



Cognitive Technologies Research Group – CoRe

*Developing factory intelligence with
multilevel data processing and knowledge extraction*

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TURKU AMK 
**Cognitive
Technologies**

Transforming the Future of European Manufacturing

Vision: Factories will soon have cognitive systems that understand the manufacturing process as a whole.

Timing: Europe can't depend on external technologies for this vision.

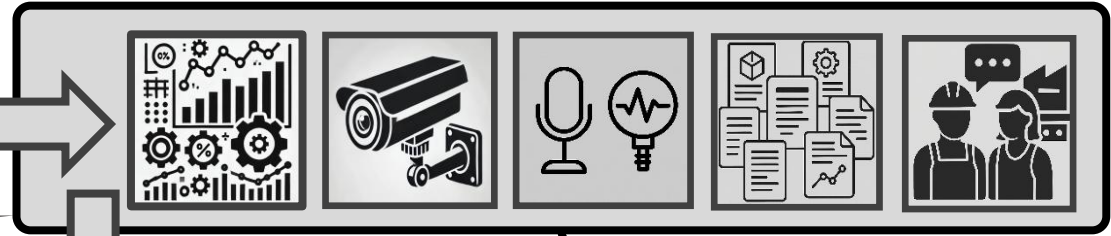
Opportunity: RDI becomes one of the priorities in the EU. Increased funding is expected.

Action: Turku UAS & CoRe wish to be at the center of this progress.



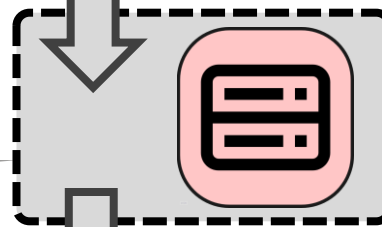
CoRe explained

Holistic, scalable, and flexible approach for industry regardless of current automation level



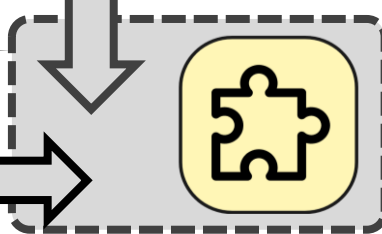
New and legacy machinery, cameras, microphones, sensors, workers' tacit knowledge, internal documentation, ...

Data harmonization, pre-processing, and storage



Heterogeneous Data Space

Creation of task-specific knowledge



Multilevel data fusion

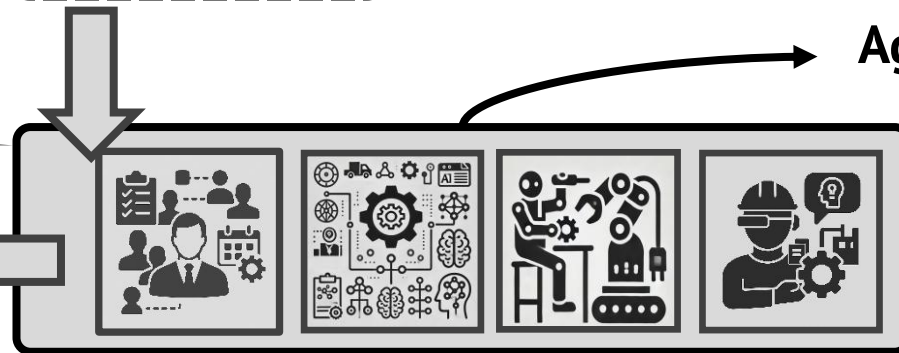
CoRe's expertise

Factory intelligence

Local AI systems validated and trained by own-workers, not external or cloud service



Providing interactive intelligence with user-specific digital solutions



Agent space

Increased cost-efficiency and competitiveness



Current projects

- **TeoÄly → Food sector 50% + Manufacturing sector 50%**

TeoÄly transforms manufacturing SMEs into data-aware, AI-enabled and human-centric production environments capable of improving efficiency, quality and decision-making through practical industrial intelligence solutions.

- **ADINO → Manufacturing sector 100%**

ADINO transforms industrial operations into adaptive, situationally aware and resource-efficient production ecosystems capable of continuously optimizing processes, material flows, and operational decision-making in real time.

- **Sensor4Food → Food sector 100%**

Sensor4Food integrates advanced photonic and multimodal sensing technologies into intelligent food production environments capable of real-time quality, safety, and process monitoring across the mean poultry value chain.



SENSOR4FOOD

ADVANCING PHOTONIC SENSOR SYSTEMS FOR A SMARTER AND SAFER FOOD AND POULTRY FUTURE

21 PARTNERS

TOTAL BUDGET ~7 M€

TUAS SHARE 0.76 M€

COORDINATED BY CORE / TURKU AMK

HORIZON-CL4-2025-04-DIGITAL-EMERGING-01: Advanced sensor technologies and multimodal sensor integration for multiple application domains (IA) (Photonics Partnership)

Full score: 15/15



**Funded by
the European Union**

No.	Participant organisation name
1	Turku University of Applied Sciences (Coordinator)
2	Universitat Politècnica de València
3	Norwegian University of Life Sciences
4	Munster Technological University
5	Multitel ASBL
6	Institute of Soil Science and Plant Cultivation State Research Institute
7	Bialoom Ltd
8	EYE4NIR
9	IRIS TECHNOLOGY SOLUTIONS S.L.
10	Onit S.p.A.
11	Onit Operations
12	Red Pitaya d.o.o
13	UVE S.A.
14	GESCO S.C.A.
15	BIOCO AS
16	NORILIA AS
17	Association of Poultry Processors and Poultry Trade in the EU Countries
18	Futuro Perfecto Innovación SL
19	NSBproject srl
20	R3fined International Ltd
21	Consejo Superior de Investigaciones Científicas



New project preparations

CEANOVA (EU) → Agriculture sector 100%
HORIZON-CL6-2026-02-FARM2FORK-06
(submitted)

CEANOVA transforms controlled-environment agriculture into an AI-driven, sensor-aware, and human-centric food production ecosystem capable of predicting, optimising, and continuously learning from greenhouse operations in real time.

PROcessIQ → Food sector 100%
Business Finland

PROcessIQ redefines industrial food production as an interconnected, explainable and adaptive process intelligence ecosystem where data, sensors and human expertise continuously support operational learning and optimisation.

AJO → Energy sector 100%
Business Finland

AJO enables real-time industrial decision intelligence by combining multimodal process data, hybrid process models and operational expertise into a continuously evolving optimisation and control framework for continuous process manufacturing.

AIM5 → Manufacturing sector 100%
HORIZON-CL4-2026-02-DIGITAL-EMERGING-51:
AI improved advanced manufacturing and production processes in factories (submitted)

AIM5 transforms industrial manufacturing into an adaptive, drift-aware, and human-trainable intelligence ecosystem capable of continuously understanding, optimising and reconfiguring production in real time.

Cognitive Technologies Research Group – CoRe

We build trustworthy and human-centered AI solutions that make data understandable and decision-making smarter.

Our goal is to strengthen the competitiveness and sustainability of organizations by transforming fragmented information sources into coherent, actionable intelligence.

Our research group coordinates Sensor4Food project, 101298835, from call HORIZON-CL4-2025-04-DIGITAL-EMERGING-01: Advanced sensor technologies and multimodal sensor integration for multiple application domains (IA) (Photonics Partnership). Our proposal scored 15/15 points

Our core expertise

Multimodal data fusion and analytics: We integrate data from machine vision, audio, text, sensors, and process systems into unified, interpretable models that support operational and strategic decision-making.

Explainable and human-centric artificial intelligence: We develop algorithms that predict, classify, and transparently explain their reasoning to users – ensuring trust and accountability in AI-assisted processes.

Modelling tacit knowledge and human expertise: We research how experiential and skill-based knowledge can be captured, quantified, and transferred into digital, measurable, and teachable forms.

Real-time analytics and edge intelligence: We bring AI closer to the user through decentralized and secure edge solutions, enabling efficient and privacy-preserving data processing.

Cognitive and interactive systems: We design and support the development of AI-based agents and cognitive systems that enhance human work instead of replacing it.

Compatible calls

Our own technology architecture is designed for interoperability and scalability, allowing seamless integration of new data streams, sensing modalities, and intelligence modules. This flexibility makes CoRe an ideal partner across multiple Horizon Europe Cluster 4 Destinations and Topics – from AI, data, and robotics, to digital twins, smart manufacturing, human-machine collaboration, and all up to space.

We are available for 2027 topics and calls in any Cluster where our experience and technology could be useful

Cluster 4 Compatible Calls

235,62	662,32	654,53	369,21	152,81	834,44
667,21	827,33	619,56	43,74	32,23	565,39
651,54	446,45	424,19	353,60	173,70	834,94
364,52	246,24	332,18	272,67	123,46	757,37
358,66	402,08	624,85	309,36	120,37	595,78
286,87	888,43	486,99	279,19	100,22	237,58

HORIZON-CL4-2027-04-DIGITAL-EMERGING-05

Our research group could contribute to develop and validate AI-enabled robotic solutions for real industrial workflows through multimodal perception, human guidance, and adaptive task execution, e.g.,

- Data fusion and multilevel knowledge building
- Multimodal perception for robotic situational awareness
- Human-guided robot programming and task learning
- AI-based orchestration of robotic workcells
- Safe and explainable human-robot collaboration
- Adaptive robot task planning in changing production environments

HORIZON-CL4-2027-01-MATERIALS-PRODUCTION-03

Our research group could contribute by developing AI and human-guided automation methods that support adaptive de-manufacturing, remanufacturing, repair, sorting, and circular production processes, e.g.,

- Data fusion and multilevel knowledge building
- Product and components condition & quality assessment
- Multimodal sensing for disassembly and remanufacturing decisions
- Human tacit knowledge and activity capturing
- Digital twin support for operation sequence planning

HORIZON-CL4-2027-04-DIGITAL-EMERGING-04

Our research group could contribute by defining, testing, and validating challenge-driven AI solutions for advanced manufacturing, especially in production optimisation, quality control, predictive maintenance, and AI-powered robotics, e.g.,

- Data fusion and multilevel knowledge building
- Industrial AI challenge definition and benchmarking
- Manufacturing datasets and validation scenarios
- AI for production optimisation and quality prediction
- Predictive maintenance and anomaly detection
- Human-in-the-loop validation of AI recommendations
- Trustworthy AI assessment for factory deployment

HORIZON-CL4-2027-02-DIGITAL-EMERGING-52 and HORIZON-CL4-2027-01-DIGITAL-EMERGING-52

Our research group could contribute by developing human-centric AI methods that make worker expertise, intuition, and experience explicit, reusable, and adaptive inside collaborative industrial environments, e.g.,

- Tacit knowledge capture and formalization
- Human-trainable AI for industrial tasks
- Co-learning and interactive mentoring systems
- Adaptive and inclusive human-AI interfaces
- Cognitive teamwork and planning support
- Operator feedback loops for continuous AI improvement
- Ethical, fair, and trustworthy AI for workforce augmentation

Because our research background and capabilities, other calls of interest are, e.g.,

[HORIZON-CL4-2027-05-DIGITAL-EMERGING-01](#)
[HORIZON-CL4-2027-01-MATERIALS-PRODUCTION-61](#)
[HORIZON-HLTH-2027-03-TOOL-04](#)
[HORIZON-CL2-2027-01-TRANSFO-04](#)
[HORIZON-CL4-2027-01-MATERIALS-PRODUCTION-08](#)
[HORIZON-CL4-2027-01-MATERIALS-PRODUCTION-02](#)
[HORIZON-CL4-2027-02-MATERIALS-PRODUCTION-32](#)

Get in touch

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Thank you!



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