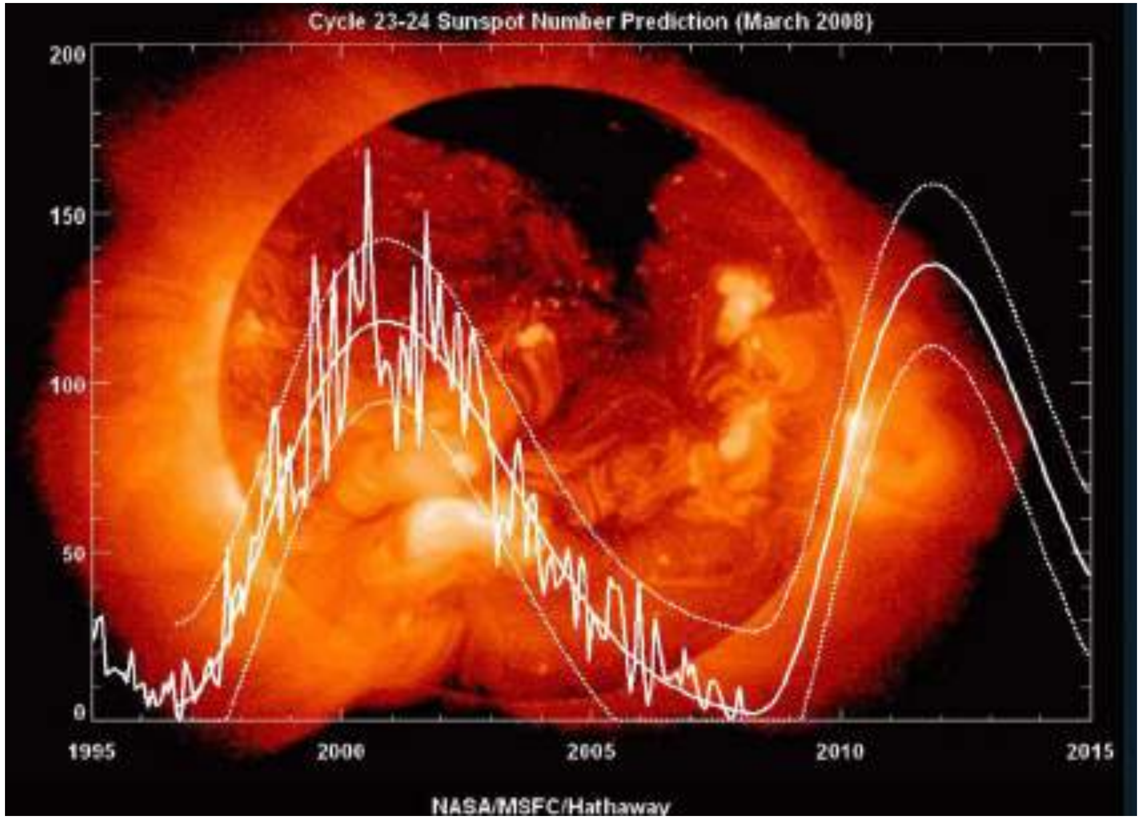


- Scalable solutions for in-orbit efficient solar energy collection and storage
- Conversion of DC-to – RF of the harvested energy in a form appropriate for transmission at long distances in empty space
- Efficient Wireless Power Transmission (WPT) of the transformed energy between in-space s/c and various stations in orbit
- Innovative green propulsion solutions for in-space mobility, resulting into low cost or eco-friendly innovative concepts

EIC Portfolio Categories

European Innovation Council

- **Category I** - Collection, conversion and transmission (CCT) in-space solar energy
- **Category II** - In-space green propulsion



Courtesy: NASA-D Hathaway

EIC Space Portfolio Considerations

	Elements for portfolio building	
Categories	Functions/devices	Enabling outcomes
Collection, conversion and transmission(CCT) of in-space solar energy	Collection Scalable solutions for in-space solar energy collection I. On-board spacecraft deployable photovoltaic panels II. on-board batteries III. PV solar cells with efficiencies above 35%, thin-film, solar cells based on CIGS technology, batteries, etc. IV. New types of transmitting antennas and rectennas, (e.g. fully integrated transparent antennas, modular solar concentrators, solar generators and others) V. Advanced solar arrays for solar electric propulsion	I. Innovative concepts and methods for end (E2E) energy efficiency conversion or transmission II. Interoperability III. Lightweight
	Conversion	High efficiency conversion from DC to RF, RF-to-DC or light-to-DC
	Transmission Wireless power transmission (WPT) I. In-space harvesting devices on spacecraft and re-translation stations or other final receivers. II. Grids of re-transmitting stations, which not only amplify the wireless transmission, but also redirect the transmission as necessary.	Wireless power transmission (WPT) I. WPT can involve either laser or microwave approaches.
In-space green propulsion	Solar electric propulsion (SEP) for increased in-space mobility or increased payload capacity in benefit for in orbit satellite servicing (IOS), In space assembly and manufacturing (ISAM), active debris removal (ADR), end of life (EoL) time Solar sail propulsion for in-space mobility	I. In-space propulsion systems for reduced propellant and reduced spacecraft mass and therefore resulting in lower costs

Category I - In-space solar energy harvesting for innovative space applications

- Collection, conversion and transmission (CCT)

Collection	Conversion	Wireless Power Transmission
Antenna's On- board s/c PV panels PV solar cells above 35% Thin-films Solar cells based on CIGS On-board batteries Transparent antennas Modular solar concentrators Advanced solar arrays for SEP	High efficiency conversion from DC to RF, RF to DC or light to DC Rectennas	Microwave WPT (e.g. antenna) Optical WPT (e.g. Laser)

European Innovation Council

Category I Functions

- Innovative approaches, methods and technologies for increased E2E efficiency on in-space solar energy collection, conversion, storage and WPT
- Scalable solutions (antennas, rectennas, solar concentrators, etc.)
- S/C solar harvesting device or grids of re-transmission stations that not only amplify but also re-direct the beam

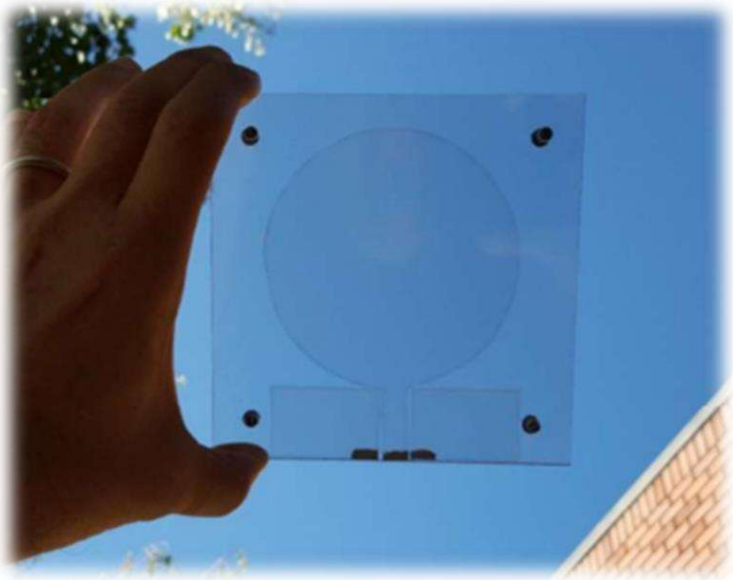
Enabling Outcomes

E2E efficiency | Interoperability | Lightweight

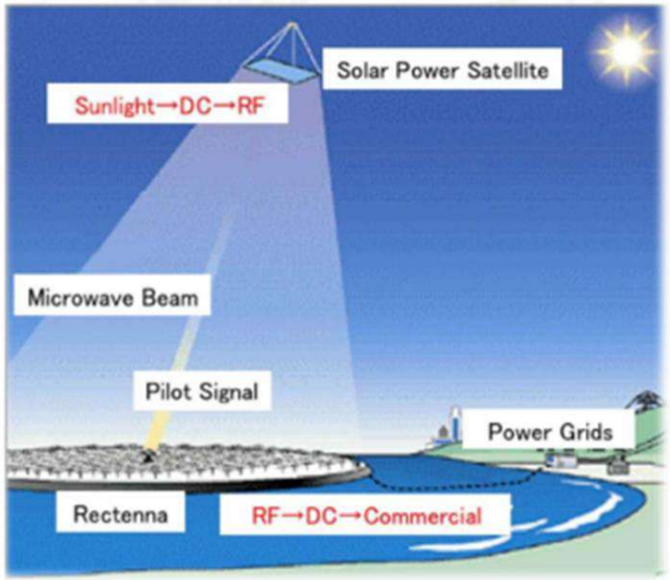
Proposals should incorporate considerations for sustainable space debris management

European Innovation Council

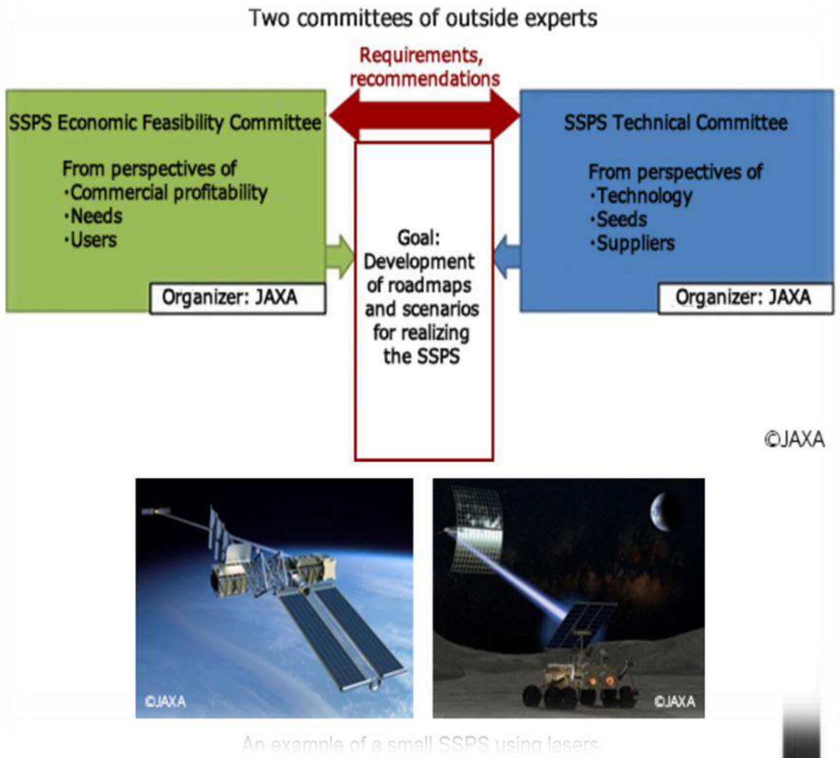
Category I CCT - Some Examples



Courtesy: NanoWeb Transperant Antennas

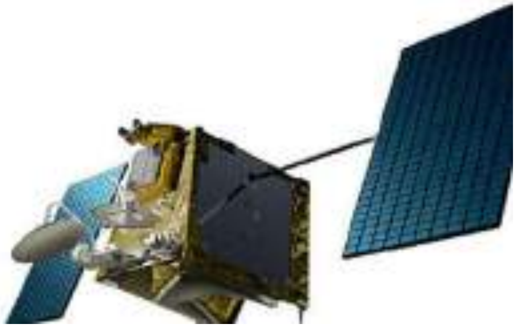


Courtesy: Sasaki, Tanaka, Maki



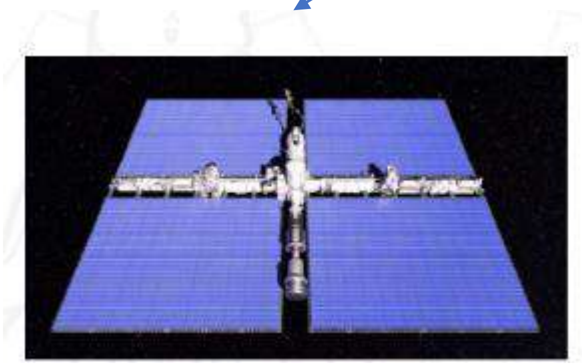
Courtesy: JAXA, inter-orbit energy transfer and planetary exploration mission concepts

Category I CCT - Real Examples



Courtesy: OneWeb

LEO orbit



Courtesy: ASU

Courtesy: Astrobotic WPT for lunar rover

Category II - In-space solar energy harvesting for innovative space applications

- In-space green propulsion for IOS, ISAM, ADR and EoL

In-space green propulsion

Solar Electric Propulsion
Solar sails
Water-based propulsion using electrolysis
Laser propulsion
Microwave propulsion

Reduced propellant → Reduced mass

Courtesy: NASA Pathfinder Technology Demonstrator-1 spacecraft, demonstrating a water-based propulsion system in low-Earth orbit.

European Innovation Council

EIC Space Portfolio Considerations - In-space solar energy harvesting for innovative space applications

- Category I - Collection, conversion and transmission (CCT)
- Category II - In-space green propulsion for IOS, ISAM, ADR and EoL

SPP1: Collection

SPP2: Conversion

SPP3: Wireless Power Transmission

SPP4: In-space green propulsion

Shared components or potential complementarities among projects

Expected outcomes and impacts

Expected outcomes

Design, development and laboratory validation of breakthrough concepts

- For energy harvesting in space, e.g., in-space utilisation of this energy for transportation and other related activities, in particular for cleaning space debris;
- Wireless power transmission of energy, e.g., through power grid, for energy beam pointing and control;
- Eco-friendly and innovative green propulsion solutions for in-space applications (e.g., spacecraft orbital corrections, in orbit satellite servicing, active debris removal, end-of life services, etc.)
- Innovative in-space robotic solutions for in-space manufacturing and assembly of space-based solar power units

Expected impacts

- **Research impacts** - mastering renewable solar energy supply for 365 days per year, developing in-orbit 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

EIC Space Portfolio aspects

In your proposal add a dedicated WP for ***portfolio activities*** with at least ***10 person months***

- Barriers to strategic autonomy/technology non-dependence
- Communicate key outcomes of research work
- Market analysis – initial stakeholders mapping
- Innovative space applications for in-space solar energy use (e.g. ISAM, ADR, EoL, etc.)
- Early commercialisation
- Access to research labs/test facilities
- Access to non-EU markets and customers
- IOD/IOV activities in case of TRL5/6

“Customer Driven” innovative space technologies and services (TRL6-9)

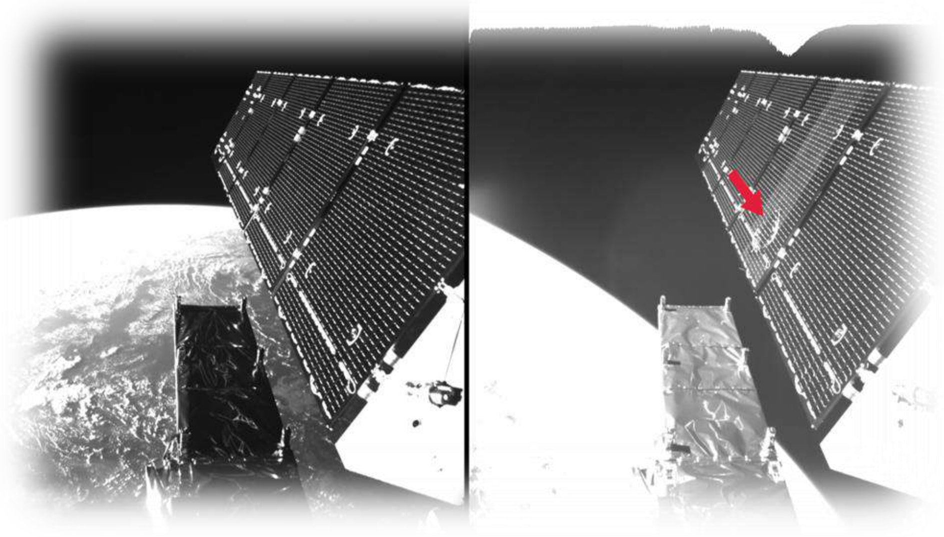
WP2023 Space Challenges

European Innovation Council

- **EIC Accelerator (TRL6-9)** - Customer-driven, innovative space technologies and services

Future market opportunities

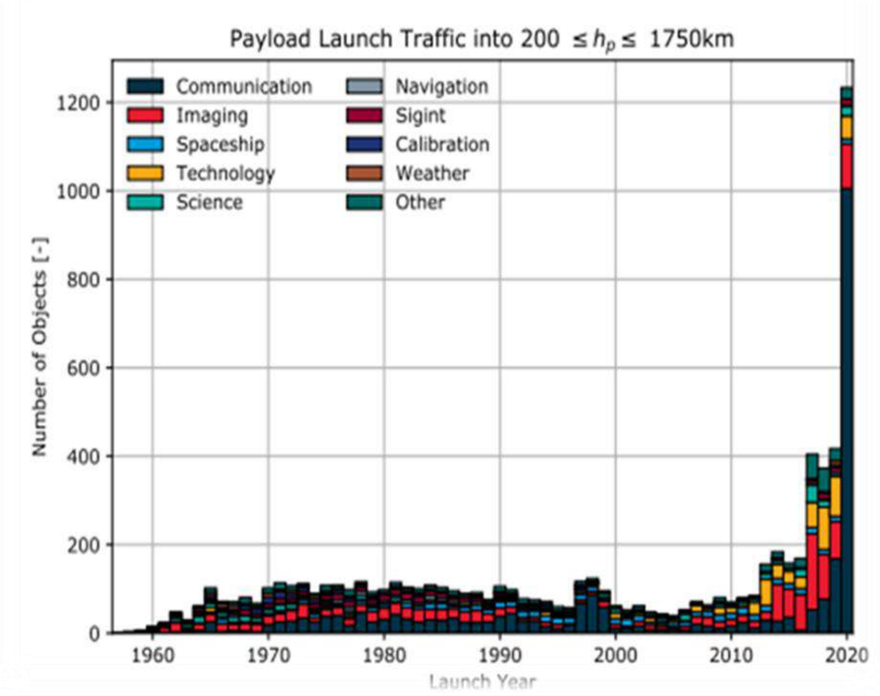
65M Euros



Courtesy: Copernicus - Sentinel 1, ESA

Background

- Increased satellite launches, up to around 5,465 operational satellites in May 2022 (Union Concerned Scientists)
- More than ***10 tonnes*** of space debris August 2022
- EU approach STM, ESA Zero Debris initiative, JAXA commercial removal of debris demonstration (CRD2)
- ASAT tests in Nov 2021 resulted in the creation of more than 1,500 debris reaching up the 1,100km orbits
- Increased ***need*** for collision avoidance capabilities, reliable space-based data and unified space traffic management
- Increased ***need*** for collection, recovering and transforming space debris



Courtesy: ESA

European Innovation Council

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

Rockets launched	6.250	(100%)
Rockets still in Space	1.990	(32%)
Satellites launched	13.630	(100%)
Satellites functioning	6.600	(48%)
Dead Satellites in Space	2.250	(17%)
Space objects mass	10.100 tonnes	
Frangmentation events	630+	
Debris tracked	32.070	
Debris >10 cm	36.500	
Debris 1 -10 cm	1 million	
Debris 0.1-1cm	130 millions	

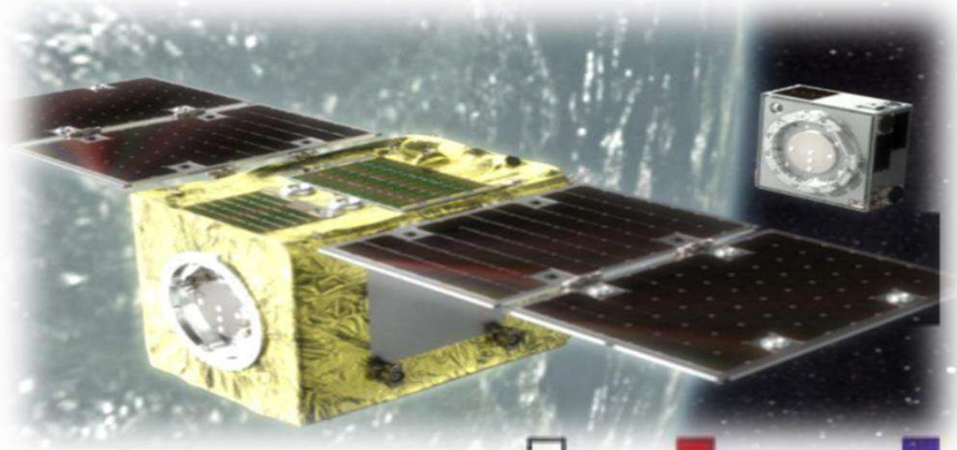
source ESA updated at August 2022

Courtesy: Slide prepared by Lorenzo Tarabini, E.T.Pack-F project coordinator - EIC Transition

Background- Part I

- ***MEV - 1*** and ***MEV- 2*** successful in orbit servicing missions, resulted into the creation of flight proven life extension services and emergence new IOS markets for GEO satellites
- ***ELSA- D*** magnetic capturing mission
- There is an emerging ***need*** for servicing GEO satellites
- Aging GEO/LEO satellites that need ***refueling***, ***repair*** or ***recycling***. Satellite owners to keep their current ***customers***
- ***Emergence*** of In Orbit Servicing, Active Debris Removal and End-of Life services technology demonstrations

Courtesy: MEV-1 Intelsat's IS-901 in GEO, Northrop Grumman's

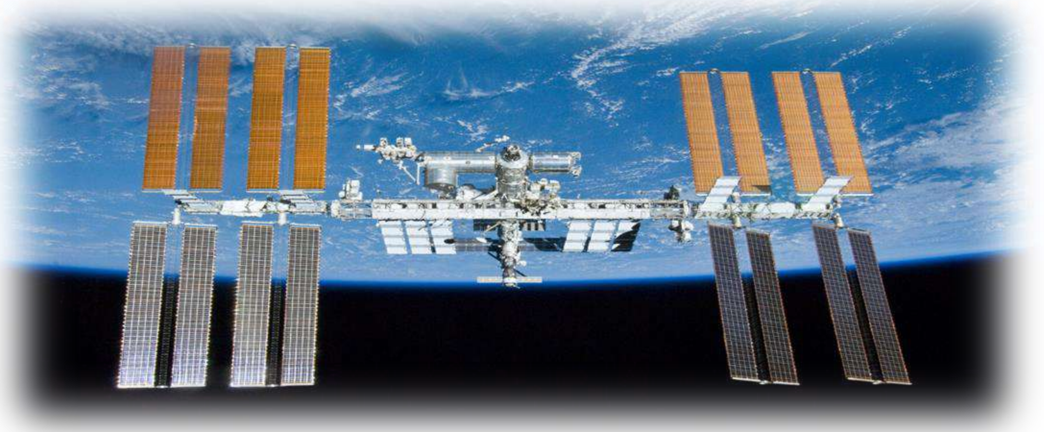


Courtesy: ELSA-D in LEO, Astroscale

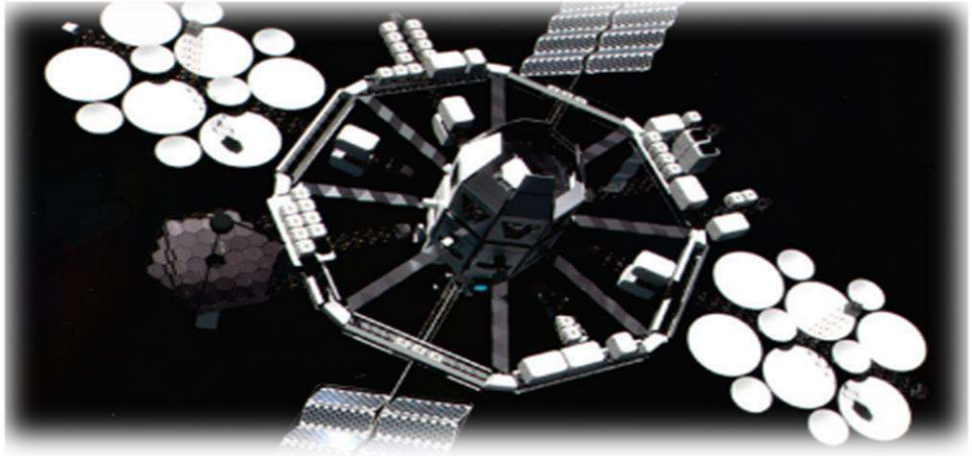
Background - Part II

European Innovation Council

- International Space Station expected retirement in 2030
- Commercial space stations- Axiom, Starlab, Orbital Reef
- Unmanned microgravity and robotic platforms – Outposts, Arkysis
- There will be a ***need*** for access to microgravity environment from European researchers and scientists



Courtesy: ESA



Courtesy: JAXA Robotic platform concept

Identified GAPs

European Innovation Council

- The **challenge** is that the **EU lacks user driven** in orbit servicing and **recycling satellite capabilities** and **unified space debris management services**
- Current satellites are built so that they **cannot be easily serviced nor recycled**
- **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 market is estimated to reach between 4.4 Billion USD (UK IOS strategy) and 6.2 Billion USD (NSR)
- Lack of user-driven, cost-effective and affordable commercial IOS, recycling and recovering capabilities and STM in Europe
- Increased competition from non-EU companies, potential loss of future customer and markets

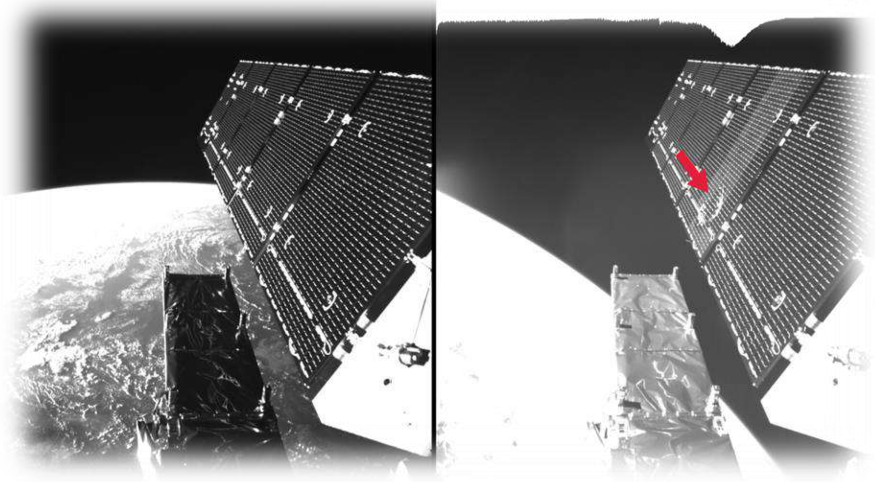
Accelerator (TRL6-9) - "Customer driven" innovative technologies and services

Goal

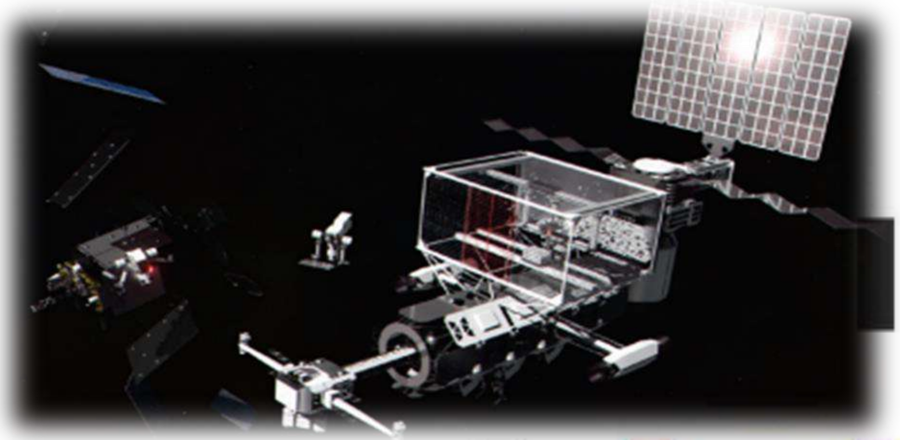
To encourage the emergence of **innovative**, **interoperable**, **scalable**, and **autonomous "customer-driven"** innovative space technologies

Scope/ specific objectives

- To inspect spacecraft in orbit, to augment satellite capabilities and resilience;
- To develop autonomous and in-space collision avoidance capabilities e.g., use of AI/ML for collision avoidance manoeuvres, space debris positioning data, etc. and develop in-space mobility propulsion capabilities;
- To collect space debris with a view for recycling, recovering and transforming purposes (e.g. microgravity platform).



Courtesy: Copernicus - Sentinel 1, ESA



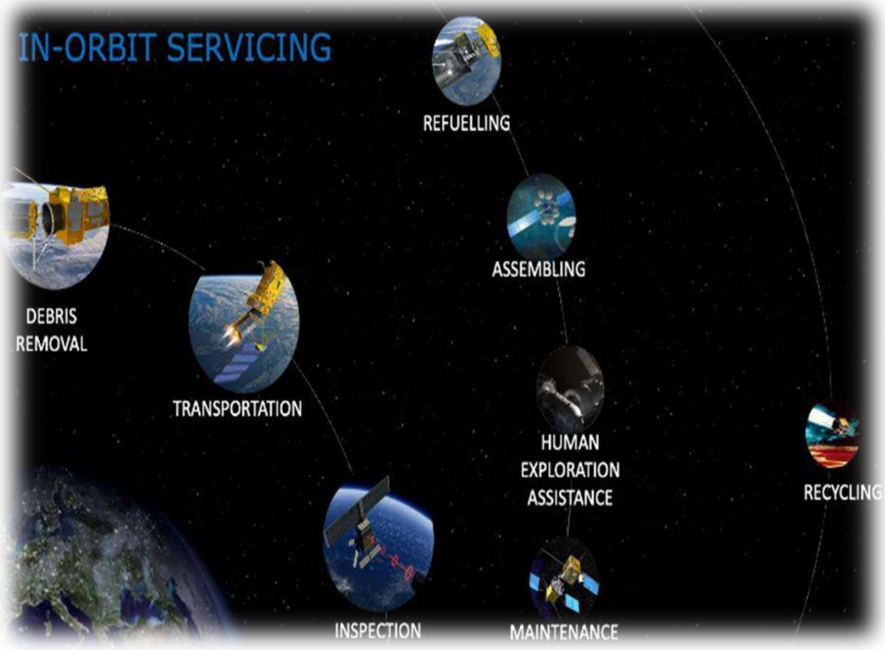
Courtesy: JAXA Recycling Plant concept image

Accelerator (TRL6-9) - "Customer driven" innovative technologies and services

European Innovation Council

Scope/ specific objectives

- To further mature self-assembly of spacecraft in orbit with different applications (e.g. in-orbit, cis-lunar exploration, Earth observation, space debris inspection, space situational awareness, etc.);
- To design and construct a R&I low Earth orbit unmanned platform assembled in orbit and to host in-orbit microgravity experiments or collect/re-use space debris considering and make use of a sustainable, modular concept for the platform and its operation;
- To scale up disruptive innovations for space situational awareness (SSA), in-space logistics, EO, navigation, SATCOM and others.



Courtesy: ESA

“Customer driven” innovative technologies and services

- Some examples of customer-driven = commercial or institutional end users

Spacecraft Inspection	Collision avoidance	Collect, recover and transform space debris
Tracking, locating & describing s/c,(distance & close inspection) Collection of information of s/c anomalies (e.g. antenna deployment anomalies) and p/l ones SSA data for SST and RPO operations, etc.	AI/ML for collision avoidance Space debris positioning data for RPO On-board processing capabilities for debris detection For IOS, ADR, EoL Unexpected s/c rescuing activities	Space debris collection Autonomous Robotic Servicers/Arms/Tools S/C or components recycling, recovering& transformation purposes(e.g. mg platforms) Space Welding

“Customer driven” innovative technologies and services

European Innovation Council

- Some examples – In Orbit Servicing (IOS), Active Debris Removal (ADR), End-of-Life (EoL) for cooperative and non-cooperative objects

In orbit servicing, Active debris removal, EoL	In-space Assembly & Manufacturing	Microgravity platforms
Augment s/c or external p/l capabilities & resilience Refuelling Orbit raising In-space docking P/L, antenna’s, components replacement or repair Robotic servicing with modular, interoperable or scalable parts Modular payloads Satellite upgrade	Self- sssembly with smallsats, cubesats, etc. GNC capabilities Modular satellites assembly Multi-material manufacturing Materials separation	Design & construct LEO unmanned robotic platform Self-assembled autonomous platform To host internal/external p/l To service smallsats or even cubesats To collect re-use space debris

Expected outcomes and impacts

Expected Outcomes

- EU servicing and re-use/recover capability for servicing EU space infrastructure, while contributing to the management and reduction of space debris;
- Timely and cost-effective in orbit satellite servicing (IOS), ADR, EOL and Space Traffic Management services
- Innovative propulsion solutions for in-space mobility of spacecraft
- Innovative technologies for space transportation, EO, navigation, SATCOM, space science, SSA

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 or recycling of components or propellant cost-savings for satellite owners, maturation of scientific and technological solutions for IOS and re-use/recycling of old satellites, "plug-play" satellite modules, 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 (IISS)*** industry will result in economic and market spillover effects.
- **Competitiveness impacts** - increased competitiveness of EU space industry for On Orbit Assembly and Manufacturing (OSAM)

European Innovation Council

EIC Future Space Portfolio for Accelerator projects

SP 1: Spacecraft Inspection

SP2: Collision avoidance

SP3: Collect, recover and re-use space debris

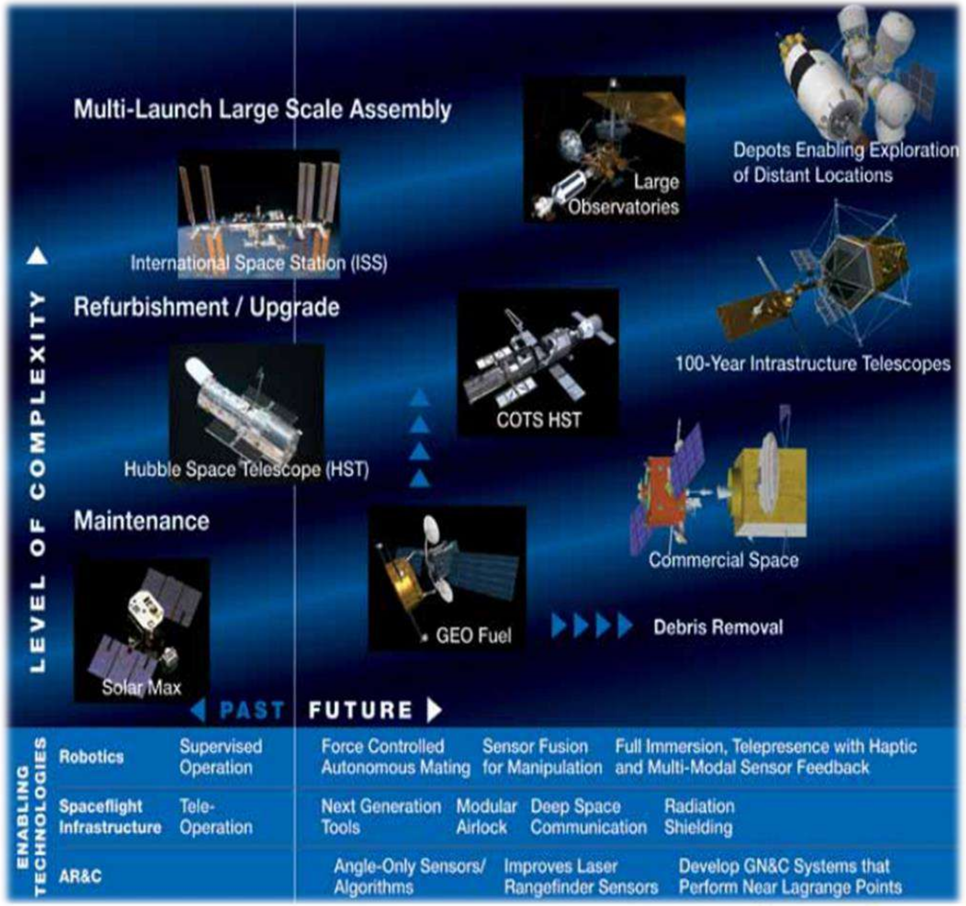
SP4: In orbit servicing, Active debris removal, EoL

SP5: In-space Assembly & Manufacturing

SP6: Microgravity platforms

EU Programmes Complementarity

- In-Orbit Demonstration and Validation initiative (IOD/IOV)
- Strategic Research and Innovation Agenda (SRIA) for EU Space R&I and contribute to the EU Future Space Ecosystem (FSE) Roadmap
- EU Approach to Space Traffic Management and EU SST Partnership activities

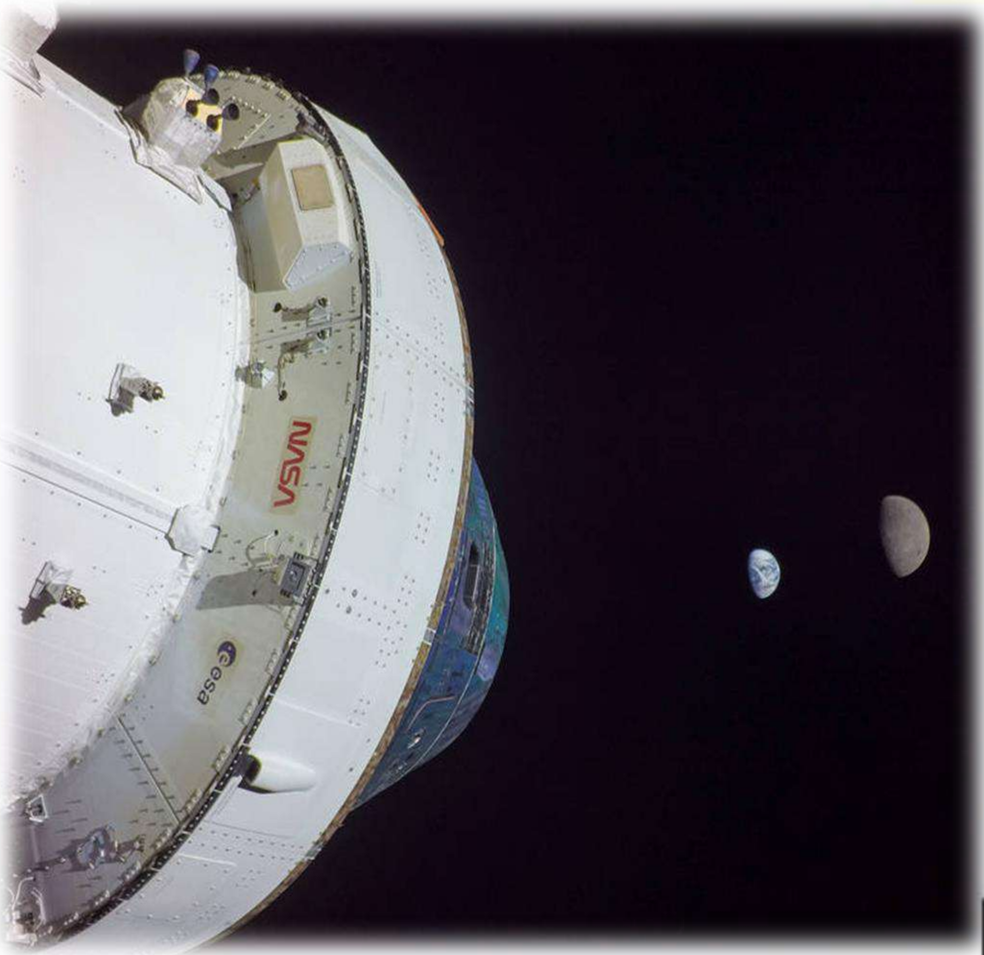


Courtesy: NASA On-Orbit Satellite Servicing Study

Conclusions

European Innovation Council

- **WP 2023 -** EIC 2023 work programme (europa.eu)
- **Info Space Days 26/01/2023 Pathfinder-** EIC Pathfinder Challenge: In-space solar energy harvesting for innovative space applications - Information day (europa.eu)
- **Portfolio Considerations** - Challenge Guide Space 2023_v2.pdf (europa.eu)
- **Info Space Days 26/01/2023 Accelerator -** EIC Accelerator space challenge - information day (europa.eu)
- **WP2023 Info Day** - European Innovation Council online Info Day - Work Programme 2023 - 13 December 2022 (europa.eu)
- **EIC Horizon scanning** for space signals for future EIC WP - EUSurvey - Survey (europa.eu)

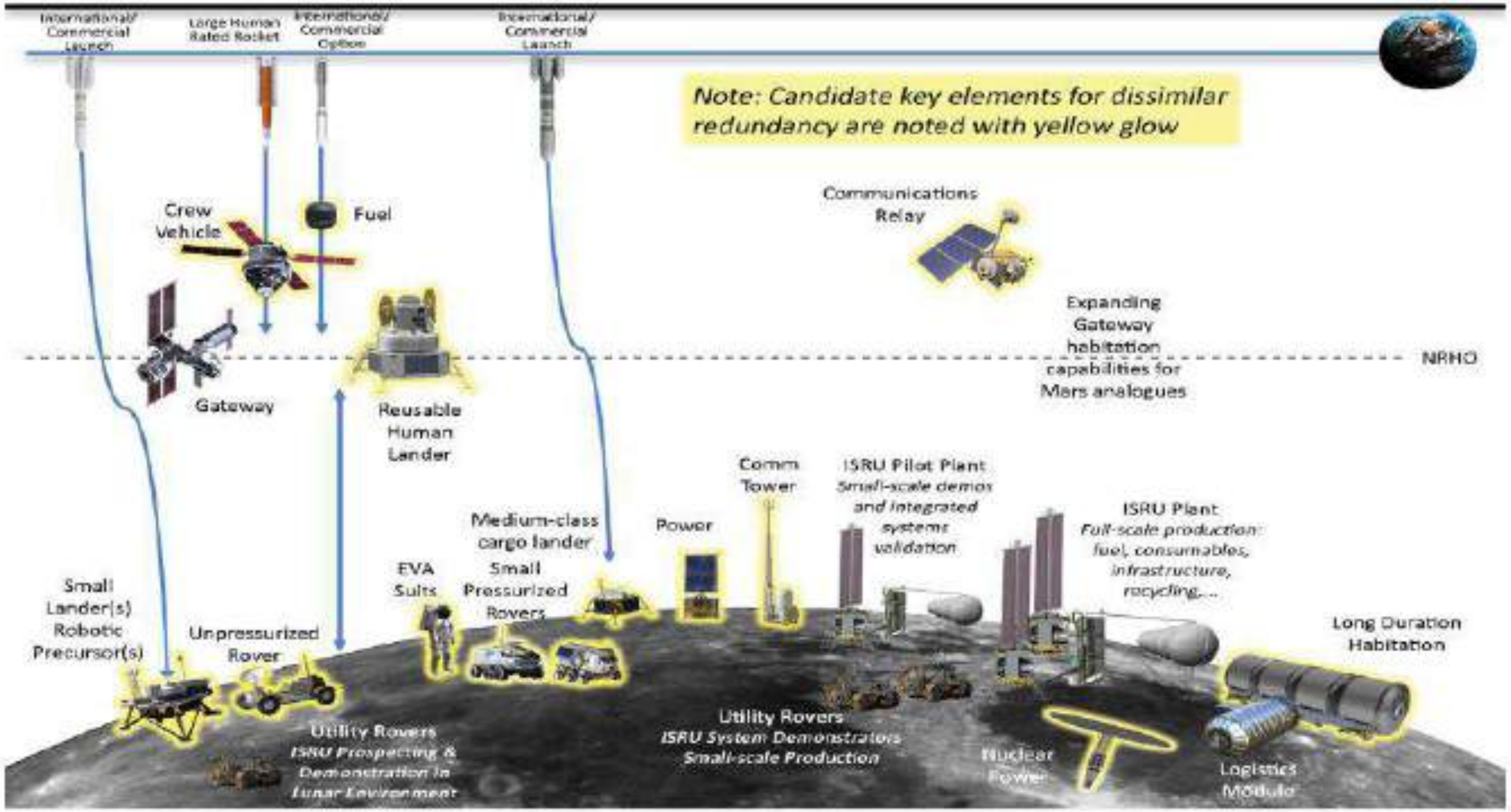


Courtesy: NASA Orion image taken the 28/11/2022, imagery of the Earth and Moon together from its distant lunar orbit, including this image on Nov. 28, 2022, taken from camera on one of the spacecraft's solar array wings.

Wrap-up

European Innovation Council

- Long term future



Courtesy: International Space Exploration Coordination Group, Global Exploration Roadmap

Thank you!
Q&A session