



Innovate
UK

Horizon Europe

Cluster 4

Digital, Industry and Space

Catherine Holt, Abishek Ramesh and Stafford Lloyd
UK National Contact Points – Horizon Europe

Cluster 4 National Contact Points

Team of sector specific advisors to support UK entities to successfully participate in EU Framework Programmes and to shape the direction of EU research agenda.



Thought Leadership – working with UK government, sector stakeholders, other nations, and European Commission to shape the future direction of research and innovation



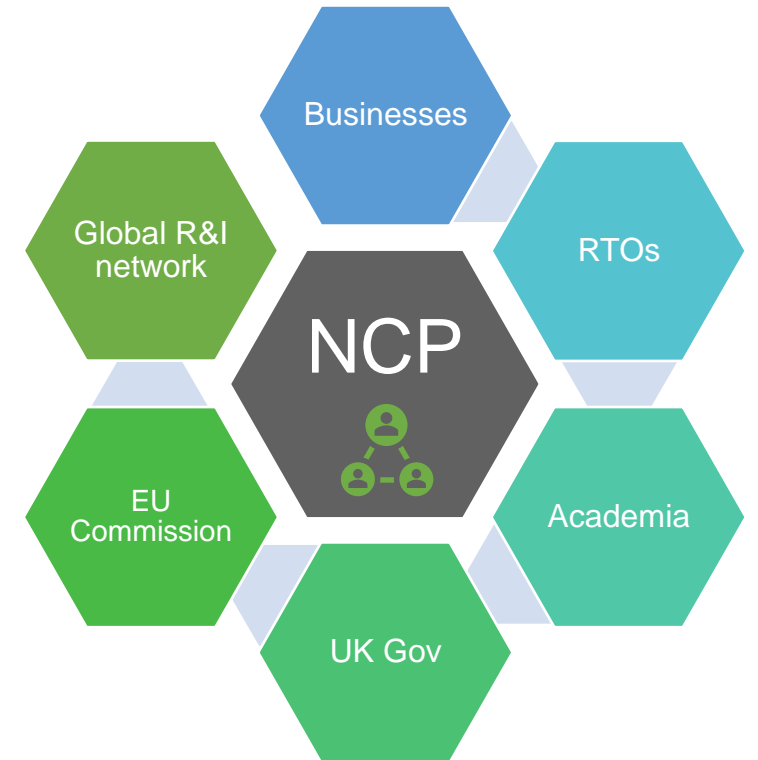
Informing, awareness raising – on all aspects of Horizon Europe rules, processes and participation



Assisting, advising and training – to improve the quality of Horizon Europe proposals with UK content to increase success rate



Signposting and cooperation – direct to relevant support and work with each other to support consortium development



Full list of UK National Contact Points

NCPs for Europe and the rest of the world

Cluster 4 events

- EC Horizon Europe Cluster 4 Info Days 2021, 29th – 30th June
<https://www.horizon-europe-infodays2021.eu/event/cluster-4-digital-industry-space>

Brokerage/Partner

Industry: 22nd June <https://cluster4industry.b2match.io/>

Industry: 1st July <https://industry2021.b2match.io/>

Digital: 24th – 25th June <https://www.horizoneuropencppportal.eu/stage/horizon-europe-cluster-4-digital-virtual-brokerage-event-2021-calls>

Space: 28th June <https://cosmos2020plus-heu-cluster4-space-brokerage.b2match.io/>

UK Association to Horizon Europe



The UK has agreed to Associate to Horizon Europe

- UK entities will have **equivalent participation rights** to those from Member States i.e. can lead and influence key collaborative projects
- **Continued access** to collaborative **R&I funding**, infrastructure and markets via Horizon Europe
 - *able to access funding from all parts of the Programme, including ERC, MSCA, Partnerships and the majority of EIC (**except EIC Accelerator equity fund**)*
 - *work programme level exclusions only in exceptional and justifiable cases (e.g. some Defence & Security)*
- **Participate in and influence** programme **governance** structures (e.g. Programme Committees)
- **UK experts** can continue to take part in project evaluations

Cluster 4: Digital, Industry and Space

Six Destinations



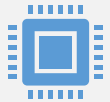
Climate neutral, circular and digitised production



Increased autonomy in key strategic value chains for resilient industry



World leading data and computing technologies



Digital and emerging technologies for competitiveness



Open strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data



A human-centred and ethical development of digital and industrial technologies

Cluster 4 – Destinations

€15.54bn funding (2021-27)

Destinations 1 & 2

Industry

- Circular Industries, Waste
- Clean Steel, Construction
- Resource & Energy efficiency
- Digital Mfg. & Automation
- Sustainability by design
- Light weight structures, Plastics
- Smart, Multi-functional materials (incl. Composites, Nano & bio)
- Adv. Materials for Energy storage (incl. Hydrogen & Electrification)

€1.51bn – 2021/22

NCP Industry: Abishek Ramesh

Destinations 3,4,6

Digital

- AI, Data & Computing
- Photonics & Electronics
- Smart Networks & Connectivity
- Robotics
- Quantum
- Graphene
- Digital Economy

€1.56bn – 2021/22

NCP Digital: Stafford Lloyd

Destinations 5

Space

- Satellite technology
- Access to space
- Space data
- Space science
- Space robotics

€0.31bn – 2021/22

NCP Space: Catherine Holt

Funding rates and main types of action

Research and Innovation Action (RIA)

- Typically, low(ish) Technology Readiness Level
- Consortium of at least three different legal entities from three different eligible countries (all UK legal entities are classed as eligible). One consortium member must be from a Member State (MS)
- All participants receive 100% of eligible direct costs plus 25% for indirect costs

Innovation Action (IA)

- Typically, high(er) Technology Readiness Level
- Consortium of at least three different legal entities from three different eligible countries. One must be from a MS
- All not-for-profit participants receive 100% of eligible direct costs plus 25% for indirect costs
- All for-profit participants receive 70% (60% if co-programmed partnerships) of eligible direct costs plus 25% for indirect costs

Coordination and Support Action (CSA)

- As name suggests, for coordinating and supporting activities such as working groups, networking, regulation review, communications, organising EU conferences, etc
- Formally do not need a collaborative approach but frequently do to meet the scope. Must have one from a MS
- All participants receive 100% of eligible direct costs plus 25% for indirect costs

Industry Calls

Abishek Ramesh

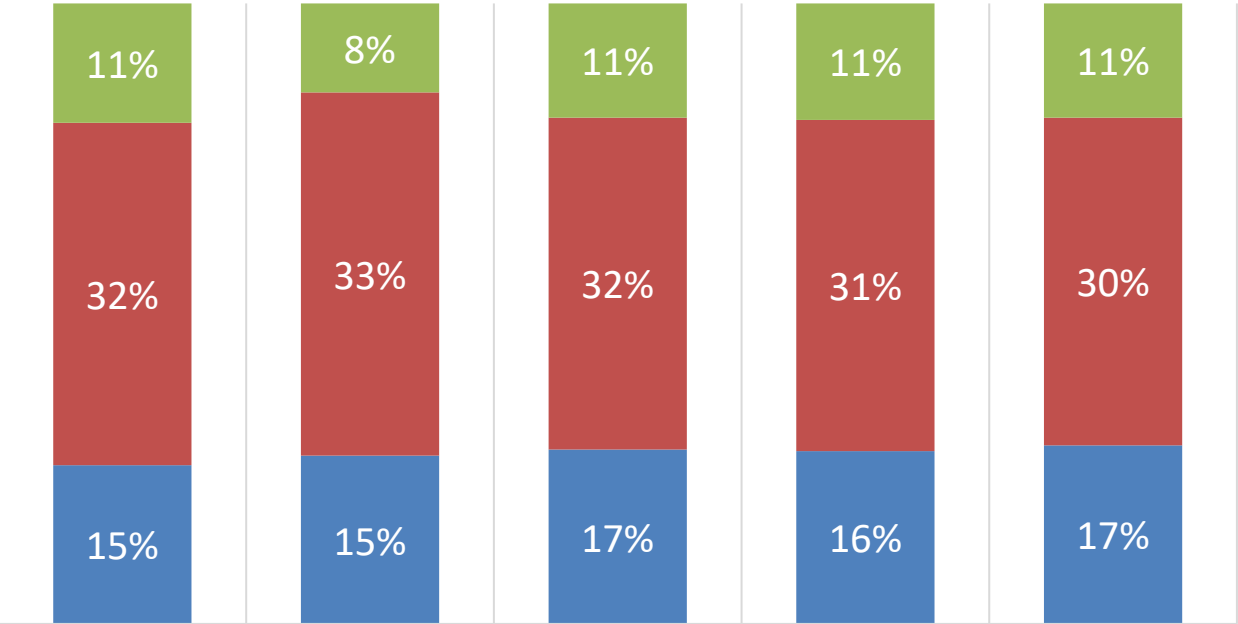
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- Circular Economy
- Digital Manufacturing
- Resilient Industries
- Raw Materials
- Resource Efficiency
- Advanced Materials



UK Success in H2020 *(Nano, Manuf. & Materials)*

H2020 PROPOSALS SUCCESS RATES COMPARISON



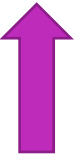
UK

ITALY

FRANCE

GERMANY

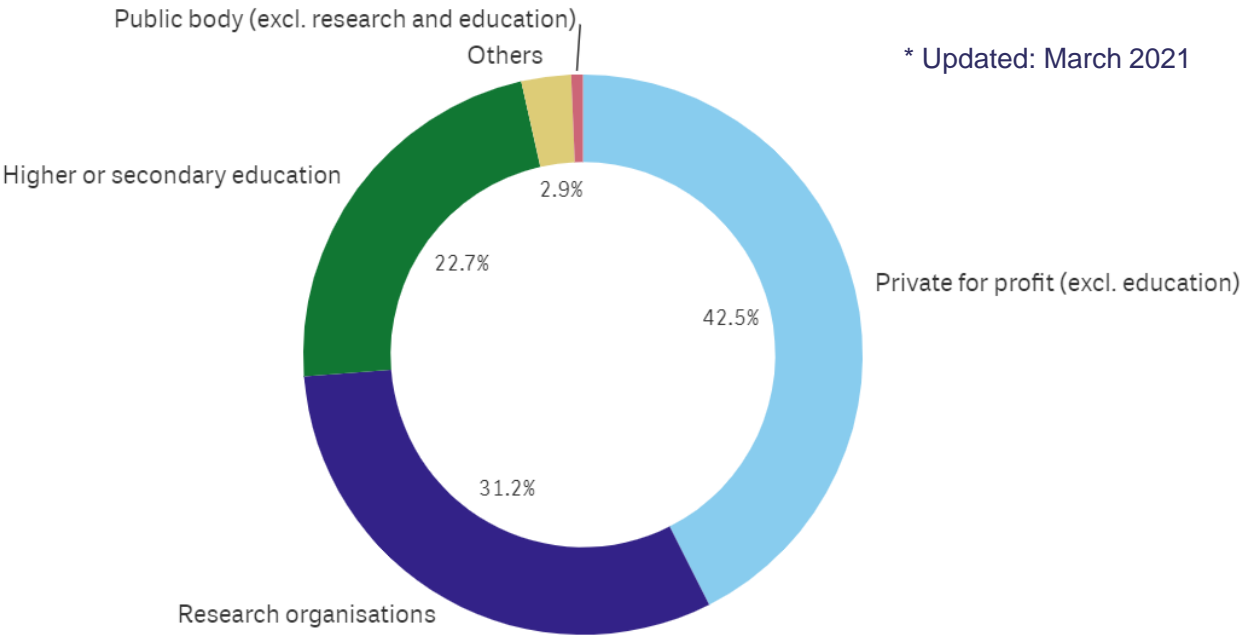
SPAIN



- Nanotechnologies, Advanced Materials and Production
- Advanced materials
- Advanced manufacturing and processing



Innovate UK



* Updated: March 2021

UK entities should continue building on strengths and collaborate strategically in order to remain competitive

EU Industrial Priorities

Strengthen excellence, leadership and competitiveness

Make industries more circular and climate-neutral

Promote adoption of key digital & emerging technologies across industries

Modernise construction sector and **reduce CO2 emissions and waste**

Step change **reduction in resource utilisation & GHG emissions while enhancing production efficiency**

Strategic autonomy and resilience in key value chains

Responsible and secure sourcing of (critical) raw materials

Sustainability by design and advanced materials solutions for clean environment

Efficient integration of renewable energy sources

Create safer, inclusive and attractive added-value manufacturing jobs



*“Europe needs industry to become **greener, more circular and more digital** while remaining **competitive on the global stage**”*

Resilience of the Single Market

Supporting Strategic Autonomy

Accelerating Twin Transitions



DESTINATION 1

- **CLIMATE NEUTRAL, CIRCULAR AND DIGITALISED PRODUCTION**
 - **Twin Green and Digital Transition in Industries – 2021**
 - **Climate Neutral, Circular and Digitised Production - 2022**

Themes	Innovations in scope*
Green, flexible & advanced manufacturing	Data driven systems, IoT, AI, Robotics, Laser, Sensors, AR/VR, Additive Mfg., AGVs, NDI, 5G, Cybersecurity & Standards, Agile Manufacturing
Advanced digital technologies for manufacturing	
Accelerating disruptive changes in Construction	LCA, AR/VR, Digital, AI, GIS, Data, Additive Mfg., Waste mgmt. (incl. Glass, Steel, Ceramics), Track and Trace, Recycling, Reuse
Hubs for climate neutrality and circular industries	Industrial symbiosis (incl. energy, waste, water), Secondary raw materials, AI, IoT, Digital
Circularity of resources in the process industries	Clean Steel, LCA, Waste mgmt.. (incl. plastics, water, Co2/CO), Feedstocks, Chemicals, Fuels, Recycling, Process optimisation, Digital
Integration of renewables and electrification in process industries	Clean energy, Energy storage & conversion, Heating, Digital, Process Optimisation, Sensors, Clean Steel

*non-exhaustive list



Note: Info based on DRAFT WP

Calls Open: 22 June 2021

Application Deadline: 23 Sept 2021

Topic ID	Title	Action Type	TRL Start	TRL End	Indicative budget (EUR million)	Expected contribution per project (EUR million)	No. of projects expected to be funded
HORIZON-CL4-2021-TWIN-TRANSITION-01-01	AI enhanced robotics system for smart manufacturing	IA	5	7	28.0	8 to 10	3
HORIZON-CL4-2021-TWIN-TRANSITION-01-02	Zero-defect manufacturing towards zero-waste	IA	5	7	27.0	8 to 10	3
HORIZON-CL4-2021-TWIN-TRANSITION-01-03	Laser-based technologies for green manufacturing	RIA	3-4	6	26.0	5 to 7	4
HORIZON-CL4-2021-TWIN-TRANSITION-01-05	Manufacturing technologies for bio-based materials	RIA	4	6	20.0	4 to 6	4
HORIZON-CL4-2021-TWIN-TRANSITION-01-07	Artificial Intelligence for sustainable, agile manufacturing	IA	4	7	18.0	4 to 6	3 or 4
HORIZON-CL4-2021-TWIN-TRANSITION-01-08	Data-driven Distributed Industrial Environments	IA	4	7	24.0	4 to 8	3 or 5
HORIZON-CL4-2021-TWIN-TRANSITION-01-10	Digital permits and compliance checks for buildings and infrastructure	IA	5	7	15.0	5	3
HORIZON-CL4-2021-TWIN-TRANSITION-01-11	Automated tools for the valorisation of construction waste	RIA	4	6	21.0	6 to 10	3
HORIZON-CL4-2021-TWIN-TRANSITION-01-12	New breakthrough technologies for technological sovereignty in construction	IA	4	6	24.0	8 to 10	2 or 3
HORIZON-CL4-2021-TWIN-TRANSITION-01-14	Deploying industrial-urban symbiosis demonstrators for the utilisation of energy, water, industrial waste and by-products at regional scale	RIA	4	6	28.0	8 to 12	3
HORIZON-CL4-2021-TWIN-TRANSITION-01-16	Hub for Circularity Community of Practice (ECoP) platform	CSA	-	-	2.0	2	1
HORIZON-CL4-2021-TWIN-TRANSITION-01-17	Plastic waste as a circular carbon feedstock for industry	IA	5	7	39.0	12 to 18	2 or 3
HORIZON-CL4-2021-TWIN-TRANSITION-01-18	Carbon Direct Avoidance in steel and other metals: Electricity and hydrogen-based metallurgy	IA	5-6	7-8	28.0	6 to 8	3
HORIZON-CL4-2021-TWIN-TRANSITION-01-19	Improvement of the yield of the iron and steel making	IA	6	8	14.0	4 to 5	3
HORIZON-CL4-2021-TWIN-TRANSITION-01-20	Reducing environmental footprint, improving circularity in extractive and processing value chains	IA	5	7	36.0	12	3
HORIZON-CL4-2021-TWIN-TRANSITION-01-21	Design and optimisation of energy flexible industrial processes	IA	5	7	39.0	12 to 18	2 or 3
HORIZON-CL4-2021-TWIN-TRANSITION-01-22	Adjustment of Steel process production to prepare for the transition towards climate neutrality	IA	6	8	14.0	4 to 5	

Note: Info based on DRAFT WP

17 call topics in 2021 with an indicative funding of **€ 403mn**

Calls Open: 12 Oct 2021

Application Deadline: 30 March 2022

Topic ID	Title	Action Type	TRL Start	TRL End	Indicative budget (EUR million)	Expected contribution per project (EUR million)	No. of projects expected to be funded
HORIZON-CL4-2022-TWIN-TRANSITION-01-01	Rapid reconfigurable production process chains	IA	5	7	27.5	8 to 10	3
HORIZON-CL4-2022-TWIN-TRANSITION-01-02	Products with complex functional surfaces	RIA	4	6	21.5	4 to 6	4
HORIZON-CL4-2022-TWIN-TRANSITION-01-04	Excellence in distributed control and modular manufacturing	RIA	4	6	21.5	4 to 6	4
HORIZON-CL4-2022-TWIN-TRANSITION-01-05	Intelligent work piece handling in a full production line	RIA	4	6	21.5	4 to 6	4
HORIZON-CL4-2022-TWIN-TRANSITION-01-06	ICT Innovation for Manufacturing Sustainability in SMEs (I4MS2)	IA	5	8	30.0	4 to 8	3 to 6
HORIZON-CL4-2022-TWIN-TRANSITION-01-07	Digital tools to support the engineering of a Circular Economy	RIA	3-4	6	22.0	3 to 6	3 to 5
HORIZON-CL4-2022-TWIN-TRANSITION-01-09	Demonstrate the use of Digital Logbook for buildings	IA	5	7	9.0	4.5	2
HORIZON-CL4-2022-TWIN-TRANSITION-01-10	Circularity flows for solid waste in urban environment	IA	5	7	42.5	12 to 18	2 or 3
HORIZON-CL4-2022-TWIN-TRANSITION-01-11	Valorisation of CO/CO2 streams into added-value products of market interest	IA	5	7	42.5	12 to 18	2 or 3
HORIZON-CL4-2022-TWIN-TRANSITION-01-13	Raw material preparation for clean steel production	IA	6	8	14.0	4 to 5	3
HORIZON-CL4-2022-TWIN-TRANSITION-01-15	New electrochemical conversion routes for the production of chemicals and materials in process industries	RIA	3-4	5-6	30.0	8 to 12	3
HORIZON-CL4-2022-TWIN-TRANSITION-01-16	Modular and hybrid heating technologies in steel production	IA	5	7	10.0	3	3
HORIZON-CL4-2022-TWIN-TRANSITION-01-17	Integration of hydrogen for replacing fossil fuels in industrial applications	IA	5	7	42.5	12 to 18	2 or 3

13 call topics in 2022 with an indicative funding of **€ 334.5mn**



Note: Info based on DRAFT WP

DESTINATION 2

- **INCREASED AUTONOMY IN KEY STRATEGIC VALUE CHAINS FOR RESILIENT INDUSTRY**
 - **Digitalised, Resource-efficient and Resilient Industry – 2021 & 2022**

Themes	Innovations in scope*
Establishing resilient and circular value chains	Composite materials, Critical raw materials, responsible sourcing of primary & secondary raw materials, Mining of the future, recycle and recovery of material, reuse, Waste mgmt. (incl., WEEE, mining, batteries, construction), resource efficiency, end of life, supply chain diversification, Data, Earth Observation, Digitalisation, Tracking materials flow
Raw materials for strategic autonomy and transition to circular economy	
Green and sustainable materials	Nanomaterials, light weight materials, multi-functional materials, coatings, polymers, Catalysis, chemicals, plastics recycling, engineered surfaces, Eco-friendly design methods, tools and materials, LCA
Materials for the benefit of society, environment and climate neutral industries	Catalysis, Heating, solar fuels, chemicals, materials for hydrogen storage, AMR, nanocoating, biomaterials, energy efficiency, super capacitors, energy storage materials
Materials and data – cross cutting actions	Biomaterials for health applications, Materials modelling and characterisation, data and digital tools for sustainable production, Innovation test beds
Improving resilience & preparedness of EU businesses, SMEs & Start-ups	Building renovations, societal innovations and new business models. Investment in Scale-up & advisory services for SMEs & Start-ups in AI, Data, Robotics, Blockchain, Sustainability, Cybersecurity domains.

*non-exhaustive list

Calls Open: 22 June 2021

Application Deadline: 23 Sept 2021

Topic ID	Title	Action Type	TRL START	TRL END	Indicative budget (EUR million)	Expected contribution per project (EUR million)	No. of projects expected to be funded
HORIZON-CL4-2021-RESILIENCE-01-01	Ensuring circularity of composite materials	RIA	3	6	24.7	8 to 9	4
HORIZON-CL4-2021-RESILIENCE-01-03	Identifying future availability of secondary raw materials	RIA		3-5	13.5	4.5	3
HORIZON-CL4-2021-RESILIENCE-01-04	Developing climate-neutral and circular raw materials	IA		6-8	36.0	12	3
HORIZON-CL4-2021-RESILIENCE-01-05	Building EU-Africa partnerships on sustainable raw materials value chains	CSA	-	-	8.0	8	1
HORIZON-CL4-2021-RESILIENCE-01-06	Innovation for responsible EU sourcing of primary raw materials, the foundation of the Green Deal	RIA		3-5	30.0	7.5	4
HORIZON-CL4-2021-RESILIENCE-01-07	Building innovative value chains from raw materials to sustainable products	IA		6-8	36.0	12	3
HORIZON-CL4-2021-RESILIENCE-01-08	Establishing EU wide sustainable-by-design materials community to support embedding sustainability criteria over the life cycle of products and processes	CSA	-	-	4.0	3 to 4	1
HORIZON-CL4-2021-RESILIENCE-01-09	Promote Europe's availability, affordability, sustainability and security of supply of essential chemicals and materials	IA	5	7	28.0	7 to 10	3
HORIZON-CL4-2021-RESILIENCE-01-10	Paving the way to an increased share of recycled plastics in added value products	RIA	3	6	23.0	5 to 7	3
HORIZON-CL4-2021-RESILIENCE-01-11	Safe- and sustainable-by-design polymeric materials	RIA	3	5	19.0	4 to 5	5
HORIZON-CL4-2021-RESILIENCE-01-12	Safe- and sustainable-by-design metallic Coatings and engineered surfaces	RIA	3	5	19.0	4 to 5	4
HORIZON-CL4-2021-RESILIENCE-01-14	Development of more energy efficient electrically heated catalytic reactors	IA	4-5	6	33.0	7 to 10	3
HORIZON-CL4-2021-RESILIENCE-01-16	Creation of an innovation community for solar fuels and chemicals	CSA	-	-	4.0	3 to 4	1
HORIZON-CL4-2021-RESILIENCE-01-17	Advanced materials for hydrogen storage	RIA	3	5	21.0	4 to 6	4
HORIZON-CL4-2021-RESILIENCE-01-20	Antimicrobial, Antiviral, and Antifungal Nanocoatings	RIA	3	6	23.0	4 to 6	4
HORIZON-CL4-2021-RESILIENCE-01-25	Biomaterials database for Health Applications	CSA	-	-	6.0	2 to 4	2
HORIZON-CL4-2021-RESILIENCE-01-26	Sustainable Industry Commons	RIA	4	6 or more	6.0	2 to 4	2
HORIZON-CL4-2021-RESILIENCE-01-27	Innovation Radar, Tech Due Diligence and Venture Building for strategic digital technologies	CSA	-	-	4.0	2.5 to 4	1
HORIZON-CL4-2021-RESILIENCE-01-28	Re-opening industrial sites preparatory action – Promoting a sustainable strategy for Europe's industrial future	CSA	-	-	2.0	1	1
HORIZON-CL4-2021-RESILIENCE-01-29	'Innovate to transform' support for SME's sustainability transition	CSA	-	-	10.0	5	2
HORIZON-CL4-2021-RESILIENCE-01-31	European Technological and Social Innovation Factory	CSA	-	-	5.0	3 to 5	
HORIZON-CL4-2021-RESILIENCE-01-32	Demonstrating innovative practices for renovation in social and affordable housing districts	IA	-	-	10.0	10	1

Note: Info based on DRAFT WP

22 call topics in 2021 with an indicative funding of **€ 365.20mn**

Calls Open: 15 Oct 2021

Application Deadline: 30 March 2022

Topic ID	Title	Action Type	TRL Start	TRL End	Indicative budget (EUR million)	Expected contribution per project (EUR million)	No. of projects expected to be funded
HORIZON-CL4-2022-RESILIENCE-01-01	Circular and low emission value chains through digitalisation	RIA	-	-	25.3	6 to 8	3
HORIZON-CL4-2022-RESILIENCE-01-02	Monitoring and supervising system for exploration and future exploitation activities in the deep sea	RIA	-	3-5	14.0	7	2
HORIZON-CL4-2022-RESILIENCE-01-03	Streamlining cross-sectoral policy framework throughout the extractive life-cycle in environmentally protected areas	CSA	-	-	2.4	2.4	1
HORIZON-CL4-2022-RESILIENCE-01-04	Developing digital platforms for the small scale extractive industry	IA	-	6-8	15.0	5	3
HORIZON-CL4-2022-RESILIENCE-01-05	Technological solutions for tracking raw material flows in complex supply chains	RIA	-	3-5	13.5	4.5	3
HORIZON-CL4-2022-RESILIENCE-01-06	Sustainable and innovative mine of the future	IA	-	6-8	36.0	12	5
HORIZON-CL4-2022-RESILIENCE-01-07	Innovative solutions for efficient use and enhanced recovery of mineral and metal by-products from processing of raw materials	IA	-	6-8	36.0	12	3
HORIZON-CL4-2022-RESILIENCE-01-08	Earth observation technologies for the mining life cycle in support of EU autonomy and transition to a climate-neutral economy	RIA	-	3-5	13.5	4.5	3
HORIZON-CL4-2022-RESILIENCE-01-10	Innovative materials for advanced nanoelectronic components and systems	RIA	3	5	20.0	3 to 5	4
HORIZON-CL4-2022-RESILIENCE-01-11	Advanced lightweight materials for energy efficient structures	RIA	3	5	20.0	3 to 5	4
HORIZON-CL4-2022-RESILIENCE-01-12	Functional multi-material components and structures	RIA	3	6	20.0	4 to 6	3
HORIZON-CL4-2022-RESILIENCE-01-13	Smart and multifunctional biomaterials for health innovations	RIA	3	5	20.0	3 to 5	4
HORIZON-CL4-2022-RESILIENCE-01-14	Membranes for gas separations - membrane distillation	IA	4	7	21.0	6 to 8	3
HORIZON-CL4-2022-RESILIENCE-01-16	Building and renovating by exploiting advanced materials for energy and resources efficient management	IA	5	7	21.0	5 to 7	3
HORIZON-CL4-2022-RESILIENCE-01-19	Advanced materials modelling and characterization	RIA	3	5	18.0	4 to 6	3
HORIZON-CL4-2022-RESILIENCE-01-20	Climate Neutral and Circular Innovative Materials Technologies Open Innovation Test Beds	IA	5	7	34.0	10 to 12	3
HORIZON-CL4-2022-RESILIENCE-01-23	Safe- and sustainable-by-design organic and hybrid coatings	RIA	3	5	20.0	3 to 5	4
HORIZON-CL4-2022-RESILIENCE-01-24	Novel materials for supercapacitor energy storage	RIA	3	6	23.0	4 to 6	4
HORIZON-CL4-2021-RESILIENCE-01-25	Optimized Industrial Systems and Lines through digitalisation	IA	-	6	15.0	4 to 5	3
HORIZON-CL4-2022-RESILIENCE-01-21	Leveraging standardisation in Digital Technologies	CSA	-	-	4.5	4.5 to 4.5	1
HORIZON-CL4-2022-RESILIENCE-01-26	'Innovate to transform' support for SME's sustainability transition	CSA	-	-	10.0	5	2

Note: Info based on DRAFT WP

21 call topics in 2022 with an indicative funding of **€ 402.20mn**

Synergies with other HEU Clusters

Cluster 1 Health

Biotech, Sensors, Adv. materials, Robotics, reconfigurable mfg. systems, 3D printing

Cluster 2 Culture, Creativity, Society

New business models, human machine interaction, skills, safety and well being of work force, cultural inclusiveness

Cluster 3 Civil security for society

Cyber security, AI, Digital tech for trust and privacy, Resilience

Cluster 5 Climate, Energy, Mobility

Adv. Materials, Batteries, Energy systems, circular industries, hubs4circularity, Lifecycle Analysis (LCA), electrification, Carbon Capture and Storage (CCS), industrial decarbonisation, resource/energy efficiency, renewable energy, Hydrogen, Heat recovery

Cluster 6 Food, Bio & Agri

Recycling, Chemicals, Food production, Design for circularity, Supply chain

Partnerships in *Cluster 4 - Industries*

Partnership name	Objective	Type	Partners
Made in Europe	Driving a sustainable, competitive and resilient manufacturing industry, thorough digital transformation and circularity models	Co-programmed	EFFRA
Clean Steel - Low Carbon Steelmaking	Transforming the steel industry into a carbon-neutral and circular industry	Co-programmed	ESTEP
Processes4Planet	Transforming process industries by enhancing circularity, resource efficiency, and carbon neutrality	Co-programmed	A.SPIRE
Metrology	Accelerate metrology research, fit-for-purpose solutions	Institutionalised	EURAMET

More details on partnerships [here](#)



Space Calls

Catherine Holt

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- Space infrastructure
- Evolution of Copernicus services
- SSA, science and skills
- Satellite applications

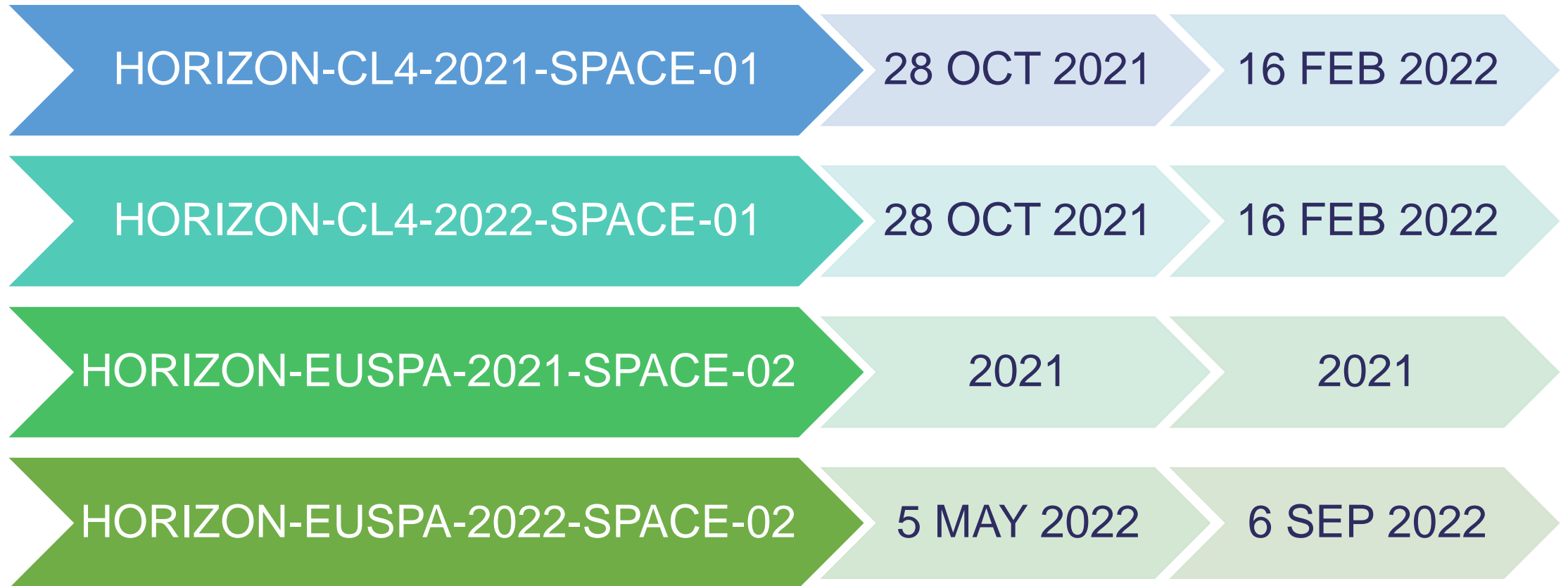


Space in Horizon Europe

5. Open strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data

Systems	Access	Data	Capabilities	Strategic
<ul style="list-style-type: none">• SatCom• EO• On-orbit operations• Electronic propulsion	<ul style="list-style-type: none">• Launchers• Propulsion• Launch systems• Ground facilities	<ul style="list-style-type: none">• Copernicus services• Copernicus applications• EGNSS applications	<ul style="list-style-type: none">• SSA• GOVSATCOM• Quantum	<ul style="list-style-type: none">• Technology non-dependence• Space science• Education and skills

Space Call Deadlines



Topics closed to the UK...at the moment

Topic reference number	Topic title	Funding action	Indicative budget (€)
CL4-2021-SPACE-01-11	End-to-end satellite communication systems and associated services	RIA	12M (2)
CL4-2021-SPACE-01-21	Reusability for European strategic space launchers - technologies and operation maturation including flight test demonstration	RIA	39M (1)
CL4-2021-SPACE-01-22	Low cost high thrust propulsion for European strategic space launchers - technologies maturation including ground tests	RIA	19.8M (1)
CL4-2021-SPACE-01-23	New space transportation solutions and services	RIA	3M (2)
CL4-2022-SPACE-01-21	Multi sites flexible industrial platform and standardised technology for improving interoperability of European access to space ground facilities	RIA	2M (1)
CL4-2021-SPACE-01-43	Copernicus Security and Emergency Services evolution	RIA	5M (1)
CL4-2021-SPACE-01-62	Quantum technologies for space gravimetry	RIA	17M (1)
CL4-2021-SPACE-01-81 CL4-2022-SPACE-01-81	Space technologies for European non-dependence and competitiveness	RIA	10.32M (4) 10.5M (4)

Topic reference number	SPACE INFRASTRUCTURE Topic title	Funding action/TRL	Budget (€)
CL4-2021-SPACE-01-12	Future space ecosystems: on-orbit operations, new system concepts <ul style="list-style-type: none"> Intelligent, adaptable and maintainable systems with plug-and-play compartmentalised modules Concepts for the next generation of potential business cases Integration of AI and industry 4.0 means into the satellite life cycle 	RIA TRL 5-6	6M (3)
CL4-2022-SPACE-01-11	Future space ecosystems: on-orbit operations, preparation of orbital demonstration mission Prepare a demonstration mission for On-Orbit Servicing (OOS) in 2025-2026 integrating robotic and autonomy technologies and technical building blocks	RIA TRL 6	26M (1)
CL4-2022-SPACE-01-12	Technologies and generic building blocks for Electrical Propulsion Maturing technologies and generic building blocks towards incremental and disruptive technologies for Electric Propulsion <ol style="list-style-type: none"> Thruster components Electrical power architecture and related components Fluidic management system and related components 	IA TRL 5-6	5.10M (3)
CL4-2022-SPACE-01-13	End-to-end Earth observation systems and associated services Flexible satellite EO end-to-end systems, including the ground segment subsystem with of ground control centres and operations <ol style="list-style-type: none"> End-to-end systems Observational payload Multi mission solutions for ground segment 	IA TRL 6	8.1M (3)

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Topic reference number	COPERNICUS SERVICES EVOLUTION Topic title	Funding action/TRL	Budget (€)
CL4-2021-SPACE-01-41	Copernicus Climate Change Service evolution <ul style="list-style-type: none"> Data assimilation methods to improve the climate consistency of Earth-system reanalysis datasets Science for predictability and new and innovative multi-model product generation to improve the realism of climate prediction models. 	RIA TRL 5-6	11M (1)
CL4-2021-SPACE-01-42	Copernicus Atmosphere Monitoring Service evolution <ul style="list-style-type: none"> Data assimilation of satellite observations to expand the use of data streams in the Copernicus Atmosphere Monitoring Service (CAMS) Improve the quality of the CAMS global and regional reactive gases and aerosol information products to deliver near-real-time observations New methods and measurements for quantifying uncertainties 	RIA TRL 5-6	7.5M (1)
CL4-2021-SPACE-01-44	Copernicus evolution for cross-services thematic domains Proof-of-concept or prototype for: <ul style="list-style-type: none"> Monitoring and forecasting the Arctic UN Sustainable Development Goals indicators 	RIA TRL 5-6	5.6M (2)

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Topic reference number	COPERNICUS SERVICES EVOLUTION Topic title	Funding action/TRL	Budget (€)
CL4-2022-SPACE-01-41	Copernicus Marine Environment Monitoring Service evolution Models for marine ecosystems monitoring and related biogeochemistry	RIA TRL 5-6	10M (1)
CL4-2022-SPACE-01-42	Copernicus Anthropogenic CO₂ Emissions Monitoring & Verification Support (MVS) capacity <ul style="list-style-type: none"> Improve the definition of the correlations between emissions of co-emitted species in support of CO2 fossil fuel emission estimation Better use of auxiliary observations to separate anthropogenic CO2 emissions from the natural variability of CO2 	RIA TRL 5-6	6M (1)
CL4-2022-SPACE-01-43	Copernicus Land Monitoring Service evolution <ul style="list-style-type: none"> Combine and explore data with different spatial and temporal characteristics Automatic processing for land cover and land cover status change assessment 	RIA TRL 5-6	5M (1)

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Topic reference number	SSA, SCIENCE, SKILLS Topic title	Funding action/TRL	Budget (€)
CL4-2022-SPACE-01-62	Space weather <ul style="list-style-type: none"> • Concepts of possible European space weather services, providing data, forecasts and warnings • Modelling to understand Sun-Earth physical mechanisms for improved forecasting skills and techniques 	RIA TRL 3-4	2M (2)
CL4-2022-SPACE-01-72	Education and skills for the EU space sector <ul style="list-style-type: none"> • Understand the space education offering and student population • Identify education and skills gaps linking to jobs and careers 	CSA	3M (1)
CL4-2022-SPACE-01-82	Space science and exploration technologies <ul style="list-style-type: none"> • Development of instrumentation and technologies for space science and exploration missions • Support on-site activities such as innovative measurement techniques, increased sensitivity, increased robustness, faster and more accurate data processing or in-situ sample and data analysis. 	RIA TRL 3-4	8M (6)

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Topic reference number	APPLICATIONS Topic title		Funding action/TRL	Budget (€)
CL4-2021-SPACE-02-51	EGNSS and Copernicus applications fostering the European Green deal <ul style="list-style-type: none"> Increasing the EU’s climate ambition for 2030 and 2050 energy natural hazards smart mobility construction farm to fork ecosystems and biodiversity 		IA TRL 7-9	14M (5)
CL4-2021-SPACE-02-52	EGNSS applications for Safety and Crisis management <ul style="list-style-type: none"> Improved emergency disaster risk management and societal resilience Timing and synchronisation applications 		IA TRL 7-9	9.3M (3)
CL4-2021-SPACE-02-53	EGNSS applications for the Digital Age <ul style="list-style-type: none"> IoT mobile solutions mHealth for ‘silver economy’, robotics AI - big data, geo-tagging cybersecurity sharing economy smart wearables 		IA TRL 7-9	9.3M (3)

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Applications – Proposal Requirements

- Applications must have clear commercial potential
- A business plan **and** evidence of user engagement is compulsory and provided as part of the proposal
- Participation of industry, in particular SMEs and midcaps, is encouraged
- Participation of entities based in countries without a space tradition is encouraged
- Involvement of post-graduate researchers (engineers, scientists, and others) is also encouraged, for example through professional work experience or through fellowships/scholarships when applicable;



Civil security for society

- terrorism
- crime
- trafficking
- border control
- infrastructure protection
- disaster resilience

Climate, energy and mobility

- greenhouse gases
- climate change
- smart mobility
- last mile solutions

Food, bioeconomy natural resources, agri & env

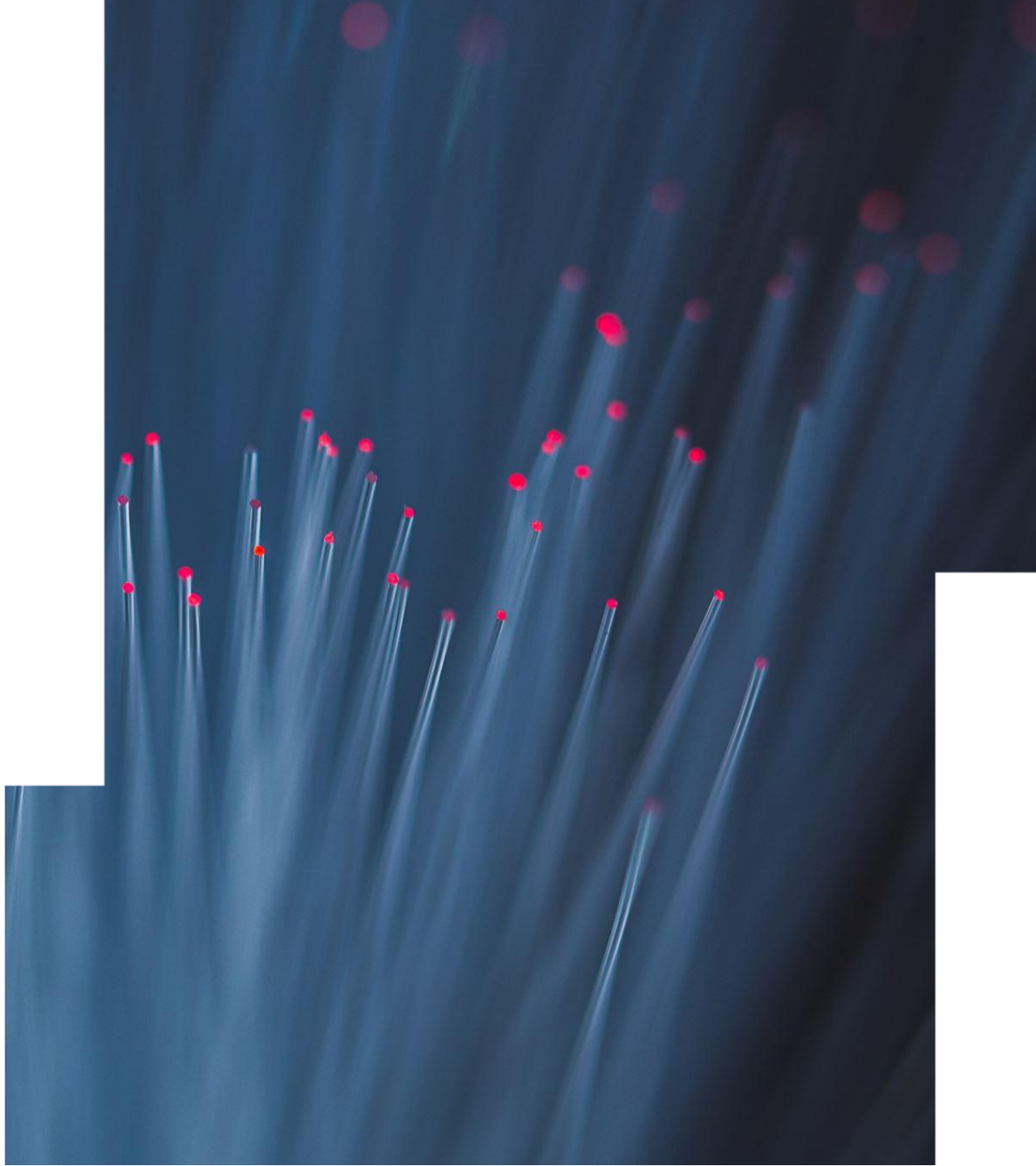
- biodiversity
- ecosystems
- agriculture
- forestry
- fisheries
- pollution
- polar
- marine
- rural economy

Digital Calls

Dr Stafford Lloyd

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- **Data and Computing**
- **AI, Data and Robotics**
- **Electronics and Photonics**
- **6G and foundational connectivity technologies**
- **Human-centric digital technologies**
- **(Quantum technologies)**





World leading data and computing technologies

Opens 22 June 2021 Deadline 21 October 2021 Budget €167.6M

- Data spaces and Analytics: 3 competitions, €110.1m
- Cloud to Edge to IoT for European Data: 3 competitions, €57.5m
- May be more opportunities in EuroHPC (tbc).

Data spaces and Analytics

Opens 22 June 2021 Deadline 21 October 2021 Budget €110.1M

Topic ID	Topic title	Funding action/TRL	Budget (€)
CL4-2021-DATA-01-01	Technologies and solutions for compliance, privacy preservation, green and responsible data operations <ul style="list-style-type: none">Digital technologies, methods, architectures and processes for user-friendly, safe, trustworthy, compliant, fair, transparent, accountable and environmentally sustainable collection, storage, processing, querying, analytics and delivery of data.	RIA TRL 2-5	8-11M (5)
CL4-2021-DATA-01-03	Technologies for Data Management <ul style="list-style-type: none">Provide new secure and energy-efficient data management tools improving the usability and discoverability of data in different contexts, covering data provenance, synthetic data generation, data quality management, improving data interoperability, metadata management, and ensuring data security, privacy and integrity.	IA TRL 5-8	5M (6)
CL4-2021-DATA-01-04:	Extreme data mining, aggregation and analytics technologies and solutions <ul style="list-style-type: none">Provide better technologies, tools and solutions for data mining of large, constantly growing amounts and varieties of data, and/or extremely sparse/dispersed/heterogeneous data, in particular IoT, industrial, scientific or societal data.	RIA TRL 3-5	5M (6)

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Cloud to Edge to IoT

Opens 22 June 2021 Deadline 21 October 2021 Budget €57.5M

Topic ID	Topic title	Funding action/TRL	Budget (€)
CL4-2021-DATA-01-05	Future European platforms for the Edge: Meta Operating Systems <ul style="list-style-type: none">Next generation of higher-level (meta) operating systems with strong computing capacity at the smart device, system and edge-level, embedded in a compute continuum from IoT-to-edge-to-cloud; device independent and open source where possible.	RIA TRL 4-5	8-12M (5)
CL4-2021-DATA-01-07	Coordination and Support of the 'Cloud-Edge-IoT' domain <ul style="list-style-type: none">Coordinate, build constituency, and analyse the needs for advanced smart IoT and edge computing nodes and systems and to map them to existing or emerging solutions, as well as to identify gaps.	CSA	1.5M (2)
CL4-2021-DATA-01-08	Roadmap for next generation computing and systems technologies <ul style="list-style-type: none">Produce yearly updated roadmaps on computing addressing a broad perspective from edge device to edge cloud to cloud to HPC, from scientific to industrial to societal and research applications.	CSA	2M (1)

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AI, Data and Robotics

Opens 22 June 2021 Deadline 21 October 2021 Budget €183.5M

Leadership in AI based on trust

- AI, Data and Robotics: 2 competitions, €48.2m
- Robotics: 2 competitions, €55.6m
- AI: 5 competition, €79.7m

AI, Data and Robotics

Opens 22 June 2021 Deadline 21 October 2021 Budget €48.2M

Topic ID	Topic title	Funding action/TRL	Budget (€)
CL4-2021-DIGITAL-EMERGING-01-09	AI, Data and Robotics for the Green Deal <ul style="list-style-type: none">Integrate and optimise innovative AI, data and robotics solutions for resource optimisation and minimisation of waste in any type of sector (from agri-food, to energy, utilities, transport, production, etc.)	RIA TRL 3-7	3-5M (6)
CL4-2021-DIGITAL-EMERGING-01-10	AI, Data and Robotics at work <ul style="list-style-type: none">Demonstrate how AI, data, robotics and automation solutions can support workers in their daily tasks, improving working conditions; aim is to keep people away from unsafe and unhealthy jobs via collaborative embodied (physical) AI, engaging and empowering end-users and workers. Focus either on collaborative embodied AI or AI and Data to support decision making.	IA TRL 5-8	5M (6)

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Robotics

Opens 22 June 2021 Deadline 21 October 2021 Budget €55.6M

Topic ID	Topic title	Funding action/TRL	Budget (€)
HORIZON-CL4-2021-DIGITAL-EMERGING-01-11	Pushing the limit of robotics cognition <ul style="list-style-type: none">New generation of AI-Powered Robotics: Enabling robots to have more profound impacts than they currently have, in powering them with a deeper kind of AI, endowing them with a better perception and understanding of the world (up to semantic and explainable representations).	RIA TRL 2-5	5M (9)
HORIZON-CL4-2021-DIGITAL-EMERGING-01-12	European Network of Excellence Centres in Robotics <ul style="list-style-type: none">Demonstrate how AI, data, robotics and automation solutions can support workers in their daily tasks, improving working conditions; aim is to keep people away from unsafe and unhealthy jobs via collaborative embodied (physical) AI, engaging and empowering end-users and workers. Focus either on collaborative embodied AI or AI and Data to support decision making.	RIA TRL 2-5	11.3M (1)

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AI

Opens 22 June 2021 Deadline 21 October 2021 Budget €79.7M

Topic ID	Topic title	Funding action/TRL	Budget (€)
HORIZON-CL4-2021-HUMAN-01-01	Verifiable robustness, energy efficiency and transparency for Trustworthy AI <ul style="list-style-type: none">Develop trustworthy AI technology to take full advantage of the huge benefits such technology can offer, and demonstrate the benefits in particular applications; five focus areas: promising approaches to machine learning, advanced transparency in AI, greener AI, advances in AI edge networks, complex systems and socially aware AI.	RIA TRL 2-5	4M (9)
CL4-2021-HUMAN-01-24	Tackling gender, race and other biases in AI <ul style="list-style-type: none">Increased availability and deployment of unbiased and bias-preventing AI solutions across a wide range of industrial and digital sectors; Topic investigates preventing and mitigating bias in AI, focusing on (1) recommender and personalisation systems, (2) algorithmic decision-making, and (3) surveillance software, including facial recognition.	RIA TRL 3-6	3-3.5M (3)
HORIZON-CL4-2021-HUMAN-01-27	AI to fight disinformation <ul style="list-style-type: none">Develop advanced AI based solutions for securing a trustworthy online environment or targeted at citizens. Proposals should include, as appropriate, the development of tools and processes for design, testing and validation, deployment and uptake, auditing, certification (where appropriate), software engineering methodologies, as well as approaches to modularity and interoperability.	RIA TRL 3-6	6.4M (2)

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AI

Opens 22 June 2021 Deadline 21 October 2021 Budget €79.7M

Topic ID	Topic title	Funding action/TRL	Budget (€)
CL4-2021-HUMAN-01-03	European Network of AI Excellence Centres: Pillars of the European AI lighthouse <ul style="list-style-type: none">Develop mechanisms to reinforce and network excellence centres in AI, bringing the best scientists together to address major AI challenges. Focus on addressing safe and secure AI addressing safety and security by design.	RIA TRL 2-5	8.9M (1)
HORIZON-CL4-2021-HUMAN-01-02	European coordination, awareness, standardisation & adoption of trustworthy European AI, Data and Robotics <ul style="list-style-type: none">Efficient AI, Data and Robotics Public-Private Partnership supporting the community and the implementation of the SRIDA (see https://ai-data-robotics-partnership.eu/)Efficient support to the research community via the AI-on-demand-platform, a public community resource (see https://www.ai4eu.eu/).	CSA	4 or 9M (2)

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Electronics and Photonics

Opens 22 June 2021 Deadline 21 October 2021 Budget €123M

Digital technologies fit for the green new deal

- Electronics: 3 competitions, €61m
- Photonics: 2 competitions, €62m
- May be more opportunities in the Key Digital Technologies partnership (tbc).

Electronics

Opens 22 June 2021 Deadline 21 October 2021 Budget €61M

Topic ID	Topic title	Funding action/TRL	Budget (€)
CL4-2021-DIGITAL-EMERGING-01-01	Ultra-low-power, secure processors for edge computing <ul style="list-style-type: none">Develop European secure specialised microprocessor designs that deliver high-performance computing at ultra-low power operation; improve by at least two orders of magnitude the performance per watt for the targeted edge applications.	RIA TRL 2-5	8-10M (3)
CL4-2021-DIGITAL-EMERGING-01-05	Open Source Hardware for ultra-low-power, secure processors <ul style="list-style-type: none">Develop a roadmap for open source hardware in Europe covering both R&D as well as funding & business aspects for edge applications in all power and performance ranges from deeply embedded to high-end computing.	CSA	1.5M (1)
CL4-2021-DIGITAL-EMERGING-01-31	Functional electronics for a green and circular economy <ul style="list-style-type: none">Development of new concepts, designs and technologies in electronics to support and enable circular economy and sustainability; focus is on flexible, printed and organic electronics.	RIA TRL 2-5	3-5M (9)

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Photonics

Opens 22 June 2021 Deadline 21 October 2021 Budget €62M

Topic ID	Topic title	Funding action/TRL	Budget (€)
CL4-2021-DIGITAL-EMERGING-01-06	Advanced optical communication components <ul style="list-style-type: none">Projects to develop ultra-dynamic photonic components and subsystems for data communication; reliable and low latency; lowered barrier for the uptake of performant communication technologies by reducing cost of transmission interfaces to around 50 cents per Gigabit per second.	IA TRL 3-6	4-6M (6)
HORIZON-CL4-2021-DIGITAL-EMERGING-01-07	Advanced Photonic Integrated Circuits <ul style="list-style-type: none">New generations of photonic integrated circuits and devices; lowering the barrier to the use of advanced or innovative photonic integration technologies for companies, in particular high-tech SMEs.	RIA TRL 2-5	3-5M (8)

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6G and foundational connectivity technologies

- Core topics to be developed through a new industrial partnership: **Smart Networks and Services** – details TBC
- €900M+ public investment
- More info see: <https://5g-ia.eu/sns-horizon-europe/>
- Opportunity to participate in a CSA, deadline 8th September.





Quantum flagship

Two tier call structure

- Core work programme calls – UK is eligible
- Quantum flagship framework partnership agreements – UK eligibility still being negotiated

Quantum core work programme calls

Opens 22 June 2021 Deadline 21 October 2021 Budget €33.9M

Topic ID	Topic title	Funding action/TRL	Budget (€)
CL4-2021-DIGITAL-EMERGING-01-21	Next generation quantum sensing technologies <ul style="list-style-type: none">Demonstrate the feasibility of next generation quantum sensing technologies and devices by showing disruptive progress in the performance, reliability and efficiency of such technologies and devices and by enhancing the TRL of all (essential) components	RIA TRL 2-5	13.5M (2)
CL4-2021-DIGITAL-EMERGING-01-23	International cooperation with Canada <ul style="list-style-type: none">Advances in quantum technologies in specific areas of mutual EU – Canada interest, including quantum computing and simulation, quantum networking and communication, quantum sensing and metrology	RIA TRL 1-3	4M (3)
CL4-2021-DIGITAL-EMERGING-01-30	Investing in new emerging quantum computing technologies <ul style="list-style-type: none">Contribute by investing in a few other emerging and potentially promising quantum technology platforms besides the ones supported in the ramp-up phase of the Quantum Technologies Flagship	RIA TRL 2-5	10M (2)
CL4-2021-DIGITAL-EMERGING-01-32	Support and coordination of the Quantum Technologies Flagship Initiative <ul style="list-style-type: none">Support the efficient functioning of the Quantum Technologies Flagship and the efficient implementation of the broader EU quantum strategy, and promote the Flagship's activities to a wide public	CSA	6.4M (1)

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Quantum Flagship framework agreements

Opens 28 October 2021 Deadline 27 January 2022 Budget €51M

UK eligibility still under discussion

Opportunities across:

- Computing
- Communications (including QKD and the quantum internet)
- Sensing
- Simulation platforms
- Pilot production capabilities.



Human Centric ethical development of Digital Technologies

Opens 22 June 2021 Deadline 21 October 2021 Budget €96.5M

Industrial leadership in extended reality technologies and immersive environments

- Internet of trust: 5 competitions, €34.4m
- Extended reality: 5 competitions, €62.1m

Internet of Trust calls

Opens 22 June 2021 Deadline 21 October 2021 Budget €34.4M

Topic ID	Topic title	Funding action/TRL	Budget (€)
CL4-2021-HUMAN-01-04	Trust & data sovereignty on the Internet <ul style="list-style-type: none">Projects should develop new technologies and data governance models for increased trust, privacy and user control of personal data and identity on the internet, leveraging decentralised and self-sovereign identity approaches, empowering the end-users and enabling user-centric business and sustainability models.	RIA	12M (1)
CL4-2021-HUMAN-01-05	Trustworthy open search and discovery <ul style="list-style-type: none">Develop technologies and solutions enabling new and trustworthy ways of searching and discovering information on the internet across a variety of resources such as personal, scientific, industrial and environmental data, connected devices and smart objects, services, multimedia content, intranets both public and private.	RIA	8.5M (2)
CL4-2021-HUMAN-01-07	Next Generation Internet community-building and outreach <ul style="list-style-type: none">Develop and implement the vision of a human-centric internet: support the European Commission in engaging a diverse community of stakeholders, including internet innovators, researchers, start-ups and SMEs, but also policy makers, internet end-users, social partners, local communities and citizens at large.	CSA	2M (1)

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Internet of Trust calls

Opens 22 June 2021 Deadline 21 October 2021 Budget €34.4M

Topic ID	Topic title	Funding action/TRL	Budget (€)
CL4-2021-HUMAN-01-08	NGI International Collaboration - Transatlantic fellowship programme <ul style="list-style-type: none">Enhanced EU-US and EU-Canada cooperation in the development of Next Generation Internet technologies, services and standards.	CSA	1.9M (1)
CL4-2021-HUMAN-01-09	NGI Tech Review <ul style="list-style-type: none">Support an open environment fostering collaboration between internet innovators to tackle key societal challenges such as response to pandemics, climate change, disinformation, or the protection of privacy. The environment will bring together internet innovators to develop, test and improve solutions based on open source technologies.	CSA	1.5M (1)

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eXtended Reality calls

Opens 22 June 2021 Deadline 21 October 2021 Budget €62.1M

Topic ID	Topic title	Funding action/TRL	Budget (€)
CL4-2021-HUMAN-01-13	eXtended Reality Modelling <ul style="list-style-type: none">Large-scale creation of eXtended Reality models with increased levels of interaction, context awareness, explainable autonomous decisions, human control, privacy and accessibility; methodologies, tools and processes to build eXtended Reality services based on these models.	RIA TRL 2-5	4M (3)
CL4-2021-HUMAN-01-14	eXtended Reality for All – Haptics <ul style="list-style-type: none">Develop an affordable, portable, usable full-page devices able to convey and input digital information in both braille and tactile graphics for people with visual impairments.	IA TRL 5-7	5.9M (1)
CL4-2021-HUMAN-01-25	eXtended Collaborative Telepresence <ul style="list-style-type: none">Provide low-cost and widely available eXtended collaborative telepresence solutions, leveraging existing open standards and technologies, while ensuring ethics, privacy, security and safety.	IA TRL 4-7	5-8M (3)

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eXtended Reality calls

Opens 22 June 2021 Deadline 21 October 2021 Budget €62.1M

Topic ID	Topic title	Funding action/TRL	Budget (€)
CL4-2021-HUMAN-01-06	Innovation for Media, including eXtended Reality <ul style="list-style-type: none">Foster the development of advanced solutions for the creation, distribution and consumption of new media products, including extended reality; development of new modular tools, components and services <u>or</u> launch of a dedicated VR Media Lab.	IA TRL 4-8	8-9M (3)
CL4-2021-HUMAN-01-28	eXtended Reality Ethics, Interoperability and Impact <ul style="list-style-type: none">Improved quality of eXtended Reality experiences and applications, combining human-machine interactions and real, mixed, augmented and virtual environments and ensuring ethics, privacy, security and safety.	CSA	2.5M (1)

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EIC Opportunities

Pathfinder Open (€3M projects)

Advanced research to develop the scientific basis to underpin breakthrough technologies:

- Radical technology vision
- Breakthrough target
- Novel interdisciplinary
- Collaborative

Transition Open (€2.5M projects)

Validate technologies and develop business plans for specific applications, **builds on Pathfinder and ERC proof of concept projects.**

- Single entity or collaborative



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**Any
Questions?**



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Thank you



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