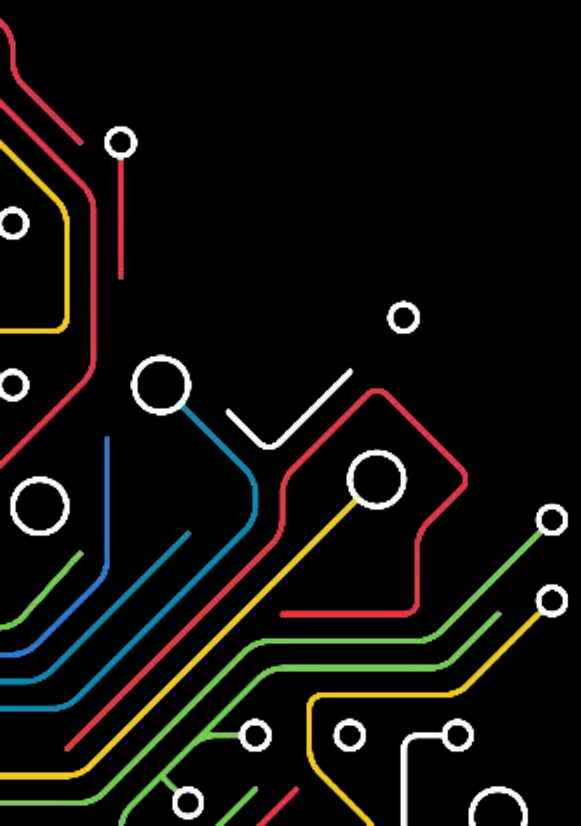
INSTITUTE FOR SYSTEMS
AND COMPUTER ENGINEERING,
TECHNOLOGY AND SCIENCE

INESCTEC

CRIIS

SCOPE AND ACTIVITY FOR 2021

CCI/2021-09-06



from knowledge
generation to
science-based
innovation

CRIIS – CENTRE FOR ROBOTICS IN INDUSTRY AND INTELLIGENT SYSTEMS

RESEARCH LINES

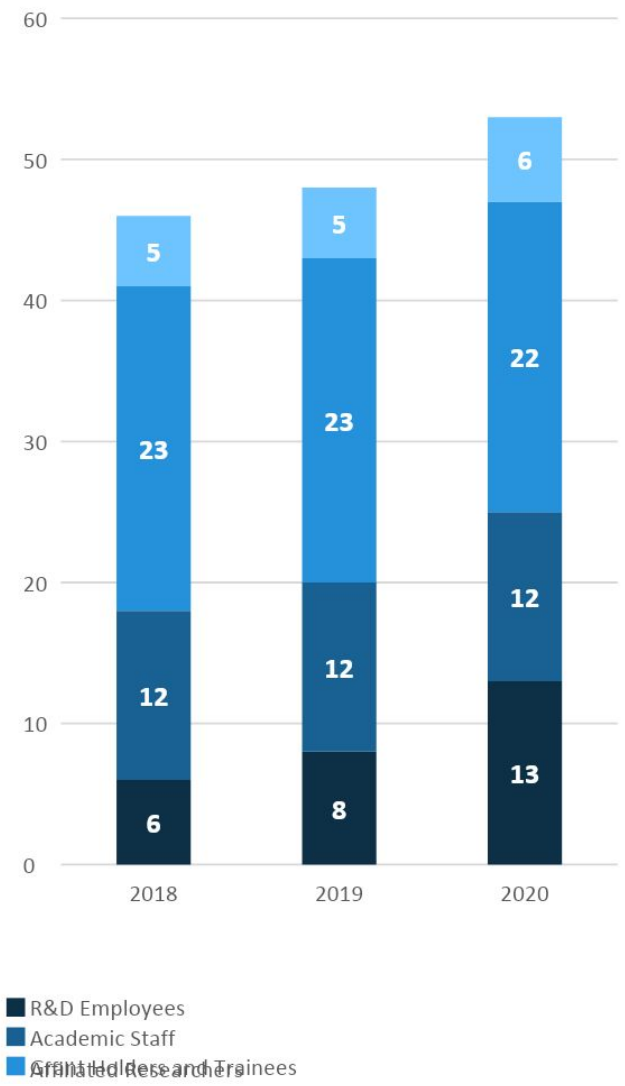
- RL1. Navigation, Localization and Coordination of Mobile Robots
- RL2. Intelligent Sensors and Control of Dynamical Systems
- RL3. 2D/3D Industrial Vision and Advanced Sensing
- RL4. Advanced Human Machine Interfaces
- RL5. Future Industrial Robotics and Collaborative Robots
- RL6. Advanced Robotics and Automation for Industry 4.0

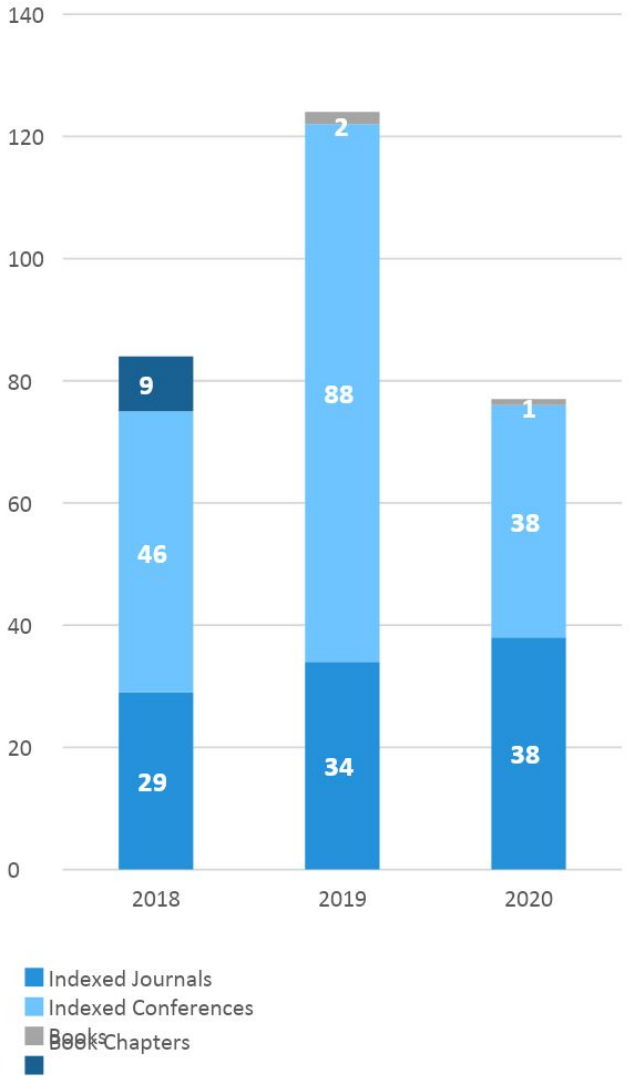
INNOVATION ACTIVITIES/MAIN MARKETS AND APPLICATION AREAS

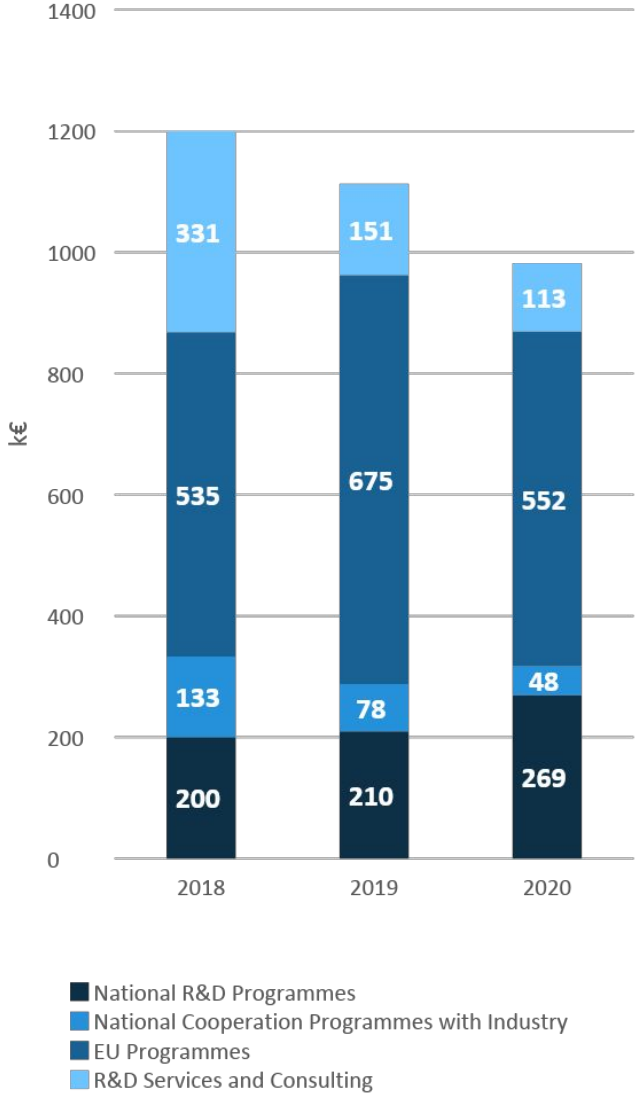
	TEC4AGRO	TEC4ENERGY	TEC4HEALTH	TEC4 INDUSTRY	TEC4SEA	Other
INOV1. Agile Production using Robotics				x		
INOV2. Inspection, Control and Embedded Systems				x		
INOV3. Cloud-based Robotics				x		
INOV4. Robotics and IoT for Agriculture and Forestry	x					

Other markets or application areas:

CRIIS - TEAM AND ACTIVITY







OBJECTIVES AND THEIR ACHIEVEMENT IN 2021

RL1

Navigation, Localization and Coordination of Mobile Robots

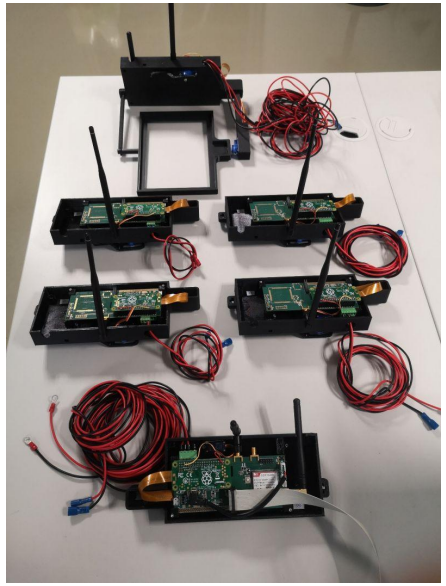
- Multiple robot coordination.
- More Robust in complex environments and communication deprived.
- Multi sensor perception.

RL2

Intelligent Sensors and Control of Dynamical Systems

- Smart, networked and software-sensors
- Main results in agriculture to support Farm-to-Fork strategy

CRIIS research



RL3

2D/3D Industrial Vision and Advanced Sensing

- Multimodal sensor fusion
- Integrated machine learning
- Active perception
- Agro and industrial.

RL4

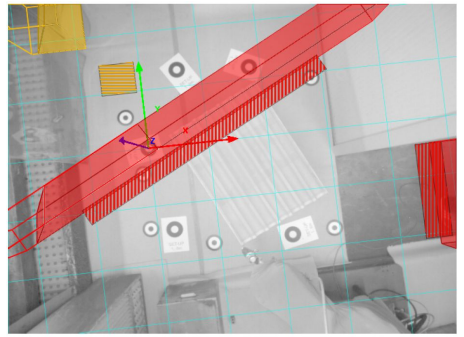
Advanced human machine interfaces

- Virtual reality
- Augmented reality
- Active perception
- Agro and industrial.

RL5

Future Industrial Robotics and Collaborative robots

- Novel machinery safety sensors
- Increase human comfort, through robot intentions



RL6

Advanced Robotics and Automation for Industry 4.0

- Digital twin-based infrastructure for the support, orchestration, monitoring, and integration of Cyber-Physical Systems.

MAIN ACTIONS AND THEIR ACHIEVEMENT IN 2021

Action	Research /Innovation line	Expected outcomes	when
iiLab strategic development and implementation	All	iiLab as main actor in CRIIS innovation activities	Sept 2021
Development of algorithms for complex multi robot coordination	RL1	Large scale multi robot demonstration	Dec2021
Cloud industry grade cloud robotics applications with CD/CI	RL6 ,INOV3	Establishment of CRIIS as a reference center on Cloud Robotics applications	Dec 2021
Development of robotics solutions for flexible and tangled objects	RL5	Increasingly capable robots for handling of flexible objects	Dec2021 (onwards)
Innovation in main Agro developments (AgIoT and AgRobXX)	INOV4	TRL8 for both AgIoT and AgRob	Dec2021

H2020 FASTEN: PROJECT OBJECTIVES

FASTEN

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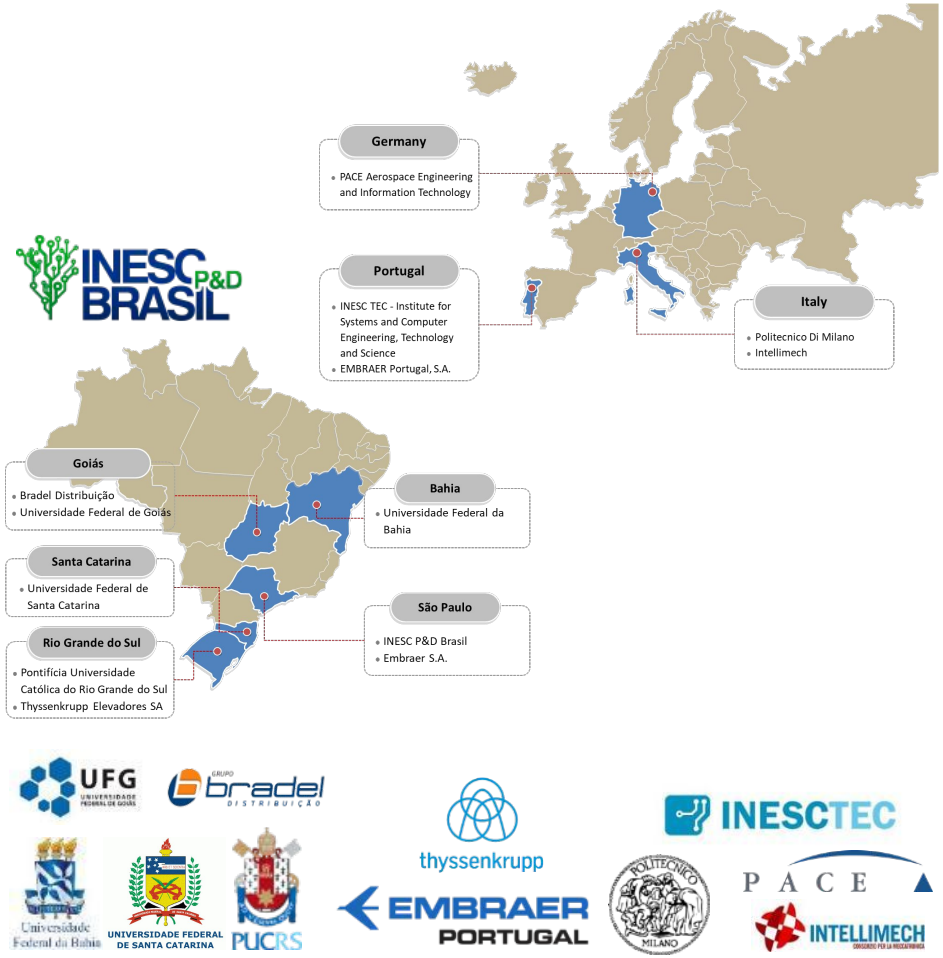
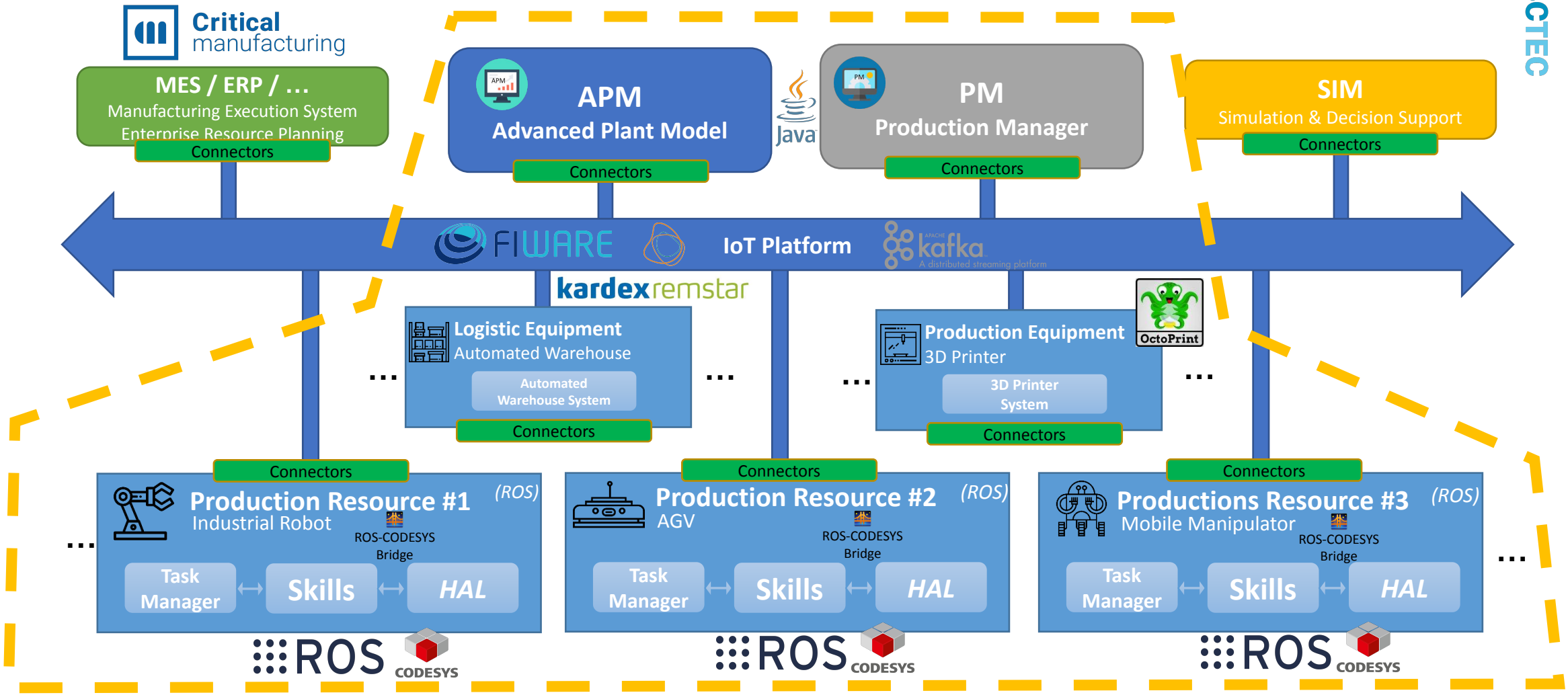
Key enabler of the full adoption of **IoT technologies** in digital manufacturing businesses, engaging end-users, and demonstrating such technologies on **Europe and Brazil.**

Develop, demonstrate, validate, and disseminate an **integrated and modular framework** for efficiently producing highly customized products

- Basis for **supporting Smart Manufacturing** by enabling:
  - Lot size one manufacturing
  - Decision-making for real time actions
  - Integration of robotic and additive manufacturing technologies
  - Higher levels of connectivity
  - Real time simulation, optimization and machine-learning approaches



H2020 FASTEN: PROJECT OBJECTIVES



H2020 FASTEN: PROJECT OUTCOMES

FASTEN

INESCTEC

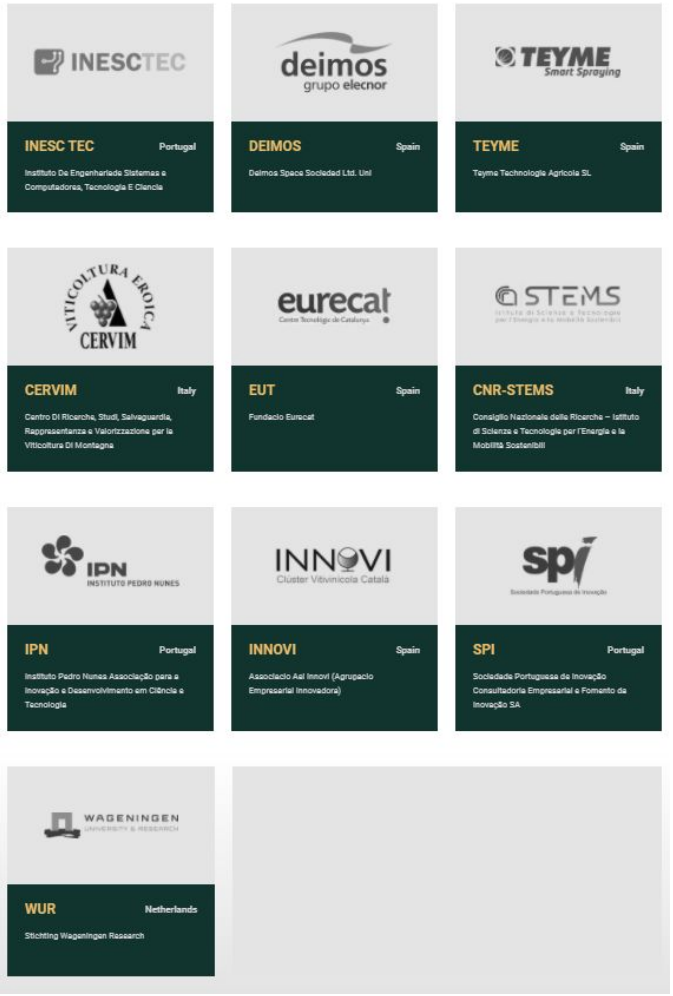
FLAGSHIP PROJECTS UNDER WAY OR TO BEGIN IN 2021

SCORPION

Cost effective robots for smart precision spraying

Spraying in agriculture represents a societal challenge due to its negative impact in human and animal health and in environment. SCORPION's objective is **to develop a safe and autonomous precision spraying tool integrated into a modular unmanned tractor (robotics platform) to increase spraying efficiency**, while reducing human and animal exposure to pesticides, water usage and labour costs. The project will focus on steep slope vineyards but with impact in other high-value permanent crops (olive groves and fruticulture). SCORPION' will consider Global Navigation Satellite System (EGNSS) receiver (triple frequency, PPP, OS-NMA, HAS) fused with other sensors, to increase the solution reliability, accuracy and safeness, and to enable autonomous ultraviolet light treatments (to eliminate partial need of phytopharmaceuticals) and to allow high precision spraying in permanent crops.

Janeiro 2021 – Dezembro 2023



FLAGSHIP PROJECTS UNDER WAY OR TO BEGIN IN 2021

SCORPION

Cost effective robots for smart precision spraying

Relation to

- ROMOVI project (P2020)
- NOVATERRA project (H2020)
- PRYSM project (H2020 open call)

Expected Outcomes

- New robot from Scratch (to be licensed to SME's)
- New navigation solution (to be licensed to SME's)

IILAB - LABORATÓRIO DE INDÚSTRIA E INOVAÇÃO

iilab INDUSTRY & INNOVATION LAB

INESCTEC

MAIN EXTERNAL PARTNERS AND COLLABORATIONS WITH OTHER CENTRES - RESEARCH

MAIN EXTERNAL PARTNERS AND COLLABORATIONS WITH OTHER CENTRES - INNOVATION