

Horizon Europe Work Programme 2023

European Commission – DG DEFIS
Innovation, Start-ups and Economics
Daniel NOELKE

Daniel.Noelke@ec.europa.eu

30 November 2022

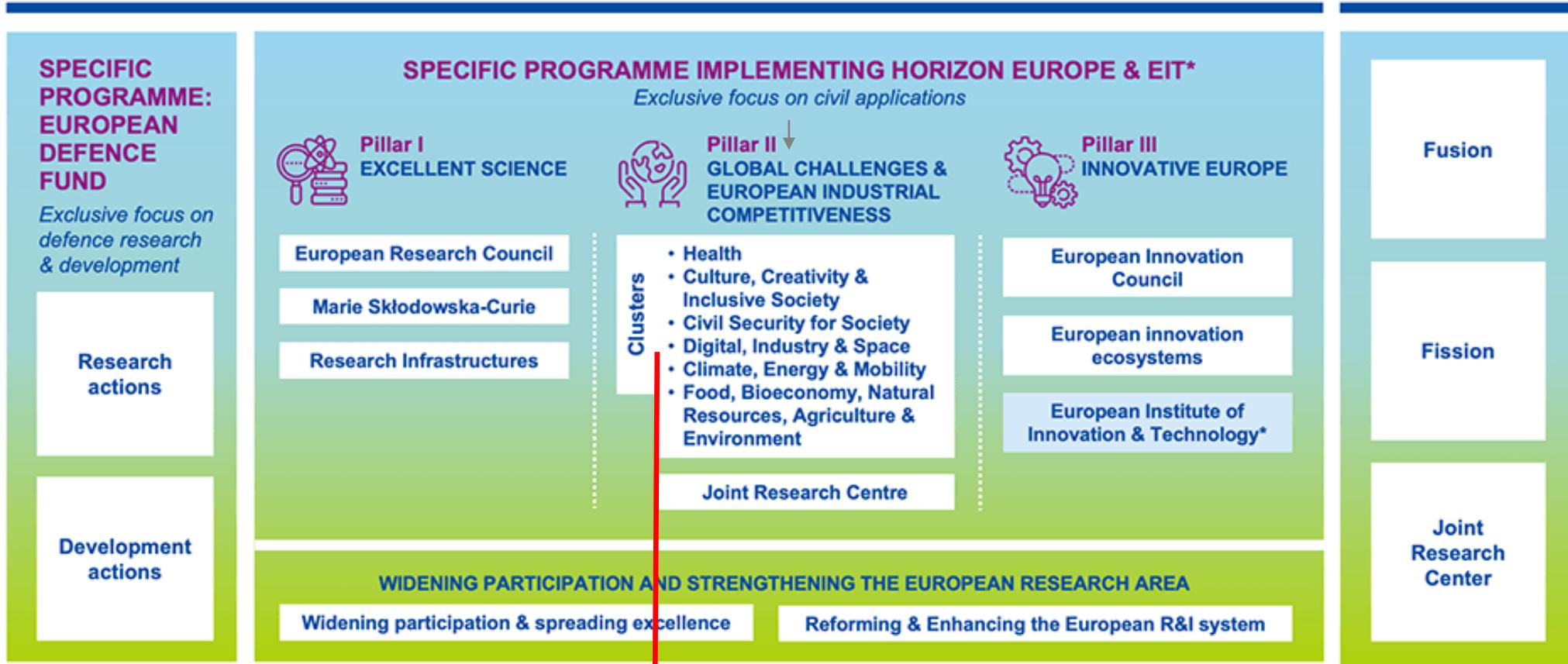


Horizon Europe,
a programme of the
European Union

Space under Horizon Europe

HORIZON EUROPE

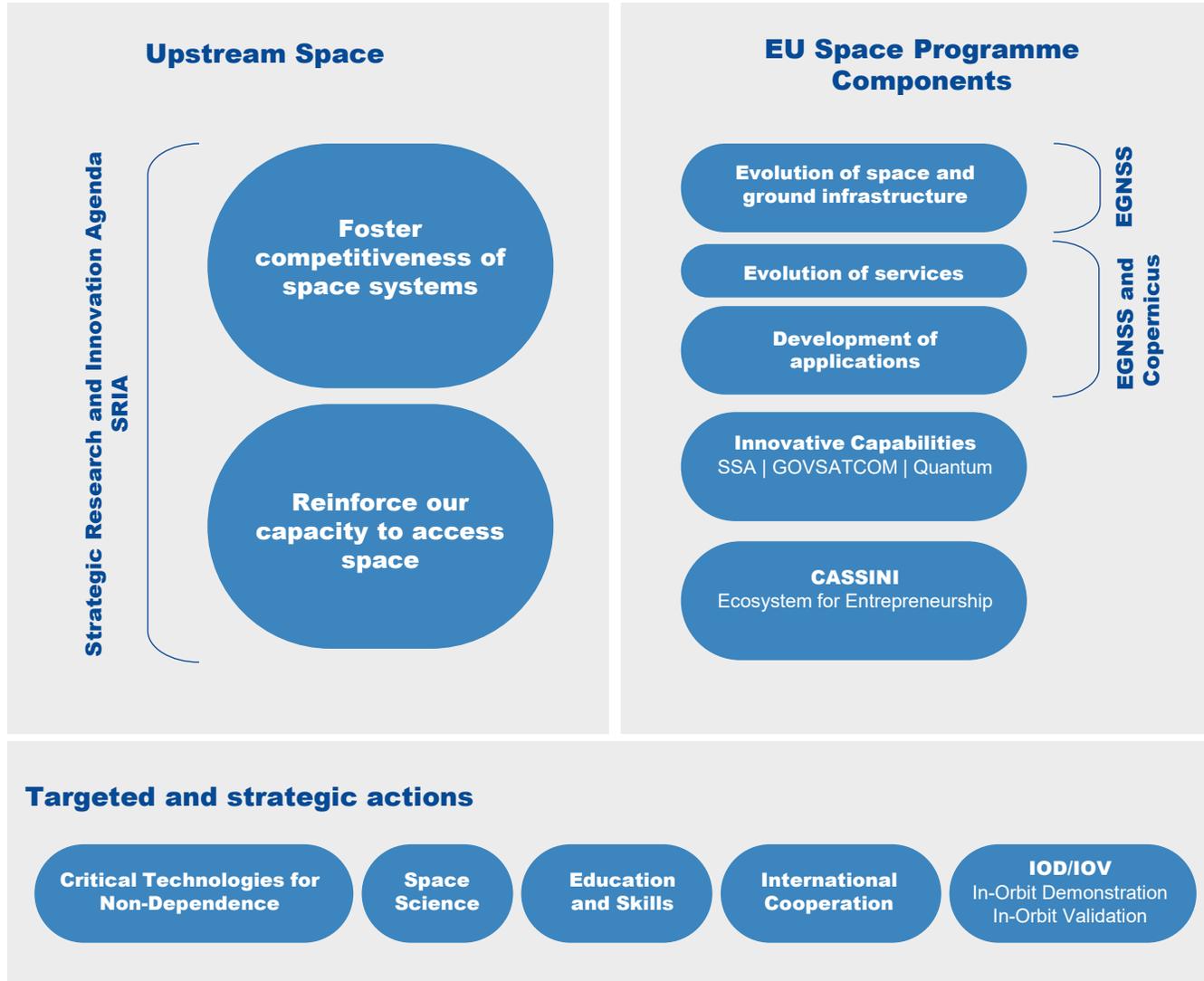
EURATOM



* The European Institute of Innovation & Technology (EIT) is not part of the Specific Programme

- 1) Manufacturing Technologies
- 2) Key Digital Technologies
- 3) Advanced Materials
- 4) Emerging Enabling Technologies
- 5) Artificial Intelligence and Robotics
- 6) Next Generation Internet
- 7) Advanced Computing and Big Data
- 8) Circular Industries
- 9) Low-carbon and Clean Industries
- 10) Space

EU-funded space R&I

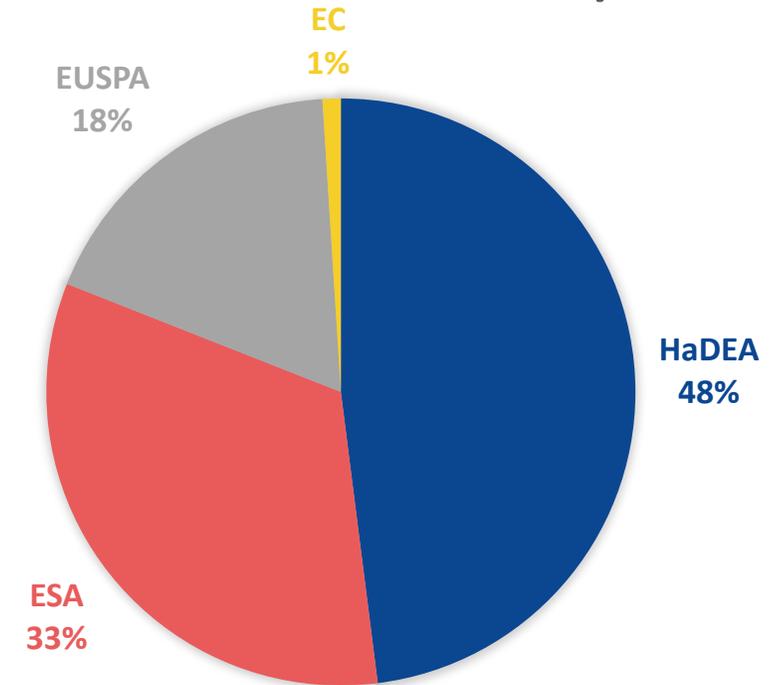


Horizon Europe, Pillar II, Cluster 4 - Space

2023: €290 million → 11 areas → 29 topics

1. Competitiveness	€28 million
2. Access to Space	€53 million
3. Evolution of EGNSS	€50 million
4. GOVSATCOM/Secure Connectivity	€38 million
5. Copernicus Services	€19 million
6. EGNSS & Copernicus applications + PRS uses + GOVSATCOM uses	€47 million
7. Quantum	€8 million
8. Space Entrepreneurship	€1 million
9. IOD/IOV	€15.1 million
10. Technological non-dependence	€20 million
11. Space Science	€10,7 million

IMPLEMENTATION % / €



1 - Competitiveness

- HORIZON-CL4-2023-SPACE-01-11: End-to-end Earth observation systems and associated services
- HORIZON-CL4-2023-SPACE-01-12: Future Space Ecosystem and Enabling Technologies
- HORIZON-CL4-2023-SPACE-01-13: CSA Future Space Ecosystem

1 - Competitiveness

- HORIZON-CL4-2023-SPACE-01-11: End-to-end Earth observation systems and associated services

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
10,10	1 to 2,50	5	IA	5/6	lump sum	No

Expected Outcomes:

- Achieve and maintain the worldwide leadership for Earth Observation system;
- A flexible and competitive end-to-end system demonstration;
- Short to medium term disruptive development and maturation of key technologies;
- Contribute to European non-dependence for the development of Earth-observation technologies and to the Green Deal.

Scope:

- **Earth observation technologies based on a network of small satellites** with innovative capabilities seizing the full innovation potential of low cost and/or disruptive and sustainable approaches;
- **Satellite Data Management and Processing** including image processing for end-to-end performance improvement and on infrastructures and networks for ground processing and virtual network functions;
- R&I to **identify, develop and implement AI in industrial processes means** fostering digitalisation for Earth observation including software validation and verification.

1 - Competitiveness

- HORIZON-CL4-2023-SPACE-01-12: Future Space Ecosystem and Enabling Technologies

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
15	0,50 – 2,50	7	RIA	(1) 4-6, (2) 3-5	Lump sum	No

Expected Outcomes

- A future space ecosystem, fostering the industrialisation and business in space;
- A sustainable, highly automated, flexible and economically viable space infrastructure, building on technologies and concepts for a circular economy in space such as plug-and-play spacecraft functionality
- New technologies and approaches for future space systems, application and services such as on-orbit services (OOS)
- Short to medium term disruptive development and maturation of key technologies.

Scope

- **Generic building blocks technologies for electric propulsion systems** considering paradigms relevant for industrialization;
- **Technologies and concepts with a clear application, pathway to applications and business sustainability in mind**, e.g., next generation of services, enabling technologies, or serial production and manufacturing concepts.

1 - Competitiveness

- HORIZON-CL4-2023-SPACE-01-13: CSA Future Space Ecosystem

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
2,00	~2,00	1	CSA	N/A	lump sum	No

Expected Outcomes

- Future Space Ecosystem roadmap focusing on in-space services, that take advantages of enabling technologies and of synergies between cluster 4 destinations and activities for the future space ecosystem maximising the market opportunities and benefits;
- Coherent principles, and guidelines and standards for On-Orbit Services supporting European actors implementing their business in this domain ensuring consideration of sustainability, safety and competitiveness.

Scope

- **Pathways to innovative and promising applications and services** taking into account new space approaches, enabling technologies as well as synergies with terrestrial sectors while making use of continuous market and trend analyses;
- **Pathways for quick maturation and space qualification** of game-changing/key technologies;
- Follow project(s) of other FSE calls to support decisions regarding programmatic and strategy questions and to verify the applicability of the existing principles and guidelines for future missions;
- **Contribute to international dialogue on recommendations for guidelines and standards for In-Space Services** based on the work done in the European Operations Framework (EOF) supporting the European Commission in policy and standards development;
- Targeted dissemination and outreach activities for FSE activities to showcase the paradigm shift and to facilitate support of European stakeholders, and to promote EU Space R&I activities in the future space ecosystem.

2 - Access to Space

- HORIZON-CL4-2023-SPACE-01-21: Low cost high thrust propulsion for European strategic space launchers - technologies maturation including ground system tests
- HORIZON-CL4-2023-SPACE-01-22: New space transportation solutions and services
- HORIZON-CL4-2023-SPACE-01-23: Modern, flexible and efficient European test, production and launch facilities

2 - Access to Space

- HORIZON-CL4-2023-SPACE-01-21: Low cost high thrust propulsion for European strategic space launchers - technologies maturation including ground system tests

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
20,00	~20,00	1	RIA	7	N/A	Yes

Expected outcomes:

- Contribution to the overarching objective of launch cost/price reduction by 50% by 2030 (with respect to A6/VegaC cost/price 2021 economic conditions).
- Innovation acceleration of enabling technologies.
- Selection of most promising technologies for cost-reduction possibilities for the current European launchers.

Scope: The propulsion systems represent a significant part of launch system costs. It is necessary to **mature new or optimised low cost effective, high performance** (high thrust to weight ratio, high specific impulse) and **green propulsion concepts, technologies and propellants for high thrust engines**. The activities should address:

1. **Maturation of enabling technologies, building blocks, tools and processes including maintenance/overhaul and safety**, up to TRL5/6 and subsystem tests including prototyping and integrated ground tests at subsystems level by 2025;
2. **Demonstration of the above technologies by subsystems and engine on-ground demonstration tests** by 2026 to reach TRL 7.

The matured technologies, building blocks, tools and processes should be applicable to strategic launchers able to launch EU Space Programme components, with the objective of enabling operational capacities by 2030 and preferably earlier.

2 - Access to Space

□ HORIZON-CL4-2023-SPACE-01-22: New space transportation solutions and services

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
23,10	4,00 – 10,00	4	RIA	5/6	N/A	Yes

Expected outcomes:

- Contribute to EU Green Deal objective through the reduction of the environmental impact of space transportation and to be prepared for the upcoming REACH regulations, especially with respect to the use of hydrazine and its derivatives, focusing on commercial market as a driver for business growth.
- Contribute to expand commercial space transportation offer and services with new space transportation solutions. The objective is to contribute to double the accessible new space transportation service market to European industry by 2030.
- Design and performance studies as well as business cases (demonstration of economical viability).

Scope: The **maturation of enabling new technologies and subsystems** (including common building blocks) in the field of green propulsion, micro launchers and associated launch facilities, kick stage, orbital propulsion and distancing, attitude and landing, re-entry solutions, smart satellite deployment systems/dispensers, for space transportation including also new routes up to Lunar orbit or surface. The maturation could go up to subsystem and system level technology demonstration and must include at least one of the following areas and linked technologies:

1. **Technologies for recovery of Space Transport vehicles elements**
2. **Space Transportation technologies in support to In-orbit servicing systems**

2 - Access to Space

□ HORIZON-CL4-2023-SPACE-01-23: Modern, flexible and efficient European test, production and launch facilities

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
10,00	2,00 to 5,00	3	RIA	5/7	N/A	Yes

Expected outcomes:

- Contribution to the overall objective of launch cost/price reduction by 50% by 2030 (with respect to A6/ Vega C cost/price 2021 economic conditions).
- Contribute to expand commercial space transportation offer and services with new space transportation solutions. The objective is to contribute to double the accessible new space transportation service market to European industry by 2030.
- Improve cost efficiency of European test, production and space launch facilities.
- Matured technologies, standardised technology for improving cost efficiency, interoperability of access to space ground facilities in Europe, ground assets portability to speed-up deployments.

Scope: Cost reduction and improving flexibility of European launch systems. The activities will address one or several of the following listed domains:

- a. Multi sites flexible industrial platform**
- b. Develop standardised and cost-effective innovative technologies** to improve cost efficiency of Test and Launch facilities, their interoperability and compatibility/attractiveness for new users.

3 – Evolution of EGNSS

- Other Actions: Mission and Services
- Other Actions: Technology and Infrastructure
- Other Actions: Operations and service provision

3 – Evolution of EGNSS

- Other Actions: Mission and Services

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
2023 – 2,5 2024 – 2,5	n/a	TBD	COM Public procurement	N/A	N/A	TBD on a case-by-case basis

- The objective is to **study potential new user needs**, as well as the resulting enhancement of services, and determine whether and **how the EGNSS programmes Galileo and EGNOS shall evolve** to answer these new user needs. This includes the preparation of contributions and technical analysis supporting the EU position in multilateral and bilateral working groups and meetings.
- The upstream R&D actions in **this area will cover the assessment of new mission concepts and of services improvements and of new services or capacities** to be introduced based on the user needs, developing the service concept including with international partners when relevant, assessing costs to the programme versus benefits to users and defining the roadmap of activities until an operational service could be provided.

3 – Evolution of EGNSS

- Other Actions: Technology and Infrastructure

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
2023 – 43 2024 - 43	n/a	TBD	Delegated to ESA	N/A	N/A	TBD on a case-by-case basis

- Actions under this area will address upstream R&D activities. They will cover the **maturing of the existing technologies and the development of new and emerging technologies** (e.g. Low Earth Orbit Positioning, Navigation and Timing EOPNT), the **engineering activities for the further evolution of Galileo and EGNOS existing systems, technical studies for the assessment of exploratory system concepts and/or responding to new mission needs and a changing environment, the development and maintenance of state-of-the-art system tools and technical test-beds, the implementation of actions agreed at Programme level to reduce the dependence of the supply chain on non-EU markets, the definition, design, development and implementation of experimental satellite demonstrator, and others.**

3 – Evolution of EGNSS

- Other Actions: Operations and service provision

Budget - € million		# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
2023 only – 5	n/a	TBD	Delegated to EUSPA	N/A	N/A	TBD on a case-by-case basis

- The improvement of the complex operations is essential to improve the performance of EGNSS services. Likewise, maintenance activities must be subject to a continuous improvement process to guarantee the service continuity. Actions under this area will cover the **development and use of service demonstrators to consolidate the future EGNSS services, the optimization of the operation schemes** using advanced dynamic strategies (e.g. machine learning, advanced on-board diagnosis, predictive maintenance) for Galileo constellation / system management for the efficient and continuous provision of the full portfolio of Services in EGNOS and in Galileo, and others.

4 – GOVSATCOM/Secure Connectivity

- Other Actions: GOVSATCOM/Secure Connectivity infrastructure
- Other Actions: GOVSATCOM/Secure Connectivity upstream R&D

4 – GOVSATCOM/Secure Connectivity

- Other Actions: GOVSATCOM/Secure Connectivity infrastructure: Development and Validation

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
2023 – 28 2024 – 20,6	tbd	TBD	Delegated to ESA	TBD	N/A	TBD on a case-by-case basis

- The Commission has adopted a proposal for a Union Programme for Secure Connectivity. The future satellite-based communication infrastructure should build upon the GOVSATCOM component of the EU Space Programme, which should also take advantage of additional national and European capacities, and develop further the European Quantum Communication Infrastructure (EuroQCI) initiative.
- This action should therefore enable and **support the development and validation actions for the construction of the initial space and ground infrastructure required for the provision of governmental services**. This includes the development and validation of the Quantum Key Distribution (QKD) payload for the EuroQCI 1st generation satellites based on EU technologies.

4 – GOVSATCOM/Secure Connectivity

- Other Actions: GOVSATCOM/Secure Connectivity upstream technology R&D activities

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
2023 only - 10		TBD	Delegated to ESA	TBD	N/A	TBD on a case-by-case basis

- A number of **key technology needs** have been identified in order to provide state of the art GOVSATCOM services, either through the GOVSATCOM pooling and sharing HUB or through a new secure connectivity infrastructure. These activities will be implemented by ESA under Contribution Agreement between the Commission and ESA.
- The upstream R&D actions in this area will cover **development of critical building blocks in the space segment, ground control and mission (network) segment and user segment terminals**, such as multi-orbit compatible broadband user terminals and government services user terminals.
- Proposals under this topic **should explore synergies and be complementary to already funded actions in the context of technology development at component level. In particular, the topics: Critical Space Technologies for European non-dependence (H2020 SPACE-10-TEC-2018-2020, COMPET-1-2014-2015-2016-2017, HorizonEurope 2021-SPACE-01-81, 2022-SPACE-01-81)**. Furthermore, activities must be complementary to national activities and activities funded by ESA, while contributing to EU non-dependence (at system, equipment and component level).

5 - Copernicus Services

- HORIZON-CL4-2023-SPACE-01-31: Copernicus for Atmosphere and Climate change, including CO2 monitoring
- HORIZON-CL4-2023-SPACE-01-32: Copernicus for Emergency Management
- HORIZON-CL4-2023-SPACE-01-33: Copernicus in-situ component
- HORIZON-CL4-2023-SPACE-01-34: Copernicus for Marine Environment Monitoring

5 - Copernicus Services

- HORIZON-CL4-2023-SPACE-01-31: Copernicus for Atmosphere and Climate change, including CO2 monitoring

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
8,60	2,00 to 3,00	3	RIA	5/6	Lump sum	No

Expected Outcomes:

- Enhanced quality and efficiency of the Copernicus Atmosphere Monitoring and Copernicus Climate Change services to respond to evolving policy and/or user requirements and to technological developments
- Continuation of the set-up of the new Copernicus service element for the monitoring of anthropogenic CO2 emissions
- Development of efficient and reliable product chains, new algorithms for data fusion, big data and analytics, use of new Sentinels and contributing missions

Scope (one focus per proposal):

- CAMS focus: **improve aerosol representation in CAMS operational global and regional systems**
- C3S focus: **develop innovative methodologies to characterise compound and cascading extreme weather events**, including determining the potential frequency, intensity and impacts of these events in a changing climate
- CO2MVS focus: **improve the requirements (accuracy, mass-conservation) for the numerical schemes** in the CO2MVS system

5 - Copernicus Services

- HORIZON-CL4-2023-SPACE-01-32: Copernicus for Emergency Management

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
3,00	~3,00	1	RIA	6	Lump sum	No

Expected Outcomes, at least three of the following:

- Automated characterisation of building height and building use through integration of different sensor types and/or open source non-EO data.
- Integration of new EO satellite data for early warning and active global fire detection and monitoring.
- Integration of high and very-high spatial resolution data and sensors for continuous multi-scale mapping and assessment of fuel structure and condition at pan-European level.
- Improvements of the hydrologic process representation in the continental and/or global scale hydrologic model of the flood and drought early warning component, including hydrological predictions for the flood.
- Methods for addressing limitations of Synthetic Aperture radar (SAR) based flood monitoring in specific scenarios and/or adverse meteorological conditions.
- Enhanced seamless sub-seasonal to seasonal predictions of severe-to-extreme hydrometeo events as droughts and associated multi-sectoral impacts.
- Optimised integration of different data sources and indexes characterising extreme meteorological events and related hazards, droughts.
- Integration of UAV along the full value-added chain in the emergency response.

Scope: Innovative methods and technologies for emergency related applications addressing the needs of the Copernicus Emergency Management Service. Service evolution should be addressed by considering: **enhancement of an existing element or component; new elements or components to the existing (core) service; new services complementing the core services and providing added functionality as required by users** (e.g. in a national or regional context).

5 - Copernicus Services

- HORIZON-CL4-2023-SPACE-01-33: Copernicus in-situ component

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
2,00	~2,00	1	RIA	5/6	Lump sum	No

Expected outcomes, two or more of the following:

- Optimal use of early observations: past observing methods, error analysis, quality control and bias adjustment
- Better use of Copernicus relevant observations and auxiliary data collected during R&I projects
- Enhanced availability and quality of in situ data critical for Copernicus products and data services
- Appropriate consideration of Copernicus Services' cross-cutting challenges and R&I priorities

Scope:

- 1. Facilitation and demonstration of efficient, methodologically sound and sustainable reuse of in situ data** collected during field campaigns and experiments for validation of Copernicus data and information services.
- 2. Development of innovative observation strategies and concepts** to improve the observational capacity in selected data sparse areas. In the marine context, the gathering and qualification of acoustic observations to characterize marine ecosystems (e.g., micronekton) is an identified priority;
- 3. Synergistic use of complementary types of surface observations;**
- 4. Application of machine learning technologies for the quality control** of historic and real-time meteorological and hydrological in-situ observations.

5 - Copernicus Services

- HORIZON-CL4-2023-SPACE-01-34: Copernicus for Marine Environment Monitoring

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
5,00	~5,00	1	RIA	5/6	Lump sum	No

Expected Outcomes:

- Improved quality and efficiency of CMEMS to service policies, the Mission “restore our oceans” and the UN decade of ocean science
- Development of new innovative products tackling more volumes of data for the continuity of the service
- Development of new algorithms preparing the use of new types of missions (new sentinels, contributing missions) for enhanced continuity of the service in coastal areas

Scope:

- **Services to address the coastal zones for policy implementation**, conservation, resilience to climate change and sustainable blue economy
- **Implement advanced and seamless monitoring and forecasting from regional to coastal scale** high resolution and high temporal dynamics to constrain coastal applications and models at national to local scale
- **Develop pan European satellite coastal observation products at high resolution** and improve access and processing of including in-situ data
- **Develop improved inputs of freshwater flows** (incl. BGC) and methods to couple hydrological models with CMEMS and coastal models
- **Develop coupling techniques between CMEMS and downstream coastal modelling systems**, including impact assessment on key coastal applications and policies

6 – EGNSS & Copernicus applications + PRS uses + GOVSATCOM uses

- HORIZON-EUSPA-2023-SPACE-01-41: Transition toward a green, smart and more secure post-pandemic society
- HORIZON-EUSPA-2023-SPACE-01-42: Closing the gaps in mature, regulated and long lead markets
- HORIZON-EUSPA-2023-SPACE-01-43: Copernicus-based applications for businesses and policy makers
- HORIZON-EUSPA-2023-SPACE-01-46: Designing space-based downstream applications with international partners
- HORIZON-EUSPA-2023-SPACE-01-44: The Galileo PRS Service for governmental-authorized use cases
- HORIZON-EUSPA-2023-SPACE-01-45: Joint test activities for PRS
- HORIZON-EUSPA-2023-SPACE-01-61 - EU GOVSATCOM for a safer and more secure EU

6 – EGNSS & Copernicus applications + PRS uses + GOVSATCOM uses

- HORIZON-EUSPA-2023-SPACE-01-41: Transition toward a green, smart and more secure post-pandemic society

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
3,5	1,5 to 2,5	2	Delegated to EUSPA - IA	7/9	N/A	No

Expected outcomes:

- Stimulate the development, validation and use of commercial downstream solutions based on synergies between the different space programme components Galileo, including its differentiators, EGNOS, Copernicus (if relevant), combined with connectivity/5G and SATCOM and cutting-edge digital technology;
- Foster the development and validation of integrated synergistic space technologies that improve the quality of life in Europe, toward environmentally-friendly and energetically-efficient communities;
- Exploit the increasing digitalisation paradigm and the adaptation of business processes in the post-pandemic environment to create new space-based commercial opportunities improving the prospects of businesses and the life of citizens.

Scope:

- 1. Development of downstream commercial applications**, which foster the creation of cities built around its citizens, developed on efficient mobility solutions, environmentally-friendly and energetically-efficient.
- 2. Development of downstream solutions based on Galileo, EGNOS and Copernicus (if relevant), combined with connectivity/5G and SATCOM and cutting-edge digital technology** to enable more efficient and resilient solutions.

6 – EGNSS & Copernicus applications + PRS uses + GOVSATCOM uses

- HORIZON-EUSPA-2023-SPACE-01-42: Closing the gaps in mature, regulated and long lead markets

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
8	1,5 to 2,5	4	Delegated to EUSPA - IA	7/9	Lump sum	No

Expected outcomes:

- **Broaden the reach of EGNSS**, by supporting its adoption in mature, regulated long lead markets, including rail, maritime inland waterways, fisheries and aquaculture, road and automotive, aviation;
- **Development of industry-accepted certification and standardization schemes that exploit the use of EGNSS** and its differentiators for operational services.

Scope:

1. **Closing the related standardization and certification gaps for rail safety critical applications.**
2. **EGNSS-supported safe and efficient operations in coastal areas**, harbour areas and other maritime areas (including for energy production e.g. off-shore wind farms), inland waterways, fisheries and aquaculture.
3. Addressing **potential standardization and certification bottlenecks for the use of EGNSS for road and automotive market** safety-related applications.
4. **Applications for the aviation market** that require further consolidation.

6 – EGNSS & Copernicus applications + PRS uses + GOVSATCOM uses

- HORIZON-EUSPA-2023-SPACE-01-43: Copernicus-based applications for businesses and policy makers

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
7	1 to 2	5	Delegated to EUSPA - RIA	2	Lump sum	No

Expected outcomes:

- **Enhance existing applications or develop new applications** and products relying on Copernicus data and services, making impact on users, businesses and/or answering needs from public authorities, e.g. support policy making and implementation such as for the Green Deal or Destination Earth or the Horizon Europe missions.
- **Contribute to increasing the integration and uptake of Copernicus data, services and applications in the European economy**, in particular the European data economy.

Scope: Projects should address only one area that should be clearly indicated

1. Applications downstream of the Copernicus Emergency service
2. Applications downstream of the Copernicus Security service
3. Applications downstream of the Marine service
4. Applications downstream of the Copernicus Land service
5. Applications downstream of the Copernicus Climate Change Service
6. Applications downstream of the Copernicus Atmosphere Monitoring Service

6 – EGNSS & Copernicus applications + PRS uses + GOVSATCOM uses

- HORIZON-EUSPA-2023-SPACE-01-44: The Galileo PRS Service for governmental-authorized use cases

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
9	1 to 2	5	Delegated to EUSPA - IA	5/7	Lump sum	Yes

Expected outcomes:

- **Develop the use cases for authorised civilian users** based on the added value of PRS service;
- **Develop the PRS applications** targeting civilian users by leveraging PRS technology;
- Build on top of previous exploratory activities and lessons learnt on the development of PRS items by stimulating the corresponding downstream PRS uptake;
- **Foster a European-level cooperation** of industrial entities for the development of authorised PRS applications;

Scope: Proposals should **identify, design and create applications leveraging the items for the first generation of Galileo.** Applications should address the **governmentally authorised user communities and scenarios for which the technical, operational and security related features requirements of PRS Service** constitute barriers to entry.

6 – EGNSS & Copernicus applications + PRS uses + GOVSATCOM uses

- HORIZON-EUSPA-2023-SPACE-01-45: Joint test activities for Galileo PRS services

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
3	1,5 to 3	2	Delegated to EUSPA - IA	6/7	Lump sum	Yes

Expected outcomes:

- Support the Programme activities related to the validation of the PRS Service, Support the PRS Participants defined activities related to testing, validation and introduction of the PRS Service;
- Build on top of previous Joint Test Activities and lesson learnt thereof;
- Foster cooperation among European PRS Participants.

Scope:

1. Proposals shall be coordinated by the Competent PRS Authorities and should address actions related to the 1) **validation and verification PRS Service** (support to the Galileo Programme); 2) **testing of PRS Service and PRS items** (PRS Participants actions); and 3) **preparation of the awareness activities and uptake to the authorised users**.
2. The proposed activities shall be carried out in full compliance with applicable regulatory framework (e.g. Decision 1104/2011, PRS regulatory framework).

6 – EGNSS & Copernicus applications + PRS uses + GOVSATCOM uses

- HORIZON-EUSPA-2023-SPACE-01-46: Designing space-based downstream applications with international partners

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
6	0,8 to 1	7	Delegated to EUSPA - RIA	3/4	Lump sum	Yes

Expected outcomes:

- The **use of EGNSS and sharing of expertise with public and/or private entities** to introduce EU space-based applications/solutions, leveraging their innovative, unique features, in particular Galileo differentiators and European know-how.
- The **use of Copernicus data**, to develop jointly algorithms, services and/or products.
- The **combined use of EGNSS and Copernicus** to develop innovative downstream applications.

Scope: **Proposals should target one or more of the three expected outcomes.** Proposal can also include the use of other space-based or non-spaced based assets and services, with a preference given to those based in the EU and in the international cooperation partners countries applying to this topic.

Legal entities established in countries that have signed an administrative cooperation arrangement on Copernicus data access and Earth observation data exchange are exceptionally eligible for Union funding.

6 – EGNSS & Copernicus applications + PRS uses + GOVSATCOM uses

- HORIZON-EUSPA-2023-SPACE-01-61 - EU GOVSATCOM for a safer and more secure EU

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
10	3 to 4	3	Delegated to EUSPA - IA	7/9	N/A	Yes

Expected outcomes:

- Identification, assessment and development of one or more suitable use case in the area of surveillance, crisis management and key infrastructure;
- After identification of technical specifications agreed with the contracting authority, support the development and/or improvement of GOVSATCOM demonstration terminals;
- Stimulate the definition of the validation strategy of the early developed GOVSATCOM services;
- Foster the identification/definition of GOVSATCOM tools required for the development of the GOVSATCOM terminals.
- Develop the application necessary to enable end-to-end demonstration of the selected use case(s);
- Perform extensive in-field activities and a final demonstration aimed at verifying the suitability of the solution,
- Elaborate the definition of the validation strategy and a user engagement plan and gather users' feedback.

Scope:

- **Proposals should select at least one GOVSATCOM use case and support the adaptation of one or more existing SATCOM terminals** in order to carry out the demonstration and ensure engagement of relevant user communities

7 - Quantum

- HORIZON-CL4-2023-SPACE-01-62: Quantum Communication Technologies for space systems
- HORIZON-CL4-2023-SPACE-01-63: Quantum Space Gravimetry Phase-A Study

7 - Quantum

- HORIZON-CL4-2023-SPACE-01-62: Quantum Communication Technologies for space systems

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
5,00	2,00 to 2,50	2	RIA	5/6	Lump sum	Yes

Expected outcomes:

- Support the EU space policy and the EU initiative to establish the Union Secure Connectivity Programme and foster the development of ultra-secure EU services based on or using space systems
- Ensure the EU sovereignty and non-dependence for the development of capacities leading to the availability of ultra-secure services based on Quantum Key Distribution (QKD).
- Enhance the TRL of the critical components necessary to build QKD space systems and foster the development of the associated QKD standards.

Scope: The **development of the critical components and technologies necessary to build a space quantum key distribution system**. The topic covers all the critical hardware and software components necessary for the quantum key distribution function to be implemented via a satellite payload, as well as the corresponding optical ground station. In addition, proposals should address the issue of standardisation for QKD space systems.

7 - Quantum

- HORIZON-CL4-2023-SPACE-01-63: Quantum Space Gravimetry Phase-A Study

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
3	1,00 to 1,50	2	RIA	3	Lump sum	Yes

Expected outcomes:

- Support the EU space policy and the EU Green Deal by assessing the feasibility of a quantum space gravimetry pathfinder mission
- Propose a mission, system and operation concept for the Quantum Space Gravimetry pathfinder mission
- Establish the list of critical components for a Quantum Space Gravimetry mission

These outcomes will contribute to securing the EU autonomy of supply for critical technologies and equipment, and foster the EU's space sector competitiveness, in line with the Expected Impact of the destination.

Scope: The final objective of this call is the **selection of a Quantum Space Gravimetry pathfinder mission**. To achieve this objective, **two phase-A proposals for a feasibility study**, as specified in ECSS-M-ST-10C, will be selected.

The scope of this topic covers in particular the system and operations concept of the pathfinder mission leading to a technical solution deployable before the end of the decade. A particular attention will be drawn on the analysis of the critical technologies and components necessary to deploy this mission, and proposals shall address the technological maturation necessary to meet this objective, based on EU solutions.

8 – Space Entrepreneurship

- Support to New Space - CASSINI Business Accelerator
- Support to New Space - CASSINI Hackathons & Mentoring
- Support to New Space - CASSINI myEUspace

8 – Space Entrepreneurship

- Other Actions: CASSINI myEUSpace – OPEN FOR APPLICATION

Expected Outcomes:

- To enhance the spur-of-the-moment **development of innovative commercial solutions based on data and information coming from Copernicus satellite images and Galileo positioning signals and services**, with a view to:
 - Incentivize new ideas;
 - Develop prototypes further into viable business propositions;
 - Support commercialization and scale up of final products;
- Addressing specific EU priorities (e.g. EU green deal, digitisation, resilience, etc.);
- To stimulate innovation and maximize innovative applications with commercial and social benefits, impact and a clear market uptake endeavor;
- To explore synergies and integration of space data with other non-space, deep technologies (e.g. AI, extended reality, quantum, metaverse).

Cut-off dates:

- 30/11 cut-off for submission of ideas → **15 ideas awarded**
- 10/02 submission of prototype → **10 best prototypes awarded**
- 25/04: submission of product → **5 best products awarded**

Delegated to EUSPA for implementation

8 – Space Entrepreneurship

- Other Actions: CASSINI Business Accelerator

Expected Outcomes:

- The aims are to **promote commercial use cases for the EU's space programme and the commercialisation** of the products of New Space companies, by providing qualified business development support. The objective is to increase the number of space-based companies that achieve high revenue growth. This will allow the companies to attract investments and capture new market shares.
- The expected economic benefits include an increase in the number of successful start-ups and scale-ups using space data and space technology, through an increase in sales, market share growth and staff hiring. These outcomes will allow the companies to attract larger amounts of financing through bank loans and equity investments.

Delegated to EUSPA for implementation

8 – Space Entrepreneurship

- Other Actions: CASSINI Hackathons & Mentoring

Expected Outcomes:

- To solve important problems for society & industry with a purpose
- To foster the next generation of space entrepreneurs
- To stimulate the spur-of-the-moment development of innovative applications based on data and information coming from Copernicus satellite images and EGNOS and Galileo positioning signals and services.
- To give people hands-on experience with EU space data and signals
- To promote the EU's space programmes Copernicus and EGNOS/Galileo to a broader audience.

Delegated to EUSPA for implementation

9 – IOD/IOV Service

Expected outcomes:

- To contribute to reduce the time to market or operational use of new technologies, products, concepts, architectures, and operations techniques;
- To provide a cost-effective service for regular aggregation (if needed), launch and operations in orbit for IOD/IOV experiments, based on EU solutions both for the spacecraft and for the launch services;
- To have at least one opportunity every year during the Horizon Europe implementation period.

Scope:

- **The IOD/IOV activities intend to provide a regular and cost-effective service** and solution for common flight ticket actions (management, spacecraft design including reuse of existing solutions, assembly, integration and tests, launch and operations) based on EU solutions both for the spacecraft (i.e. platform, experiments aggregation, operations in orbit including preparation and associated Ground Segment) and for the launch services.
- **The scope of the activities may include mission design, integration and implementation, for all the necessary tasks to prepare, provide and operate spacecraft(s), together with the related ground segment, which accommodates the selected IOD/IOV experiments as well as the associated launch services.**
- Concerning launch aspects, IOD/IOV activities should support the European launcher exploitation policy, therefore relying as far as possible on EU manufactured launcher solutions launched from the EU territory.

Implementation of all procurement activities is entrusted to ESA on behalf of the European Commission

10 – Technological non-dependence

□ HORIZON-CL4-2023-SPACE-01-72: Space technologies for European non-dependence and competitiveness

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
20,00	2,00 o 3,00	7	RIA	4/8	Lump sum	Yes

Expected outcomes:

- Reduce the dependence on critical space technologies and capabilities from outside EU for the EU space programme components (i.e. Galileo/EGNOS, Copernicus, Govsatcom and SSA) and other space applications;
- Develop or regain in the mid-term the European capacity to operate independently in space;
- Enhance the technical capabilities and overall competitiveness of European space industry vendors on the worldwide market;
- Open new competition opportunities for European manufacturers by reducing dependency on export restricted technologies that are of strategic importance to future European space efforts;
- Improve the overall European space technology landscape and complement and/or create synergy with activities of European and national programmes either in the space or non-space fields.

10 – Technological non-dependence

□ HORIZON-CL4-2023-SPACE-01-72: Space technologies for European non-dependence and competitiveness

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
20,00	2,00 o 3,00	7	RIA	4/8	Lump sum	Yes

Technologies:

- High speed DAC-ADC
- Space qualified carbon fibre pre-impregnated material sources
- Enhanced performance and space qualified detectors – IR range
- Mid-power range electric propulsion thruster technology: Qualification of electrical propulsion thrusters and PPU for power ranges up to 5kW
- Mid-power range electric propulsion thruster technology: Development of new generation of thrusters based on non-dependent propellants (i.e. not Xe or Kr)
- Replacement solutions for metallic lead (Pb)
- High performance, cost effective multi - junction solar cells for space applications

10 – Technological non-dependence

□ HORIZON-CL4-2023-SPACE-01-72: Space technologies for European non-dependence and competitiveness

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
20,00	2,00 o 3,00	7	RIA	4/8	Lump sum	Yes

- This WP topic has a higher level of requirements. Already in the proposal, applicants are asked to:
 - Describe the technologies and/or technology processes to be used and show that they are free of any non-EU legal export restrictions or limitations, such as those established in the International Traffic in Arms Regulations (ITAR), Export Administration regulation (EAR) such as EAR99 or equivalent instruments applicable in other jurisdictions;
 - Set up a suitable technology development process aiming at avoiding export restrictions of non-EU states and assess vulnerabilities of the supply chain.
- As per WP 2023, companies that have a multinational nature will be requested to provide guarantee of absence of foreign control through the OCA procedure.
- Legal obligation
- For a period of up to 4 years after the end of the project, access rights to the use of products and/or processes generated by the project shall be given to European entities, in compliance with the signed Grant Agreement and with no legal restrictions and limitations stemming from International Traffic in Arms Regulations (ITAR), EAR99 or equivalent instruments applicable in other jurisdictions.

11 - Space Science

□ HORIZON-CL4-2023-SPACE-01-71: Scientific exploitation of space data

Budget - € million	Per project - € million	# of projects	Type of action	TRL by end of project	Financial set-up	Country restriction
10,70	1,00 to 1,50	8	RIA	3/4	N/A	No

Expected outcomes:

- Support the data exploitation of European missions and instruments, in conjunction, when relevant, with international missions.
- A higher number of scientific publications based on Europe's space data, high-level data products made available through appropriate archives, and tools and methods developed for the advanced processing of data. Projects are also expected to add value to existing activities on European and international levels, and to enhance and broaden research partnerships.
- Increased collaboration of scientific teams both within and outside Europe across different domains.
- To strengthen European scientific excellence and support the development of leading-edge scientific research in Europe

Scope: Exploitation of all acquired and available data provided by space missions in their operative, post-operative or data exploitation phase ensuring complementarity with activities already supported by ESA or national agencies during development phases.

Projects may rely on data available through Copernicus DIAS (Data and Information Access Services), **ESA Space Science Archives** when possible or other means (e.g. instrumentation teams). Combination and correlation of this data with international scientific mission data, as well as with relevant data produced by ground-based infrastructures all over the world, is encouraged to further increase the scientific return and to enable new research activities using existing data sets.

These activities shall add scientific value through analysis of the data, leading to scientific publications and higher-level data products, tools and methods. Resulting analyses should help preparing future European and international missions.

International cooperation is encouraged in particular with countries active in space exploration and space science.

Expected timing

- WP 2023 – 2024 publication: ~ 5 December 2022;
- Call opening and closing:
 - HORIZON-CL4-2023-SPACE-01: **22 December 2022 – 28 March 2023**;
 - HORIZON-EUSPA-2023-SPACE: **October 2023 – February 2024**;
 - HORIZON-CL4-2024-SPACE-01: **21 November 2023 – 20 February 2024**;
- Pre-publication of the HE Work Programme 2023/2024:
 - https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/horizon-europe-work-programmes_en

Financing & Application

- Financing:
 - Research and Innovation Actions (RIA): 100%
 - Innovation Actions (IA): up to 70%
 - Coordination and Support Actions (CSA): 100%
- Application: [EU Funding & Tender Portal](#)

The screenshot shows the 'Funding & tender opportunities' page on the European Commission's SEDIA portal. The page features a search bar, filters for 'GRANTS' and 'TENDERS', and a list of funding opportunities. The first opportunity listed is the 'CASSINI Prize for digital space applications' under the 'Horizon Europe (HORIZON)' programme. It is currently 'Open for submission' and has a deadline of 03 May 2023 17:00:00 Brussels time.

European Commission | Funding & tender opportunities | Single Electronic Data Interchange Area (SEDIA)

English EN | Register | Login

SEARCH FUNDING & TENDERS | HOW TO PARTICIPATE | PROJECTS & RESULTS | WORK AS AN EXPERT | SUPPORT | Get started

Funding and tenders (16)

Need help? | Sort by: Submission status

CASSINI Prize for digital space applications | Call for proposal | Grant

HORIZON ~~EUSPA~~ 2022-MARITIME-PRIZE

Programme	Horizon Europe (HORIZON)	Status	Open for submission
Type of action	HORIZON Inducement Prize	Deadline model	single-stage
Opening date	05 July 2022	Deadline date	03 May 2023 17:00:00 Brussels time

Submission status: Forthcoming (6) | Open for submission (1) | Closed (9)



EU SPACE

Information on Associated Countries

https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/updates-association-third-countries-horizon-europe-2021-12-21_en



Consultation for EU-funded space R&I

The EU is setting up a new consultation and coordination framework for developing a comprehensive **Strategy for EU Space R&I** and invites interested stakeholders to participate

- ✓ Take part in workshops organised on various space R&I domains and cross-cutting activities
- ✓ Provide your insights and perspectives on future focus areas and the way forward

Register today to stay informed



The image features a large, solid red circle in the center. Inside this circle, the words "Thank you." are written in a bold, white, sans-serif font. The background is a composite image showing a view of Earth from space, with a network of white lines and dots overlaid on the globe, suggesting a global network or data flow. The sky is dark blue with stars. There are also several white and blue diagonal lines of varying thicknesses that appear to be part of the graphic design, some overlapping the red circle.

Thank you.