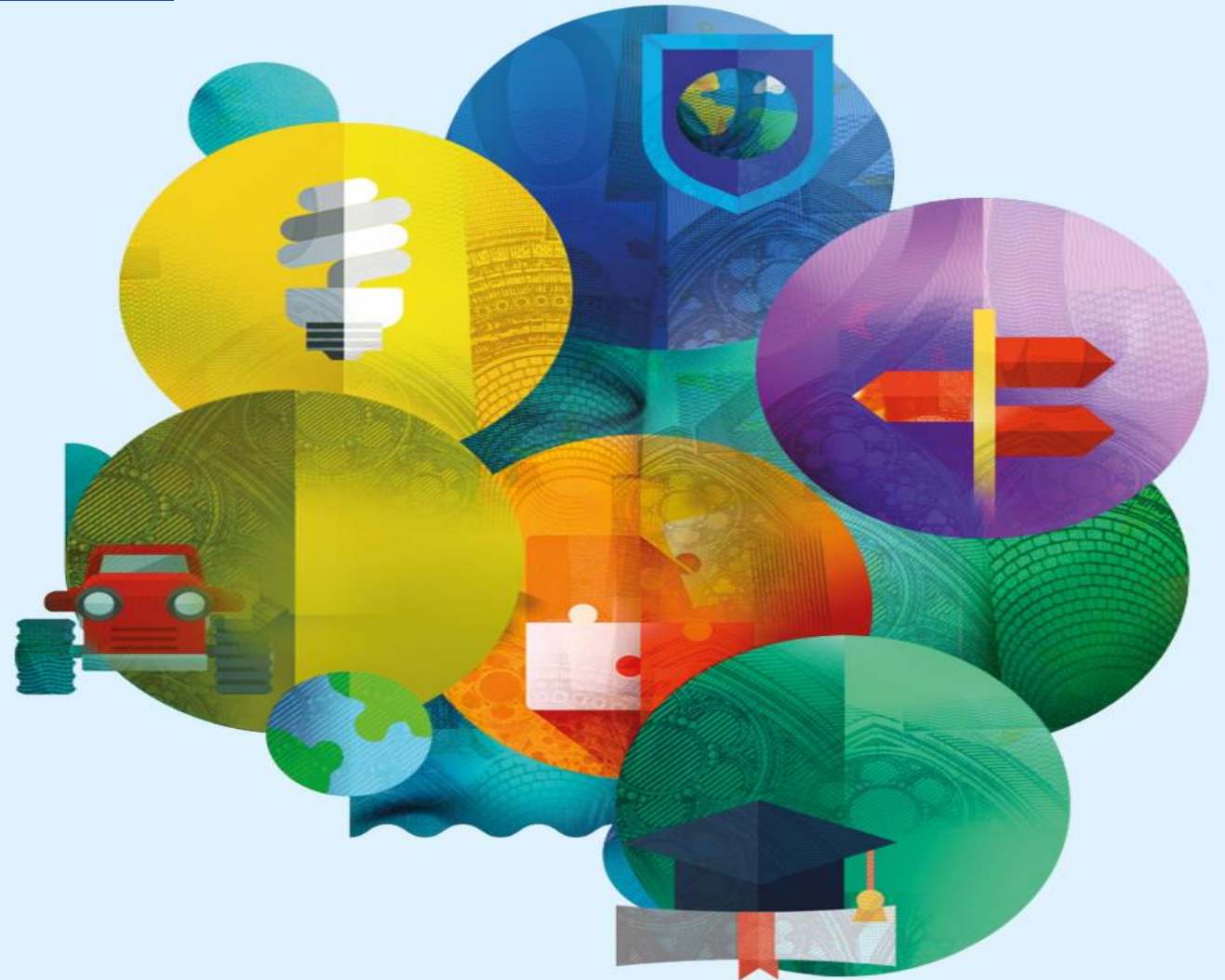


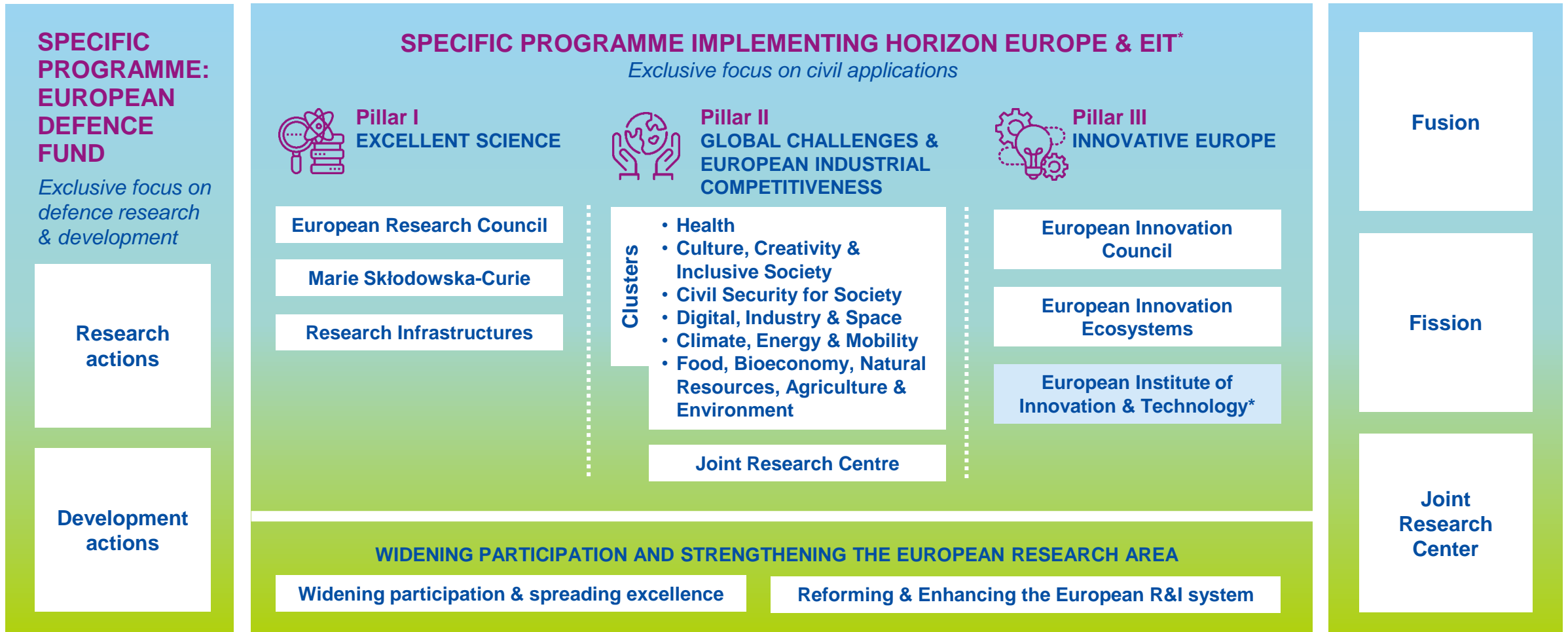
# HORIZON EUROPE WORK PROGRAMME 2021-2022

*Cluster 4*  
*Digital, Industry, Space*



# HORIZON EUROPE

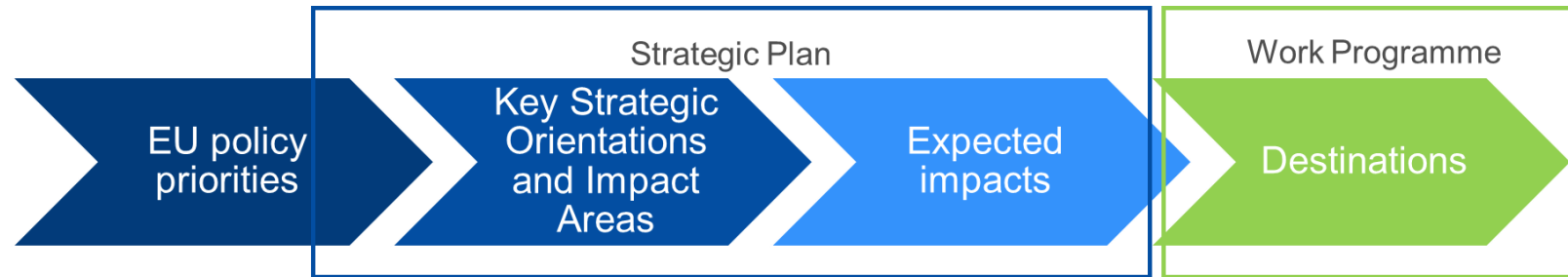
# EURATOM



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

# Cluster 4 – Strategic Priorities

*From EU priorities to Work Programme Destinations*



Cluster 4 directly supports three of the four Key Strategic Orientations of the [Strategic Plan 2021-2024](#)

- Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains (A)
- Making Europe the first digitally enabled, circular, climate-neutral and sustainable economy (C)
- Creating a more resilient, inclusive and democratic European society (D)

# Cluster 4 'Digital, Industry and Space' Destinations in Work Programme 2021-22

Key Strategic Orientation in the Strategic Plan 2021 - 2024	Destination
<p><b>Making Europe the first digitally enabled, circular, climate-neutral and sustainable economy</b></p>	<p>Climate neutral, circular and digitised production <b>TWIN-TRANSITION</b></p>
<p><b>Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains</b></p>	<p>A digitised, resource efficient, and resilient industry <b>RESILIENCE</b></p>
	<p>World-leading data and computing technologies <b>DATA</b></p>
	<p>Digital and emerging technologies for competitiveness and fit for the green deal <b>DIGITAL-EMERGING</b></p>
<p><b>Creating a more resilient, inclusive and democratic European society</b></p>	<p>Open Strategic Autonomy in developing, deploying and using global space-based infrastructures, services, applications and data <b>SPACE</b></p> <p>A human-centred and ethical development of digital and industrial technologies <b>HUMAN</b></p>

KEY STRATEGIC ORIENTATION	EXPECTED IMPACT
<p><b>Making Europe the first digitally enabled, circular, climate-neutral and sustainable economy (C)</b></p>	<p><b>Global leadership in clean and climate-neutral industrial value chains, circular economy and climate-neutral digital systems and infrastructures (networks, data centres)</b>, through innovative production and manufacturing processes and their digitisation, new business models, sustainable-by-design advanced materials and technologies enabling the switch to decarbonisation in all major emitting industrial sectors, including green digital technologies.</p>
<p><b>Promoting an open strategic autonomy by leading the development of key digital, and enabling and emerging technologies, sectors and value chains (A)</b></p>	<p><b>Industrial leadership and increased autonomy in key strategic value chains with security of supply in raw materials</b>, achieved through breakthrough technologies in areas of industrial alliances, dynamic industrial innovation ecosystems and advanced solutions for substitution, resource and energy efficiency, effective reuse and recycling and clean primary production of raw materials, including critical raw materials and leadership in circular economy.</p> <p><b>Globally attractive, secure and dynamic data-agile economy</b> by developing and enabling the uptake of the next-generation computing and data technologies and infrastructures (including space infrastructure and data), enabling the European single market for data with the corresponding data spaces and a trustworthy artificial intelligence ecosystem.</p> <p><b>Open strategic autonomy in digital technologies and in future emerging enabling technologies</b> by strengthening European capacities in key parts of digital and future supply chains, allowing agile responses to urgent needs, and by investing in early discovery and industrial uptake of new technologies.</p> <p><b>Open strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data</b>, including by reinforcing the EU's independent capacity to access space, securing the autonomy of supply for critical technologies and equipment and fostering the EU's space sector competitiveness.</p>
<p><b>Creating a more resilient, inclusive and democratic European society (D)</b></p>	<p><b>A human-centred and ethical development of digital and industrial technologies</b>, through a two-way engagement in the development of technologies, empowering end-users and workers, and supporting social innovation.</p>

## Budget of Cluster 4

Total budget of 15.348 B€ over 2021-2027 (including NGEU)

For the WP 2021-2022, the programmable budget is ~3.4 B€, distributed approximately as follows

DESTINATION	BUDGET 2021-2022
Destination 1 'Climate neutral, circular and digitised production'	<b>737,5 M€</b>
Destination 2 'Increased autonomy in key strategic value chains for resilient industry'	<b>776,4 M€</b>
Destination 3 'World leading data and computing technologies'	<b>346 M€</b>
Destination 4 'Digital and emerging technologies for competitiveness and fit for the green deal'	<b>750 M€</b>
Destination 5 'Open Strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data'	<b>518,9 M€</b>
Destination 6 'A Human-centred and ethical development of digital and industrial technologies'	<b>327 M€</b>
Other Actions (other than Space Other Actions)	<b>58 M€</b>

# Partnerships in Cluster 4



- Processes4Planet – Transforming the European Process Industry for a sustainable society
- Clean Steel - Low Carbon Steelmaking
- Made in Europe
- EuroHPC, High-Performance Computing (JU)
- KDT, Key Digital Technologies (JU)
- SNS, Smart Networks and Services (JU)
- Artificial Intelligence, Data and Robotics
- Photonics
- Globally competitive Space Systems (proposed)
- Metrology

# Co-programmed European Partnerships

Legal form: Contractual Arrangement / MoU (signed between representatives of the partners and the Commission)

[#RiDaysEU | Memorandum of Understanding signature ceremony for EU Partnerships - YouTube](#)

## Implementation:

- Union budget is implemented in the Horizon Europe Work Programme.
- Piloting 60% funding rate for IA (TRL 5 to 7)
- Partners implement their commitments and contributions under their responsibility.

**Activities and contributions have to be agreed in the Annual Work Plan (to ensure they are in the scope of the partnership)**

- European Commission: call topics for the necessary range of actions)
- Partners: their own activities and investments (at least equivalent to public funding)

**Private association** provides back-office with important functionalities



## A mutually-reinforcing set of components

### Digital Decade Communication

2030 Vision & Targets, Approach to delivery, Digital Principles

Public consultation & discussions with Member States / Stakeholders

### Policy Program: a Path to the Digital Decade & Digital Principles proposal

#### Upcoming Declaration on Digital Principles

- ✓ ensure the same rights that apply offline can be fully exercised online, including access to:
  - ✓ high quality connectivity
  - ✓ sufficient digital skills
  - ✓ public services
  - ✓ fair and non-discriminatory online services

# Destination 3: World leading data and computing technologies

SECTIONS	NUMBER OF TOPICS	ESTIMATED BUDGET (EUR M)
Data sharing in the common European data spaces	3	134
Strengthening Europe's data analytics capacity	2	63
From Cloud to Edge to IoT for European Data	5 (incl. 2 CSAs)	149
TOTAL estimated budget WP 2021-2022	10	346

EuroHPC JU: 243 MEUR

# Call - WORLD LEADING DATA AND COMPUTING TECHNOLOGIES 2022

## *HORIZON-CL4-2022-DATA-01*

**205 MEur**

### *HORIZON-CL4-2022-DATA-01*

#### **Data sharing in the common European data spaces**

-04: Technologies and solutions for data trading, monetizing, exchange and interoperability (AI, Data and Robotics Partnership) (IA)

#### **Strengthening Europe's data analytics capacity**

-01: Methods for exploiting data and knowledge for extremely precise outcomes (analysis, prediction, decision support), reducing complexity and presenting insights in understandable way (RIA)

-05: Extreme data mining, aggregation and analytics technologies and solutions (RIA)

#### **From Cloud to Edge to IoT for European Data**

-02: Cognitive Cloud: AI-enabled computing continuum from Cloud to Edge (RIA)

-03: Programming tools for decentralised intelligence and swarms (RIA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-04	IA	52	10-13	4	23-Nov 2021 to 05 Apr 2022
-01	RIA	33	8-12	3	23-Nov 2021 to 05 Apr 2022
-05	RIA	30	5	6	23-Nov 2021 to 05 Apr 2022
-02	RIA	50	4-6	10	23-Nov 2021 to 05 Apr 2022
-03	RIA	40	4-8	5	23-Nov 2021 to 05 Apr 2022

## Destination 4: Digital and emerging technologies for competitiveness and fit for the green deal

	NUMBER OF TOPICS	ESTIMATED BUDGET (EUR M)
Ultra-low power processors	3 (incl. 1 CSA)	50
European Innovation Leadership in Electronics	2 (incl. 1 CSA)	38
European Innovation Leadership in Photonics	3	113
6G and foundational connectivity technologies	3 (incl. 1 CSA)	29
Innovation in AI, Data and Robotics	3	68
Tomorrow's deployable Robots: efficient, robust, safe, adaptive and trusted	4	120,5
European leadership in Emerging Enabling Technologies	4 (incl. 1 CSA)	59,5
Flagship on Quantum Technologies: a Paradigm Shift	17 (incl. 1 CSA + 6 SGAs in OA)	228,5
Graphene: Europe in the lead	5 (incl. 1 CSA)	43,5
TOTAL estimated budget WP 2021-2022	44	750

**KDT JU: 460 MEUR, SNS JU: 243 MEUR**

# Call - Digital and emerging technologies for competitiveness and fit for the green deal

## *HORIZON-CL4-2021-DIGITAL-EMERGING-02*

### *HORIZON-CL4-2021-DIGITAL-EMERGING-02*

**51 MEur**

#### **Flagship on Quantum Technologies: a Paradigm Shift**

- 15: Framework Partnership Agreement for developing the first large-scale quantum computers (FPA)
- 16: Basic Science for Quantum Technologies (RIA)
- 17: Framework Partnership Agreement for developing large scale quantum simulation platform technologies (FPA)
- 19: Framework Partnership Agreements in Quantum Communications (FPA)
- 20: Quantum sensing technologies for market uptake (IA)
- 22: Framework Partnership Agreements for open testing and experimentation and for pilot production capabilities for quantum technologies (FPA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-10	RIA	12	5-7	2	2-Nov to 27 Jan 2022
-15	FPA			0	2-Nov to 27 Jan 2022
-16	RIA	16	2-3	5	2-Nov to 27 Jan 2022
-17	FPA			0	2-Nov to 27 Jan 2022
-19	FPA			0	2-Nov to 27 Jan 2022
-20	IA	23	7-10	3	2-Nov to 27 Jan 2022
-22	FPA			0	2-Nov to 27 Jan 2022

### *HORIZON-CL4-QUANTUM-XX-SGAs*

**143,60 MEur**

#### **(Other Actions) Flagship on Quantum Technologies: a Paradigm Shift**

- 01-SGA - Developing the first large-scale quantum computers (SGA)
- 02-SGA - Developing large scale quantum simulation platform technologies (SGA)
- 03-SGA - Building the Quantum Internet (SGA)
- 04-SGA - Quantum encryption and future quantum network technologies (SGA)
- 05-SGA - Supporting open testing and experimentation for quantum technologies in Europe (SGA)
- 06-SGA - Supporting experimental production capabilities for quantum technologies in Europe (SGA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-01-SGA	SGA	40	18-20	2	2nd/3rd quarter of 2022
-02-SGA	SGA	16.6	16.6	1	2nd/3rd quarter of 2022
-03-SGA	SGA	24	24	1	2nd/3rd quarter of 2022
-04-SGA	SGA	25	25	1	2nd/3rd quarter of 2022
-05-SGA	SGA	19	19	1	2nd/3rd quarter of 2022
-06-SGA	SGA	19	19	1	2nd/3rd quarter of 2022

# Call - Digital and emerging technologies for competitiveness and fit for the green deal 2022

## *HORIZON-CL4-2022-DIGITAL-EMERGING-01*

**200 MEur**

### *HORIZON-CL4-2022-DIGITAL-EMERGING-01*

#### Ultra-low power processors

-26: Open source for cloud-based services (RIA)

#### European Innovation Leadership in Electronics

-38: International cooperation in semiconductors (CSA)

#### European Innovation Leadership in Photonics

-03: Advanced multi-sensing systems (Photonics Partnership) (RIA)

#### 6G and foundational connectivity technologies

-30: European Enabling technologies for Beyond 5G/6G RAN disaggregated architectures (RIA)

-39: Ultra low energy and secure networks (RIA)

#### Innovation in AI, Data and Robotics

-05: AI, Data and Robotics for Industry optimisation (including production and services) (AI, Data and Robotics Partnership) (IA)

#### Tomorrow's deployable Robots: efficient, robust, safe, adaptive and trusted

-06: Pushing the limit of physical intelligence and performance (RIA)

-07: Increased robotics capabilities demonstrated in key sectors (AI, Data and Robotics Partnership) (IA)

#### European leadership in Emerging Enabling Technologies

-35: Advanced characterisation methodologies to assess and predict the health and environmental risks of nanomaterials (RIA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-26	RIA	22	4-6	4	21-Dec2021 to 05 Apr 2022
-38	CSA	3	3	1	21-Dec2021 to 05 Apr 2022
-03	RIA	48	3-5	10	21-Dec2021 to 05 Apr 2022
-30	RIA	13	13	1	21-Dec2021 to 05 Apr 2022
-39	RIA	13	13	1	21-Dec2021 to 05 Apr 2022
-05	IA	19	3-5	5	16-Jun 2022 to 16 Nov 2022
-06	RIA	28.5	4	7	16-Jun 2022 to 16 Nov 2022
-07	IA	36	6	6	16-Jun 2022 to 16 Nov 2022
-35	RIA	17.5	2-3	5	21-Dec2021 to 05 Apr 2022

# Call - Digital and emerging technologies for competitiveness and fit for the green deal 2022

## *HORIZON-CL4-2022-DIGITAL-EMERGING-02*

**43,5 MEur**

### *HORIZON-CL4-2022-DIGITAL-EMERGING-02*

#### **Graphene: Europe in the lead**

- 17: New generation of advanced electronic and photonic 2D materials-based devices, systems and sensors (RIA)
- 18: 2D materials-based devices and systems for energy storage and/or harvesting (RIA)
- 19: 2D materials-based devices and systems for biomedical applications (RIA)
- 20: 2D-material-based composites, coatings and foams (IA)
- 22: Supporting the coordination of the Graphene Flagship projects (CSA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-17	RIA	16.5	16.5	1	16-Jun 2022 to 16 Nov 2022
-18	RIA	9	9	1	16-Jun 2022 to 16 Nov 2022
-19	RIA	6	6	1	16-Jun 2022 to 16 Nov 2022
-20	IA	9	9	1	16-Jun 2022 to 16 Nov 2022
-22	CSA	3	3	1	16-Jun 2022 to 16 Nov 2022

# Destination 6: A human-centred and ethical development and industrial technologies

	NUMBER OF TOPICS	ESTIMATED BUDGET (EUR M)
Leadership in AI based on trust	7 (incl. 1 CSA)	131,5
An Internet of Trust	8 (incl. 3 CSAs)	64,5
eXtended Reality (XR)	7 (incl. 1 CSA)	103,5
Systemic approaches to make the most of the technologies within society and industry incl. 3 <u>NCP Networks for Cluster 4 (Digital, Industry and Space)</u>	9 (incl. 7 CSAs)	27,5
TOTAL estimated budget WP 2021-2022	31	327



# Call - A HUMAN-CENTRED AND ETHICAL DEVELOPMENT OF DIGITAL AND INDUSTRIAL TECHNOLOGIES 2022

## *HORIZON-CL4-2022-HUMAN-01*

*121 MEur*

### *HORIZON-CL4-2022-HUMAN-01*

#### **Leadership in AI based on trust**

-01: AI for human empowerment (AI, Data and Robotics Partnership) (RIA)

-02: European Network of AI Excellence Centres: Expanding the European AI lighthouse (RIA)

#### **An Internet of Trust**

-03: Internet architecture and decentralised technologies (RIA)

-05: Next Generation Safer Internet: Technologies to identify digital Child Sexual Abuse Material (CSAM) (RIA)

-07: NGI International Collaboration - USA and Canada (RIA)

#### **eXtended Reality (XR)**

-14: eXtended Reality Technologies (RIA)

-19: eXtended Reality Learning - Engage and Interact (IA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-01	RIA	16	4	4	16-Jun 2022 to 16 Nov 2022
-02	RIA	34.5	11.5	3	16-Jun 2022 to 16 Nov 2022
-03	RIA	22	11.5	2	21-Dec2021 to 05 Apr 2022
-05	RIA	2	2	1	21-Dec2021 to 05 Apr 2022
-07	RIA	6	6	1	21-Dec2021 to 05 Apr 2022
-14	RIA	19	5-8	3	21-Dec2021 to 05 Apr 2022
-19	IA	21.5	5-8	3	21-Dec2021 to 05 Apr 2022

# Destination 1: Climate neutral, circular, and digitised production

SECTIONS	NUMBER OF TOPICS	ESTIMATED BUDGET (EUR M)
Green, flexible and advanced manufacturing	8	193
Advanced digital technologies for manufacturing	4	94
A new way to build, accelerating disruptive change in construction	4	69
Hubs for circularity, a stepping stone towards climate neutrality and circularity in industry	3 (including 1 CSA)	72,5
Enabling circularity of resources in the process industries, including waste, water and CO <sub>2</sub> /CO	6	173,5
Integration of Renewables and Electrification in process industry	5	135,5
TOTAL estimated budget WP 2021-2022	30	737,5

# Call - CLIMATE NEUTRAL, CIRCULAR AND DIGITISED PRODUCTION 2022

## HORIZON-CL4-2022-TWIN-TRANSITION-01

**52 MEur**

**Advanced digital technologies for manufacturing**

- 06: ICT Innovation for Manufacturing Sustainability in SMEs (I4MS2) (Made in Europe Partnership) (IA)
- 07: Digital tools to support the engineering of a Circular Economy (Made in Europe Partnership) (RIA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-06	IA	30	4-8	4	12-Oct 2021 to 30-Mar 2022
-07	RIA	22	3-6	3	12-Oct 2021 to 30-Mar 2022

# Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2022

## HORIZON-CL4-2022-RESILIENCE-01

**4,5 MEur**

**Improving the resilience and preparedness of EU businesses, especially SMEs and Startups**

- 21: Leveraging standardisation in Digital Technologies (CSA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-21	CSA	4.5	4.5	1	12-Oct 2021 to 30-Mar 2022

# Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021 (PCP)

## HORIZON-CL4-2022-RESILIENCE-02-PCP

**9 MEur**

**Improving the resilience and preparedness of EU businesses, especially SMEs and Startups**

- 01: Boosting green economic recovery and open strategic autonomy in Strategic Digital Technologies through pre-commercial procurement (PCP action)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-21	PCP	9	9	1	12-Oct 2021 to 30-Mar 2022

Cluster 4 Info Days on 29-30 Nov & 1 Dec 2021:

[Cluster 4 - Digital, Industry & Space | European Commission \(europa.eu\)](#)

Participants portal - Funding & tender opportunities:

[Funding & tenders \(europa.eu\)](#)