THE EU RESEARCH & INNOVATION PROGRAMME

2021 – 2027

EVANGELIA MARKIDOU
Head of Sector
Robotics & AI Innovation and Excellence
European Commission DG CONNECT

OUTLINE

CALL:
Opening June 22
Closing November 22

DESTINATION 4
DIGITAL AND EMERGING TECHNOLOGIES
FOR COMPETITIVENESS AND FIT FOR THE GREEN DEAL

Innovation in AI, Data and Robotics

DIGITAL-EMERGING-01-05:
AI, Data and Robotics for Industry optimisation (Production & Services) **(IA)**

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

DIGITAL-EMERGING-01-06:
Pushing the limit of physical intelligence and performance **(RIA)**

DIGITAL-EMERGING-01-07:
Increased robotics capabilities demonstrated in key sectors **(IA)**

European Commission

INNOVATION IN AI, DATA AND ROBOTICS

HORIZON-CL4-2022-DIGITAL-EMERGING-02-05

- AI, DATA AND ROBOTICS FOR INDUSTRY OPTIMISATION (INCLUDING PRODUCTION AND SERVICES)

European Commission

TYPE: Innovation Action (IA)

BUDGET: 19 M€

SIZE: Focused projects: no FSTP
Large projects: Min. 40% FSTP*

TRL start: 3-5 ➔ TRL end: 6-7

* FSTP: Financial Support to Third Parties

European Commission

AI, Data and Robotics for Industry optimization (production and services)

Expected outcomes (at least one):

1. Advancing **AI, data and robotics**, and automation for the **optimisation of production and services value-chains**
   - ➔ products, services, processes
   - ➔ competitiveness, working conditions, and envir. sustainability

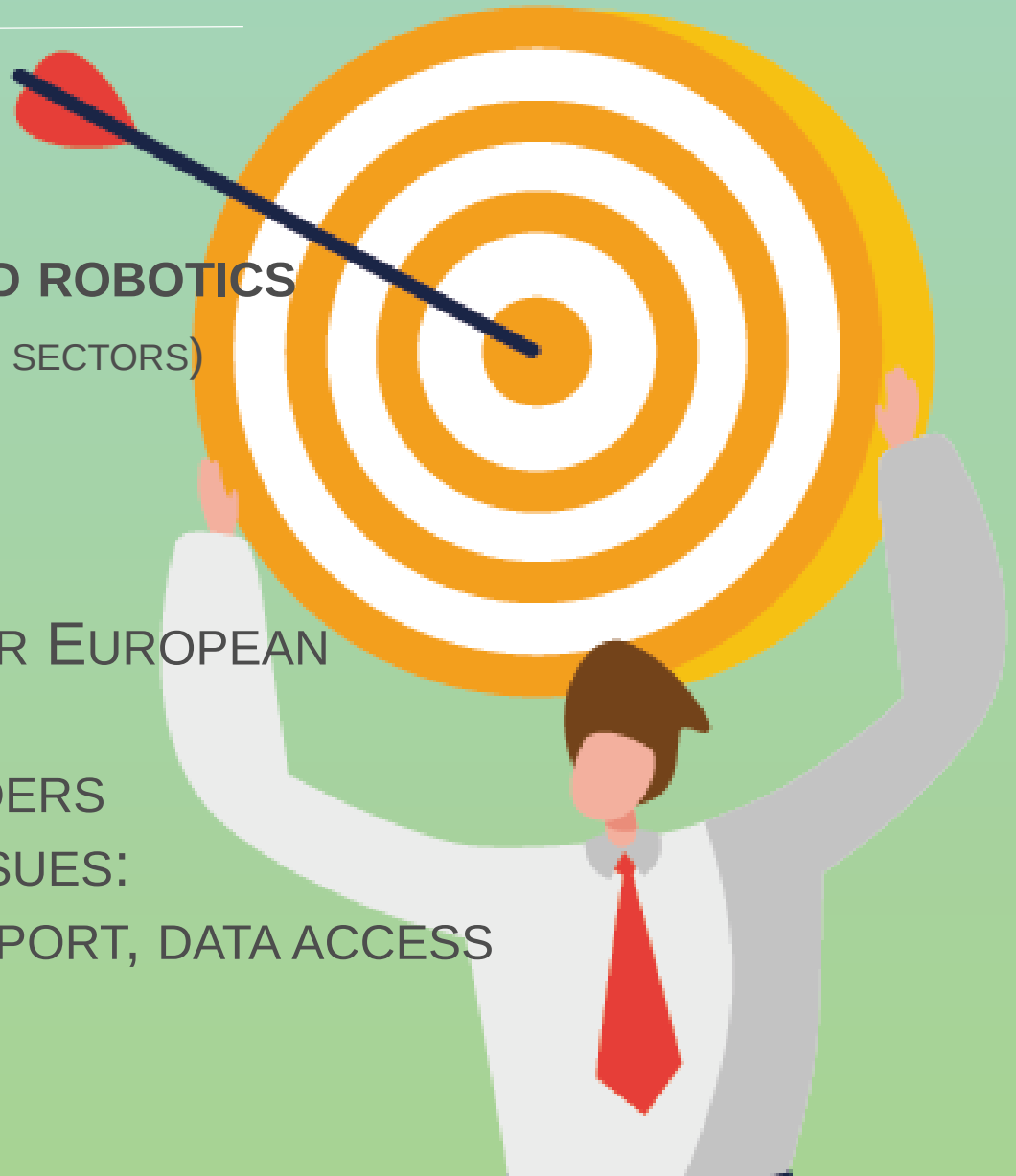
2. **AI for adapting production or services workflows** to
   - ➔changing environments,
   - ➔ dynamic and unpredictable resource constraint
   - ➔ capabilities and restrictions of humans
   - ➔transferring results from one domain to another.

SPECIFY FOCUS : Production or Services !!

Will be used for funding selection

➔ if not explicit in proposal ➔ will be assessed @ evaluation stage

SCOPE: INTEGRATE AND OPTIMISE AI, DATA AND ROBOTICS SOLUTIONS TO DEMONSTRATE HOW THEY CAN OPTIMISE PRODUCTION AND SERVICE USE CASES



INDUSTRY-EMPOWERING AI, DATA AND ROBOTICS

- USE-CASES DRIVEN (MAJOR INDUSTRIAL SECTORS)
- DEMONSTRATE:
  - TECHNOLOGY PERFORMANCE
  - TRUSTWORTHY SOLUTIONS
  - SUBSTANTIAL BENEFIT TO MAJOR EUROPEAN INDUSTRIES
- DEEP INVOLVEMENT OF STAKEHOLDERS
- ADDRESS ALSO NON-TECHNICAL ISSUES:
  - ETHICAL, TRUST, BUSINESS SUPPORT, DATA ACCESS AND RE-USE

TWO TYPES OF PROPOSALS:

FOCUSED PROJECTS

Small

- user industry
- technology providers

LARGER PROJECTS

Challenges from User companies

Must include FSTP:

- >40% of the budget
- up to 200K€/TP
- TP = SMEs (70% funding) and start-ups (100% funding)

European Commission

Other requirements:

Build on existing results / Resources

+

Share Results

Connect with stakeholders, DIH

+ PPP

User industries:

- requirements
- validation

Support to SMEs and Start-ups

&

Awareness Raising

European Commission

1. **What are we looking for?**

- Maximise impact (Major industrial sector + demonstrate clear benefits)
- Integrate and optimise AI, data and robotics solutions to demonstrate how they can contribute to the Use-Case
- Test in actual / highly realistic operating environments ➔ boost deployment
- Right mix of expertise
- BOTH Robotics and non-Robotics AI encouraged – ideal: combination AI-Data-Robotics
- BOTH Small (focused) and Large (FSTP) projects ➔ encourage GOOD FSTP as well

2**. What do we <u>NOT</u> want?**

- Major Research component ➔ BUT build on latest developments
- Tech push / Invented problems
- Niche sectors with limited impact
- Anything artificial ➔ BUT everything optimized towards the project objectives

TOMORROW'S DEPLOYABLE ROBOTS:

EFFICIENT, ROBUST, SAFE, ADAPTIVE AND TRUSTED

DIGITAL-EMERGING-02-06

- PUSHING THE LIMIT OF PHYSICAL INTELLIGENCE AND PERFORMANCE **(RIA)**

DIGITAL-EMERGING-02-07

- INCREASED ROBOTICS CAPABILITIES DEMONSTRATED IN KEY SECTORS **(IA)**

European Commission

PUSHING THE LIMIT OF PHYSICAL INTELLIGENCE AND PERFORMANCE

TYPE: Research and Innovation Action (RIA)

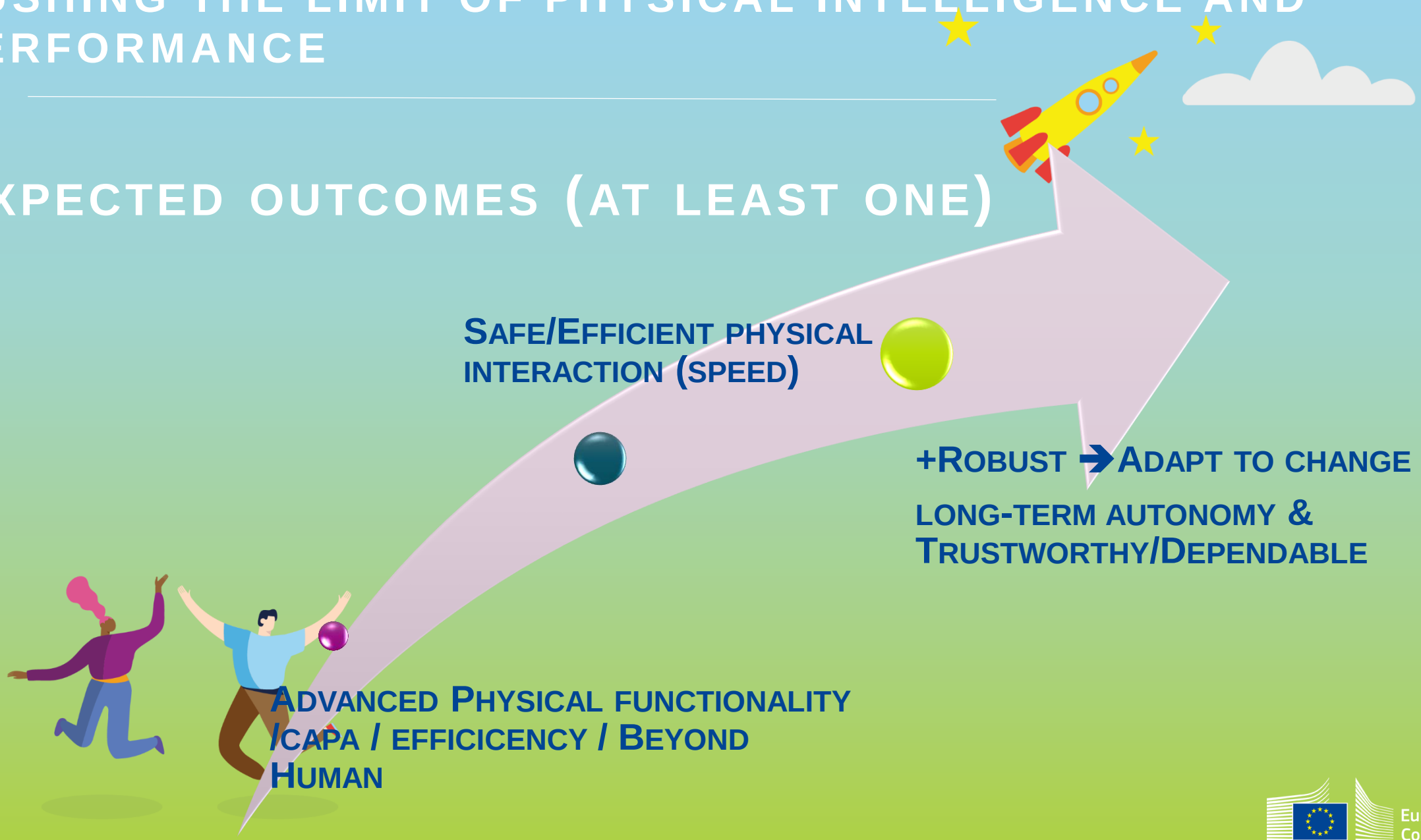
BUDGET: 28.5 M€

TRL start: 2-3 ➔ TRL end: 4-5

European Commission

PUSHING THE LIMIT OF PHYSICAL INTELLIGENCE AND PERFORMANCE

EXPECTED OUTCOMES (AT LEAST ONE)



European Commission

SCOPE: SIGNIFICANTLY EXTEND PHYSICAL CAPABILITY

PHYSICAL PERFORMANCE

ROBUSTNESS & RESILIENCE, ENERGY EFFICIENCY + SAFETY & AUTONOMY, SPEED, EXTREME PHYSICAL CONDITIONS

PROMISING/ INNOVATOVE CONCEPTS

COLLABORATIVE, MODULAR AND DISTRIBUTED, HYPER REDUNDANT, HIGHLY RECONFIGURABLE, SOFT OR MINIATURISED ROBOTICS

➔ ADAPTATION (INDUSTRY AND SOCIETY)

➔ NOVEL CONFIGURATIONS AND CONCEPTS

European Commission

SCOPE: NOVEL SCIENTIFIC APPROACHES OR PUSH THE LIMIT OF EXISTING ONES

+ ROBOTS PHYSICAL CAPABILITIES RELEVANT TO INDUSTRY AND SERVICE NEEDS

- ACTUATION, MINIATURIZATION, CONTROL, TRUSTWORTHINESS, DEPENDABILITY

EMBED METHODS & TOOLS

+ PERFORMANCE AND INTERACTION OF ROBOTS IN REAL WORLD TASKS

- WHERE TESTABILITY IS LIMITED

RETHINK ROBOT BODIES

- + PHYSICAL AND INTERACTION CAPABILITIES
- ANY SIZE/TYPE OF ACTIVITY/ENVIRONMENT
- INNOVATIVE APPROACHES - BUILD ON UNDERLYING TECHNOLOGIES + ENERGY EFFICIENCY
- COGNITIVE MECHATRONICS..

TRUSTWORTHY AI

European Commission

ALL PROPOSALS EXPECTED TO

DEMONSTRATE PROGRESS

(TRL 4-5 AT THE END OF THE PROJECTS)

- QUALITATIVE AND QUANTITATIVE KPIs
- DEMONSTRATORS BENCHMARKING & PROGRESS MONITORING

European Commission

TOMORROW'S DEPLOYABLE ROBOTS:

EFFICIENT, ROBUST, SAFE, ADAPTIVE AND TRUSTED

DIGITAL-EMERGING-02-06

- PUSHING THE LIMIT OF PHYSICAL INTELLIGENCE AND PERFORMANCE **(RIA)**

DIGITAL-EMERGING-02-07

- INCREASED ROBOTICS CAPABILITIES DEMONSTRATED IN KEY SECTORS **(IA)**

European Commission

INCREASED ROBOTICS CAPABILITIES DEMONSTRATED IN KEY SECTORS

TYPE: Innovation Action (IA)

BUDGET: 36M€

BUDGET: FSTP*

at least 20% project budget ➔ Development/Enhancement of demonstrators
max 200k€ per TP = Technology provider (SME/Start-ups)

TRL start: 3-5 ➔ TRL end: 6-7

* FSTP: Financial Support to Third Parties

European Commission

EXPECTED OUTCOMES CONTRIBUTE (AT LEAST ONE)

DEMONSTRATORS/SYSTEMS ABLE TO SHOW

ADDED VALUE OF ROBOTICS + THEIR PERFORMANCES

- MAJOR APPLICATION SECTORS
- OR DDD + STRENUOUS
- OR EXTREME ENVIRONMENTS

BEYOND HUMAN PERFORMANCE IN COMPLEX TASKS

- HIGH IMPACT IN KEY SECTORS
- ++ADAPTATION & FLEXIBILITY

HIGH LEVELS OF REACTIVITY & RESPONSIVENESS & INTELLIGIBILITY

- INTERACTION (HUMAN-ROBOT/ROBOT-ROBOT)
- MAJOR APPLICATION SECTORS

European Commission

SCOPE: INTEGRATE NOVEL ROBOTICS TECHNOLOGIES WITH ADVANCED CAPABILITIES INTO SOLUTIONS

SSH EXPERTISE (AT DESIGN STAGE):

- INTERACTION (HRI)
- INTELLIGIBILITY (ROBOT ACTION)
- TRUSTWORTHINESS/ ACCEPTABILITY

END-USERS NEEDS /APPLICATION DRIVEN

HIGHLY REALISTIC ENVIRONMENT / REAL-WORLD SCENARIOS

DEMONSTRATE ADDED VALUE OF ROBOTICS IN APPLICATIONS

➔ SUBSTANTIAL IMPACT

➔ SCALABILITY / SHORT TERM DEPLOYMENT POTENTIAL

European Commission

ALL PROPOSALS EXPECTED TO

DEMONSTRATE ADDED VALUE OF ROBOTICS TO THE CHOSEN APPLICATION

(TRL 6-7 AT THE END OF THE PROJECTS)

- QUALITATIVE AND QUANTITATIVE INDUSTRY OR SERVICE RELATED KPIS
- DEMONSTRATORS BENCHMARKING & PROGRESS MONITORING

European Commission

SCOPE:

IF SHARED WORKSPACE

- SAFE, DEPENDABLE EFFICIENT AND INTUITIVE INTERACTION

HUMAN-CENTERED

- INTERDISCIPLINARY: TECHNICAL + SSH
- INVOLVE WORKERS, PROFESSIONALS, ETC.
- INTERACTION DESIGN & TRUSTWORTHY AI

CONFIGURATION AND DEPLOYMENT TOOLS ENCOURAGED

- FAST DEPLOYABILITY
- EASY RECONFIGURATION

European Commission

SCOPE: HIGH IMPACT SECTORS / USE-CASES WHERE THE TECHNOLOGY CAN DEMONSTRATE MAXIMUM ADDED VALUE

FOCUS ON **ONE USE-CASE:**

HIGH IMPACT

- MAJOR SECTOR WITH HIGH SOCIO-ECO / ENVIR. IMPACT
  - IMPROVE EFFECTIVENESS/EFFICIENCY OF PROCESSES SERVICES

+ HUMAN WORKING CONDITIONS

- KEEPING WORKERS AWAY FROM UNSAFE AND UNHEALTHY JOBS.

European Commission

Work Programme topic: What are we looking for?

DIGITAL-EMERGING-01-061

- PUSHING THE LIMIT OF PHYSICAL INTELLIGENCE AND PERFORMANCE **(RIA)**

DIGITAL-EMERGING-01-07

- INCREASED ROBOTICS CAPABILITIES DEMONSTRATED IN KEY SECTORS **(IA)**

AMBITIOUS: **Step change**

- (RIA) Physical Capability
- (IA) **High Impact** sectors/Use-Cases

Major benefit from Robotics

➔ HIGH VISIBILITY

Mutlidisciplinarity:

Dictated by the projects needs (tech development vs. use)

2. What do we NOT want?

DIGITAL-EMERGING-01-061

- PUSHING THE LIMIT OF PHYSICAL INTELLIGENCE AND PERFORMANCE **(RIA)**

DIGITAL-EMERGING-01-07

- INCREASED ROBOTICS CAPABILITIES DEMONSTRATED IN KEY SECTORS **(IA)**

INCREMENTAL PROGRESS

APPLICATIONS OF LIMITED IMPACT

INVENTED/TECH PUSH PROBLEMS/VALIDATION SCENARIOS

« ARTIFICIAL MULTIDICIPLINARITY »

➔ NOT DRIVEN BY PROJECTS OBJECTIVES

Work Programme topic: What are we looking for?

For all Topics, projects are requested to:

➔ Dedicate a Task to connect to the CSA – PPP on AI, Data and robotics
➔Build on/Re-Use results from previous funded actions
➔Connect to DIHs
➔Build on AI-on-Demand platform (+ others)
➔ put their communicable results on the AI-on-demand platform (+ Other related platforms)

European Commission

Leadership in AI based on trust

CALL:
Opening June 22
Closing November 22

HORIZON-CL4-2022-HUMAN-02-01

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

HORIZON-CL4-2022-HUMAN-02-02

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

European Commission

AI FOR HUMAN EMPOWERMENT (AI, DATA AND ROBOTICS PARTNERSHIP) (RIA)

TYPE: Research and Innovation Action (RIA)

BUDGET: 16 M€

TRL start: 2-3 ➔ TRL end: 4-5

European Commission

Scope

Next level of **perception, visualisation, interaction and collaboration** between humans and AI systems working together to achieve common goals, sharing mutual understanding and learning of each other's abilities and respective roles.

Innovative and promising approaches incl. human-in the loop approaches for truly mixed human-AI initiatives combining the best of human and machine knowledge and capabilities, tacit knowledge extraction

European Commission

Research Objectives

TRULY MIXED HUMAN-AI INITIATIVES FOR HUMAN EMPOWERMENT.

TRUSTWORTHY HYBRID DECISION-SUPPORT SYSTEMS

European Commission

Truly mixed human-AI initiatives for human empowerment

- combine the best of human and machine knowledge and capabilities including shared and sliding autonomy in interaction, addressing reactivity, and fluidity of interaction

- The systems should adapt to the user rather than the opposite, based on analysis, understanding and anticipation about human behaviour and expectations.

Trustworthy hybrid decision-support

- **mixed** and **sliding decision-making**, for context interpretation, for dealing with uncertainty, transparent anticipation, reliability, human-centric planning and decision-making, interdependencies, and augmented decision-making.
- Transparency, fairness, technical accuracy and robustness will be the key, together with validation strategies assessing also the quality of the decision of the AI supported socio-technical system.

Human centric approach:

- **multidisciplinary** and **trans-disciplinary** approaches paying particular attention to **intersectional** factors relevant to stimulate **novel research avenues**, and eventually improve **user-acceptance**. **Collaborative design** and evaluation with **users involvement** should also be considered.

- proposals in this topic will dedicate part of their activities on investigating **novel ways** of **engagement** by **citizens** or **citizen representatives** with AI development, with a view of optimising experience towards **improving usability** and **experience** for **citizens** (both at professional or daily life environment).

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

TYPE: Research and Innovation Action (RIA)

BUDGET: 34,5 M€

TRL start: 2-3 ➔ TRL end: 4-5

European Commission

Expected Outcomes

Scientific progress in AI, addressing major challenges hampering its deployment, incl. Systems Engineering

Build-up the European Lighthouse, initiated by earlier Networks of Excellecence Centres (H2020, HUMAN-01-03)

Unify and Reinforce the World-Class European AI Community

European Commission

Technology Focus

Next Generation AI – Scientific research and technologies prioritised in the latest SRIDA (AI, Data, Robotics Partnership)

- Foundational research and emerging and novel approaches, with a view of improving the technical performances of AI-based systems
- New paradigms, algorithms, architectures and novel optimization and regularization methods, hybrid AI, hybrid machine learning, data/sample –efficiency
- Scientific research and technologies prioritised in the latest SRIDA (AI, Data and Robotics PPP), and complementing the previously selected Networks of Excellence centres (H2020-ICT48, HORIZON-CL4-2021-HUMAN-01-03

2. What we do NOT want?

HORIZON-CL4-2022-HUMAN-02-01 – AI for human empowerment (AI, Data and Robotics Partnership) (RIA)

- Scientific progress disconnected from industry needs / incremental SoA – lack of ambition
- Purely technical approach (SSH not an integral part of the research)

HORIZON-CL4-2022-HUMAN-02-02: European Network of Network of AI Excellence Centres: Expanding the European AI Lighthouse (RIA)

- Second-Class experts in AI
- Disjoint efforts of the AI community to address the research challenge

The AI, Data and Robotics partnership (2021-2030)

Co-programmed partnerships in Horizon Europe

European Commission
Public Side

Public
Private
Partnership

ADR
Association
Private Side

In the MOU signed between Adra and the European Commission, it was agreed to design a number of programs for European companies and raise 2.6 billion euros to fund these:

– Up to 1.3 billion euros of public investment by the European Commission (through Horizon Europe)

– Up to 1.3 billion euros of private investment through Adra for the period 2021 – 2030

Fields of Action

for AI, Data and Robotics.

to stimulate deployment and adoption, build up an effective innovation ecosystem and drive excellent research.

the communities that underpin European AI, Data and Robotics.

and orient public funding to address the key challenges.

will deliver Europe's vision for a human centric and trustworthy use of AI, Data and Robotics.

Adra - The AI, Data, and Robotics Association

Overview

What?

Adra (AI, Data and Robotics Association, asbl) is a membership association that establishes the private side of the AI, Data and Robotics Partnership in Horizon Europe.

Adra and the partnership pursue a common and shared vision to **boost European competitiveness, societal wellbeing and environmental aspects** to lead the world in researching, developing and deploying **value-driven trustworthy AI, Data and Robotics** based on fundamental European rights, principles and values.

Who?

Founding members: BDVA, CLAIRE, ELLIS, EurAI and euRobotics

Elected president: Marina Bill (ABB)

BDV BIG DATA VALUE ASSOCIATION

CLAIRE Confederation of Laboratories for Artificial Intelligence Research in Europe

ellis European Laboratory for Learning and Intelligent Systems

EurAi

eu ROBOTICS

When?

May 21, 2021 Foundation

June 23, 2021 Memorandum of Understanding with the EC

November 25, 2021 Launch Event (https://youtu.be/faO9DIzCTOw)

Adra asbl: Types of Membership

The AI Data Robotics Association

Members with voting rights

- **Industry Members**
  - Large companies
  - Mid-Caps
  - Small and Medium Enterprises (“SME”) and Start-ups
- **Research Members**
  - Research and Technology Organisations (RTO)
  - Universities, university colleges and university departments and laboratories or research groups of universities engaging in research, innovation and education (HES)
- **Strategic Members**
  - not-for-profit organisations having their own members and whose main objectives are of essential value for the Purpose of the Association

Members without voting rights

- **Associate Members:** trade unions, non-governmental organisations, regional clusters, etc and other stakeholders not falling in the Member categories above

TESTING AND EXPERIMENTATION FACILITIES

#DigitalEuropeProgramme

Work Programme sectorial AI TEFs

1. What are we looking for?

- World-class reference testing and experimentation facilities with a focus on testing and validation of advanced AI-based technologies in real-world scenarios for the four sectors: agri-food, healthcare, manufacturing and smart cities & communities

- TEFs to support technology providers of AI solutions within technological readiness levels 6-8

- Includes AI soft- & hardware, e.g. AI-powered robots

Work Programme topic

2. What do we NOT want?

- No research → DIGITAL is deployment focused
- Upgrading existing infrastructure, not starting from scratch a new one
- Supporting digital infrastructure, not costs for buildings, fields, plants, etc
- No box-ticking of call text, but proposals with maximum impact

Why is the EC funding sectorial TEFs?

- Testing and experimenting state-of-the art AI-based soft-/hardware solutions and products in real-world environments, and at scale, is an important step to bring technology to market
- Support for European technology providers of AI solutions
- Support world-class reference technology infrastructures at EU level
- Improve uptake of Trustworthy AI

What is a TEF?

- World class reference sites for experimentation and testing AI
- Real setting
- Essential sectors: Agri-food, Healthcare, Manufacturing and Smart Cities & Communities
- Connected to the Network of Digital Innovation Hubs
- Equipped with infrastructure & latest AI + Access to cloud/Data/HPC…

Sectorial TEFs in Numbers

- 20 to 30M€ per sector (50% funding)
- 5M€ EU funding per facility – physical location
- Co-funded by Member States / private investment.
- Duration: 4-5 years

Additional Information

- Dedicated webpage with FAQ, table of Member States' initial interest to co-fund sectorial AI TEFs, link to matchmaking platform, upcoming infoday and past workshops & infoday

https://digital-strategy.ec.europa.eu/en/activities/testing-and-experimentation-facilities

-Matchmaking platform still open until early April
https://digital-industry-2021.b2match.io/

Funding & Tender opportunities portal

Thank You!

 # HorizonEU

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

European Commission