#HorizonEU

**THE EU
RESEARCH & INNOVATION
PROGRAMME**

2021 – 2027

Horizon Europe Cluster 4 - Digital, Industry and Space

19 July 2021

Overview 'Digital'

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DHoU CNECT.D1- Research Strategy and programme coordination**

European Commission

Research and Innovation

Cluster 4 'Digital, Industry and Space' – Political Priorities

[European Space Strategy](#)

[Action Plan on critical raw materials](#)

[Circular Economy Action Plan – For a cleaner and more competitive Europe](#)

[European data strategy | European Commission (europa.eu)](#)

[Europe's Digital Decade: digital targets for 2030 | European Commission (europa.eu)](#)

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

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

European Commission

Partnerships in Cluster 4

- Processes4Planet – Transforming the European Process Industry for a sustainable society (1,300M€)

- Clean Steel – Low-carbon Steelmaking (700M€)

- Made in Europe (900M€)

- EuroHPC, High-Performance Computing (JU, 900M€)

- KDT, Key Digital Technologies (JU, 1,800M€)

- SNS, Smart Networks and Services (JU, 900M€)

- Artificial Intelligence, Data and Robotics (1,300M€)

- Photonics (340M€)

- Globally competitive Space Systems (proposed)

- Metrology (Art. 185, 300M€)

Indicative Budget of Cluster 4
2021-27 budget of 15.348 bn€ (including NGEU)

For the WP 2021-2022, the **programmable budget is ~3.5 bn€**, distributed *approximately* as:

DESTINATION	BUDGET 2021-2022
Destination 'Climate neutral, circular and digitised production'	737.5 M€
Destination 'Increased autonomy in key strategic value chains for resilient industry'	776.4 M€
Destination 'World leading data and computing technologies'	346.0 M€
Destination 'Digital and emerging technologies for competitiveness and fit for the green deal'	750.0 M€
Destination 'Open Strategic autonomy in developing, deploying and using global space-based infrastructures, services, applications and data' (incl. Other Actions)	517.6 M€
Destination 'A Human-centred and ethical development of digital and industrial technologies'	327.0 M€
Other Actions (other than Space-related)	36.0 M€

European Commission

Climate neutral, circular, and digitised production

SECTIONS	NUMBER OF TOPICS	ESTIMATED BUDGET (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 CO2/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 - TWIN GREEN AND DIGITAL TRANSITION 2021

HORIZON-CL4-2021-TWIN-TRANSITION-01   *96 MEur*

HORIZON-CL4-2021-TWIN-TRANSITION-01

Green, flexible and advanced manufacturing

-01: AI enhanced robotics systems for smart manufacturing (AI, Data and Robotics - Made in Europe Partnerships) (IA)
-03: Laser-based technologies for green manufacturing (Photonics - Made in Europe Partnerships) (RIA)

Advanced digital technologies for manufacturing

-07: Artificial Intelligence for sustainable, agile manufacturing (AI, Data and Robotics - Made in Europe Partnerships) (IA)
-08: Data-driven Distributed Industrial Environments (Made in Europe Partnership) (IA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-01	IA	28	8-10	3	22-Jun to 23-Sep 2021
-03	RIA	26	5-7	4	22-Jun to 23-Sep 2021
-07	IA	18	4-6	3	22-Jun to 23-Sep 2021
-08	IA	24	4-8	3	22-Jun to 23-Sep 2021

Autonomy in Key Strategic Value Chains for Resilient Industry

SECTIONS	NUMBER OF TOPICS	ESTIMATED BUDGET (M€)
Novel paradigms to establish resilient and circular value chains	2	50
Raw materials for EU strategic autonomy and successful transition to a climate-neutral and circular economy	12 (incl. 2 CSA)	253.9
Green and Sustainable Materials	9 (incl. 1 CSA)	173
Materials for the benefit of society and the environment and materials for decarbonising Industry	8 (incl. 2 CSA)	175
Materials and data cross-cutting actions	5 (incl. 1 CSA)	59.5
Improving the resilience and preparedness of EU businesses, especially SMEs and Startups	8 (incl. 4 CSA)	65
TOTAL estimated budget WP 2021-2022	44	776.4

Call - A DIGITISED, RESOURCE-EFFICIENT AND RESILIENT INDUSTRY 2021

HORIZON-CL4-2021-RESILIENCE-01   *4 MEur*

HORIZON-CL4-2021-RESILIENCE-01

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

-27: Innovation Radar, Tech Due Diligence and Venture Building for strategic digital technologies (CSA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-27	CSA	4	2.5-4	1	22-Jun to 23-Sep 2021

World leading Data and Computing Technologies 2021-2022

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 2021

HORIZON-CL4-2021-DATA-01

141 MEur

HORIZON-CL4-2021-DATA-01

Data sharing in the common European data spaces

-01: Technologies and solutions for compliance, privacy preservation, green and responsible data operations (AI, Data and Robotics Partnership) (RIA)

-03: Technologies for data management (AI, Data and Robotics Partnership) (IA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-01	RIA	52	8-11	5	22-Jun to 21 Oct 2021
-03	IA	30	5	6	22-Jun to 21 Oct 2021

From Cloud to Edge to IoT for European Data

-05: Future European platforms for the Edge: Meta Operating Systems (RIA)

-07: Coordination and Support of the 'Cloud-Edge-IoT' domain (CSA)

-08: Roadmap for next generation computing and systems technologies (CSA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-05	RIA	54	8-12	5	22-Jun to 21 Oct 2021
-07	CSA	3	1.5	2	22-Jun to 21 Oct 2021
-08	CSA	2	2	1	22-Jun to 21 Oct 2021

Digital and emerging technologies for competitiveness and fit for the green deal – 2021-2022

SECTIONS	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

European Commission

Call - Digital and emerging technologies for competitiveness and fit for the green deal - 2021

HORIZON-CL4-2021-DIGITAL-EMERGING-01

HORIZON-CL4-2021-DIGITAL-EMERGING-01   *311,9 MEur*

<u>Ultra-low power processors</u>

-01: Ultra-low-power, secure processors for edge computing (RIA)

-05: Open Source Hardware for ultra-low-power, secure processors (CSA)

<u>European Innovation Leadership in Electronics</u>

-31: Functional electronics for green and circular economy (RIA)

<u>European Innovation Leadership in Photonics</u>

-06: Advanced optical communication components (Photonics Partnership) (IA)

-07: Advanced Photonic Integrated Circuits (Photonics Partnership) (RIA)

<u>6G and foundational connectivity technologies</u>

-26: Coordination of European Smart Network actions (CSA)

<u>Innovation in AI, Data and Robotics</u>

-09: AI, Data and Robotics for the Green Deal (AI, Data and Robotics Partnership) (IA)

-10: AI, Data and Robotics at work (AI, Data and Robotics Partnership) (IA)

<u>Tomorrow's deployable Robots: efficient, robust, safe, adaptive and trusted</u>

-11: Pushing the limit of robotics cognition (AI, Data and Robotics Partnership) (RIA)

-12: European Network of Excellence Centres in Robotics (RIA)

<u>European leadership in Emerging Enabling Technologies</u>

-13: Academia-Industry Forum on Emerging Enabling Technologies (CSA)

-14: Advanced spintronics: Unleashing spin in the next generation ICs (RIA)

-27: Development of technologies/devices for bio-intelligent manufacturing (RIA)

<u>Flagship on Quantum Technologies: a Paradigm Shift</u>

-21: Next generation quantum sensing technologies (RIA)

-23: International cooperation with Canada (RIA)

-30: Investing in new emerging quantum computing technologies (RIA)

-32: Support and coordination of the Quantum Technologies Flagship Initiative (CSA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-01	RIA	26	8-10	3	22-Jun to 21 Oct 2021
-05	CSA	2	2	1	22-Jun to 21 Oct 2021
-31	RIA	35	3-5	9	22-Jun to 21 Oct 2021
-06	IA	26	4-6	6	22-Jun to 21 Oct 2021
-07	RIA	39	3-5	8	22-Jun to 21 Oct 2021
-26	CSA	3	3	1	22-Jun to 21 Oct 2021
-09	IA	27	3-5	7	22-Jun to 21 Oct 2021
-10	IA	22	3-5	6	22-Jun to 21 Oct 2021
-11	RIA	44.5	5	9	22-Jun to 21 Oct 2021
-12	RIA	11.5	11.5	1	22-Jun to 21 Oct 2021
-13	CSA	2.5	2.5	1	22-Jun to 21 Oct 2021
-14	RIA	17	2-3	6	22-Jun to 21 Oct 2021
-27	RIA	22.5	5-7	4	22-Jun to 21 Oct 2021
-21	RIA	13.5	6.75	2	22-Jun to 21 Oct 2021
-23	RIA	4	1.33	3	22-Jun to 21 Oct 2021
-30	RIA	10	5	2	22-Jun to 21 Oct 2021
-32	CSA	6.4	6.4	1	22-Jun to 21 Oct 2021

Call - Digital and emerging technologies for competitiveness and fit for the green deal - 2021

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	28-Oct to 27 Jan 2022
-15	FPA			0	28-Oct to 27 Jan 2022
-16	RIA	16	2-3	5	28-Oct to 27 Jan 2022
-17	FPA			0	28-Oct to 27 Jan 2022
-19	FPA			0	28-Oct to 27 Jan 2022
-20	IA	23	7-10	3	28-Oct to 27 Jan 2022
-22	FPA			0	28-Oct 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

Article 22(5)

High TRL Quantum Technologies	Framework Partnership Agreement for developing the first large-scale quantum computers (FPA), including: • Specific Grant Agreement for developing the first large-scale quantum computers (SGA)
High TRL Quantum Technologies	Framework Partnership Agreement for developing large scale quantum simulation platform technologies (FPA). including: • Specific Grant Agreement for developing large scale quantum simulation platform technologies (SGA)
High TRL Quantum Technologies	Framework Partnership Agreements in Quantum Communications (FPA), including: • Specific Grant Agreement for building the Quantum Internet (SGA) • Specific Grant Agreement for Quantum encryption and future quantum network technologies (SGA)
High TRL Quantum Technologies	Grant Agreement for Quantum sensing technologies for market uptake
High TRL Quantum Technologies	Framework Partnership Agreements for open testing and experimentation and for pilot production capabilities for quantum technologies (FPA), inclu • Specific Grant Agreement for supporting open testing and experimentation for quantum technologies in Europe (SGA) • Specific Grant Agreement for supporting experimental production capabilities for quantum technologies in Europe (SGA)
High TRL Quantum Technologies	Grant Agreement for Strengthening the quantum software ecosystem for quantum computing platforms

Opening of FPA calls: 28 October 2021

European Commission

Eligibility conditions: Article 22(5)

Current work programme eligible countries:

- Member States + EEA countries Iceland & Norway

Until now: Discussions with Member States on assurances from candidate associated countries (AC).

During July: Candidate AC to reply to questionnnaire

August-September: Assessment of replies, discussions, Commission - MS

October: WP update to add candidate AC (publication before 28 October)

A human-centred and ethical development and industrial technologies 2021-2022

SECTIONS	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 NCP Networks for Cluster 4 (Digital, Industry and Space)	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 2021

HORIZON-CL4-2021-HUMAN-01   206 MEur

HORIZON-CL4-2021-HUMAN-01

Leadership in AI based on trust

-01: Verifiable robustness, energy efficiency and transparency for Trustworthy AI: Scientific excellence boosting industrial competitiveness (AI, Data and Robotics Partnership) (RIA)

-02: European coordination, awareness, standardisation & adoption of trustworthy European AI, Data and Robotics (AI, Data and Robotics Partnership) (CSA)

-03: European Network of AI Excellence Centres: Pillars of the European AI lighthouse (RIA)

-24: Tackling gender, race and other biases in AI (RIA)

-27: AI to fight disinformation (RIA)

An Internet of Trust

-04: Trust & data sovereignty on the Internet (RIA)

-05: Trustworthy open search and discovery (RIA)

-07: Next Generation Internet community-building and outreach (CSA)

-08: NGI International Collaboration - Transatlantic fellowship programme (CSA)

-09: NGI Tech Review (CSA)

eXtended Reality (XR)

-13: eXtended Reality Modelling (RIA)

-14: eXtended Reality for All – Haptics (RIA)

-25: eXtended Collaborative Telepresence (IA)

-06: Innovation for Media, including eXtended Reality (IA)

-28: eXtended Reality Ethics, Interoperability and Impact (CSA)

Systemic approaches to make the most of the technologies within society and industry

-17: Awareness raising on Intellectual property (IP) management for European R&I (CSA)

-18: Fostering standardisation to boost European industry's competitiveness (CSA)

-19: Testing innovative solutions on local communities' demand (CSA)

-20: Piloting a new industry-academia knowledge exchange focussing on companies' needs (CSA)

-21: Art-driven use experiments and design (RIA)

-29: Support for transnational activities of National Contact Points in the thematic area of Digital (CSA)

-30: Support for transnational activities of National Contact Points in the thematic area of Industry (CSA)

-31: Support for transnational activities of National Contact Points in the thematic area of Space (CSA)

-26: Workforce skills for industry 5.0 (RIA)

	ToA	Budget (ME)	EU contribution (ME)	No of projects	Call period
-01	RIA	36	4	9	22-Jun to 21 Oct 2021
-02	CSA	13	4-9	2	22-Jun to 21 Oct 2021
-03	RIA	9	9	1	22-Jun to 21 Oct 2021
-24	RIA	10	3-3.5	3	22-Jun to 21 Oct 2021
-27	RIA	13	6.5	2	22-Jun to 21 Oct 2021
-04	RIA	12	12	1	22-Jun to 21 Oct 2021
-05	RIA	17	8.5	2	22-Jun to 21 Oct 2021
-07	CSA	2	2	1	22-Jun to 21 Oct 2021
-08	CSA	2	2	1	22-Jun to 21 Oct 2021
-09	CSA	1.5	1.5	1	22-Jun to 21 Oct 2021
-13	RIA	14.5	4.8	3	22-Jun to 21 Oct 2021
-14	RIA	6	6	1	22-Jun to 21 Oct 2021
-25	IA	14	5-8	2	22-Jun to 21 Oct 2021
-06	IA	26	8-9	3	22-Jun to 21 Oct 2021
-28	CSA	2.5	2.5	1	22-Jun to 21 Oct 2021
-17	CSA	1	1	1	22-Jun to 21 Oct 2021
-18	CSA	1	1	1	22-Jun to 21 Oct 2021
-19	IA	5	5	1	22-Jun to 21 Oct 2021
-20	CSA	2	2	1	22-Jun to 21 Oct 2021
-26	RIA	5	5	1	22-Jun to 21 Oct 2021
-21	RIA	8.5	2.8	3	22-Jun to 21 Oct 2021
-29	CSA	2.5	2.5	1	22-Jun to 21 Oct 2021
-30	CSA	1.5	1.5	1	22-Jun to 21 Oct 2021
-31	CSA	1	1	1	22-Jun to 21 Oct 2021

CLUSTER 4 – SPACE DESTINATION

Watch the Topics presentations:

https://www.horizon-europe-infodays2021.eu/event/cluster-4-digital-industry-space/

Thank you!

HorizonEU

http://ec.europa.eu/horizon-europe