Service Robotics Research @ PIC4SeR

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01. PIC4SeR

Service Robotics

Center organization

Service robotics

Service robots assist human beings, typically by performing a job that is dirty, dull, distant, dangerous or repetitive, including household chores. They typically are autonomous and/or operated by a built-in control system, with manual override options.

The International Organization for Standardization defines a “service robot” as a robot “that performs useful tasks for humans or equipment excluding industrial automation applications”

PIC4SeR – Service robotics





Key technologies shaping

PERCEPTION

COGNITION

ACTION

Future capabilities of robots







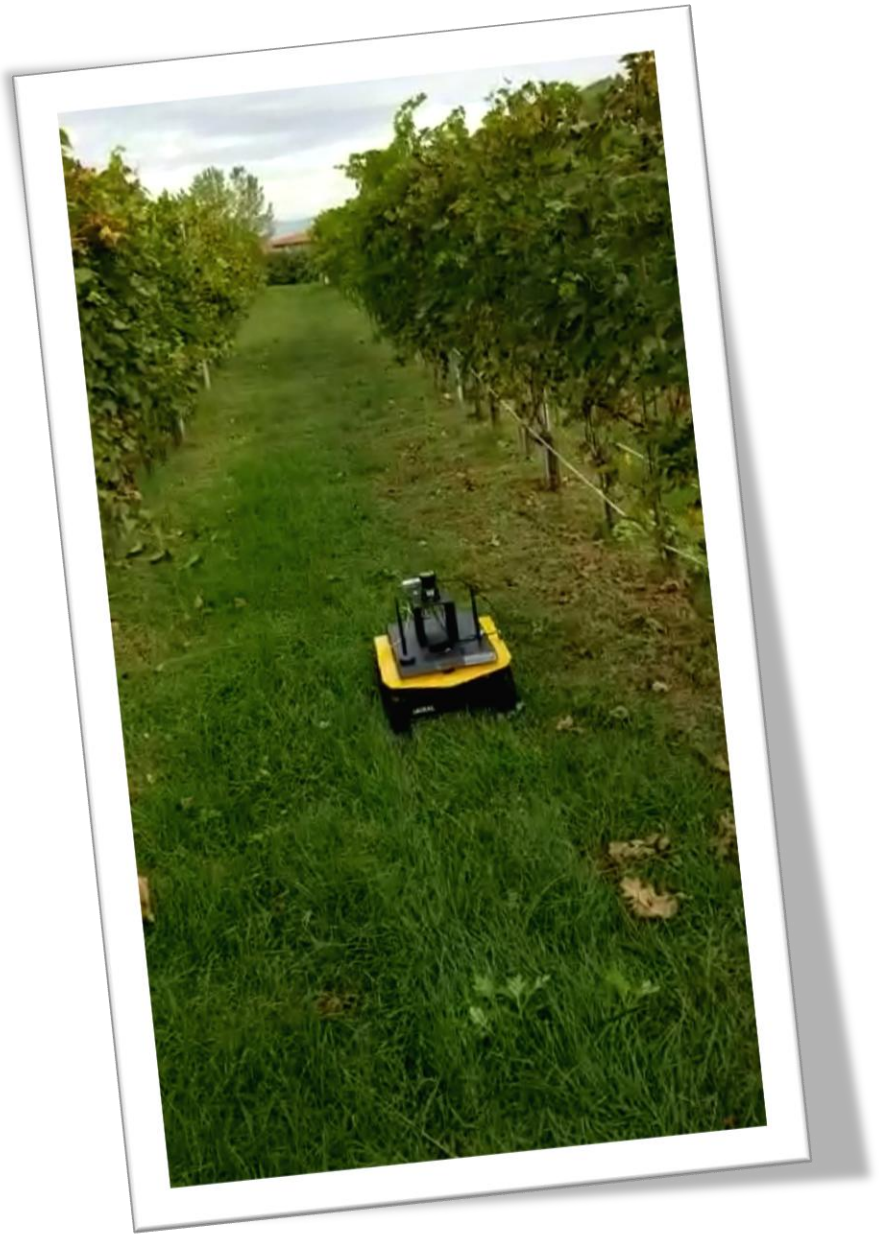


Industrial Robots

Service Robots

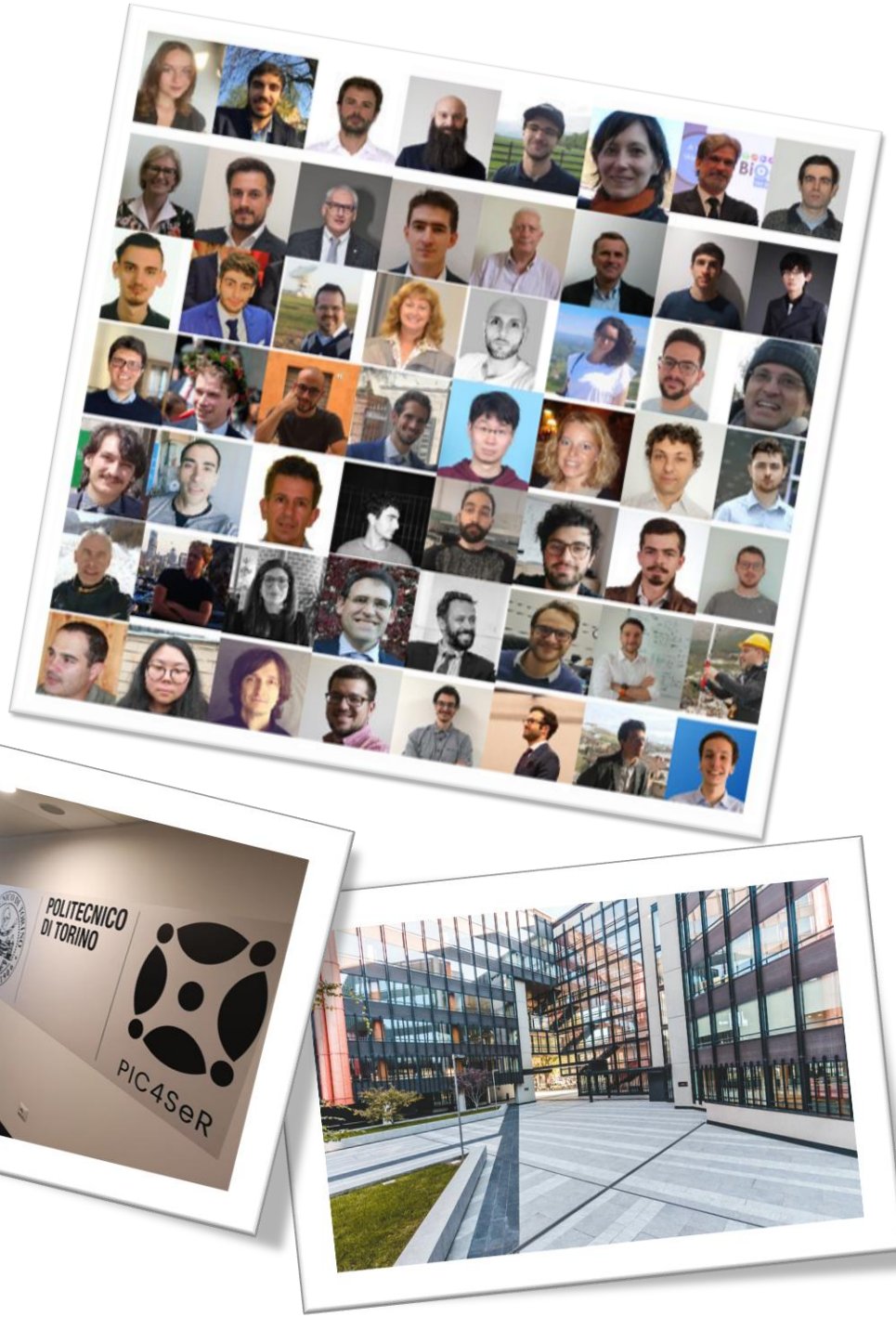
PIC4SeR – Why?

- Service robotic field can be classified as **disruptive technologies**
- **Harmonize research projects** and **industrial partnerships** to optimize the results
- To start a **common workplace**, a common knowledge and a common language
- To develop an **integrated approach** and technology development process in this booming area
- To **link together** technology needs coming from several industrial partners
- To start **interdisciplinary didactic activities** in this area
- To join several international research communities **with a unique "ID"** and coordinated research proposals



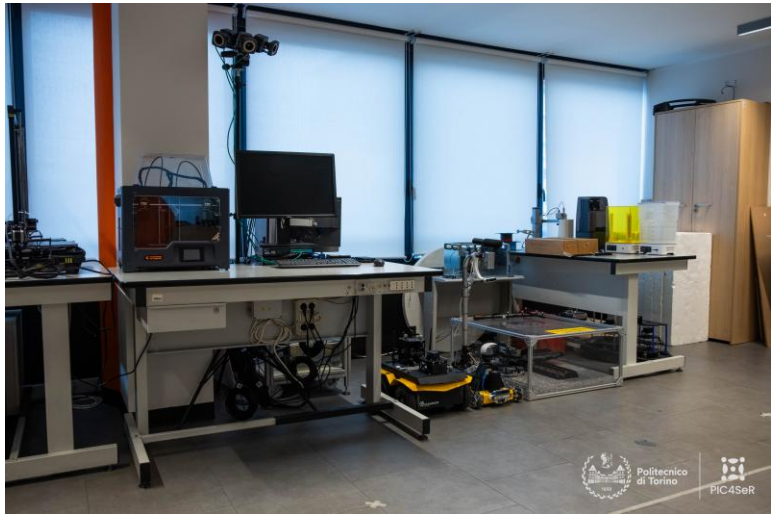
PIC4SeR in pills

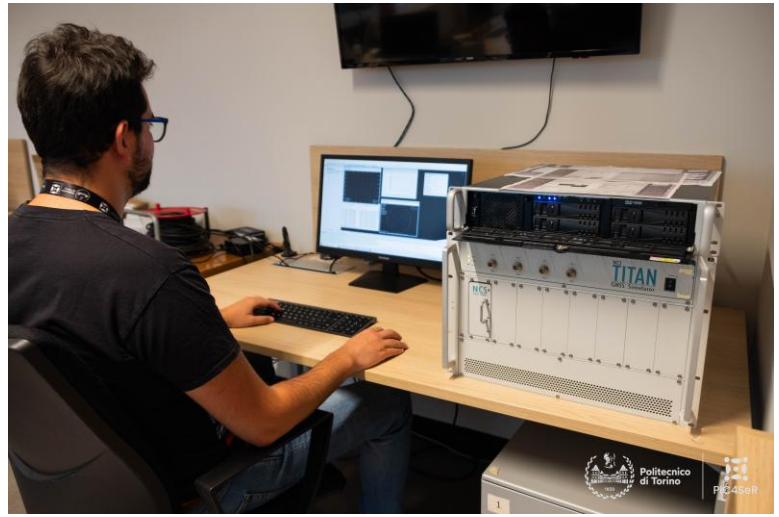
- **5 PoliTO departments**
  - **DET** (Electronics & Telecoms)
  - **DAUIN** (Informatics & Control)
  - **DIMEAS** (Mechanics & Aerospace)
  - **DIATI** (Geomatics & Photogrammetry)
  - **DAD** (Design & Cultural Heritage)
- **56 people involved**
  - 31 staff
  - 10 researcher
  - 15 PhD students
- **Location: COVIVIO building**
  - C.so Ferrucci 112 - Torino
  - 580mq of labs and offices
  - indoor & outdoor **facilities** available for testing

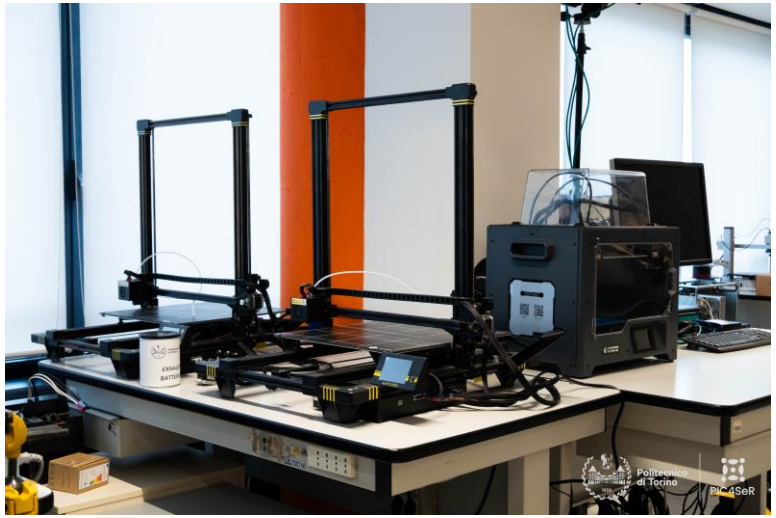


PIC4SeR indoor facilities

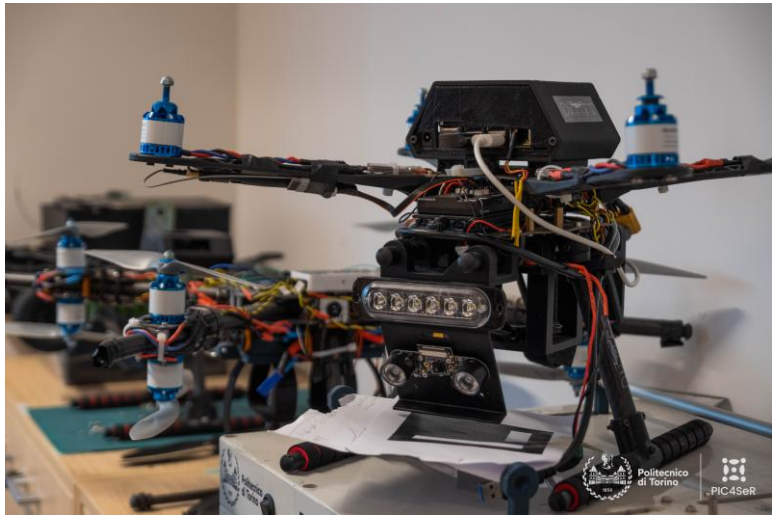












PIC4SeR outdoor facilities



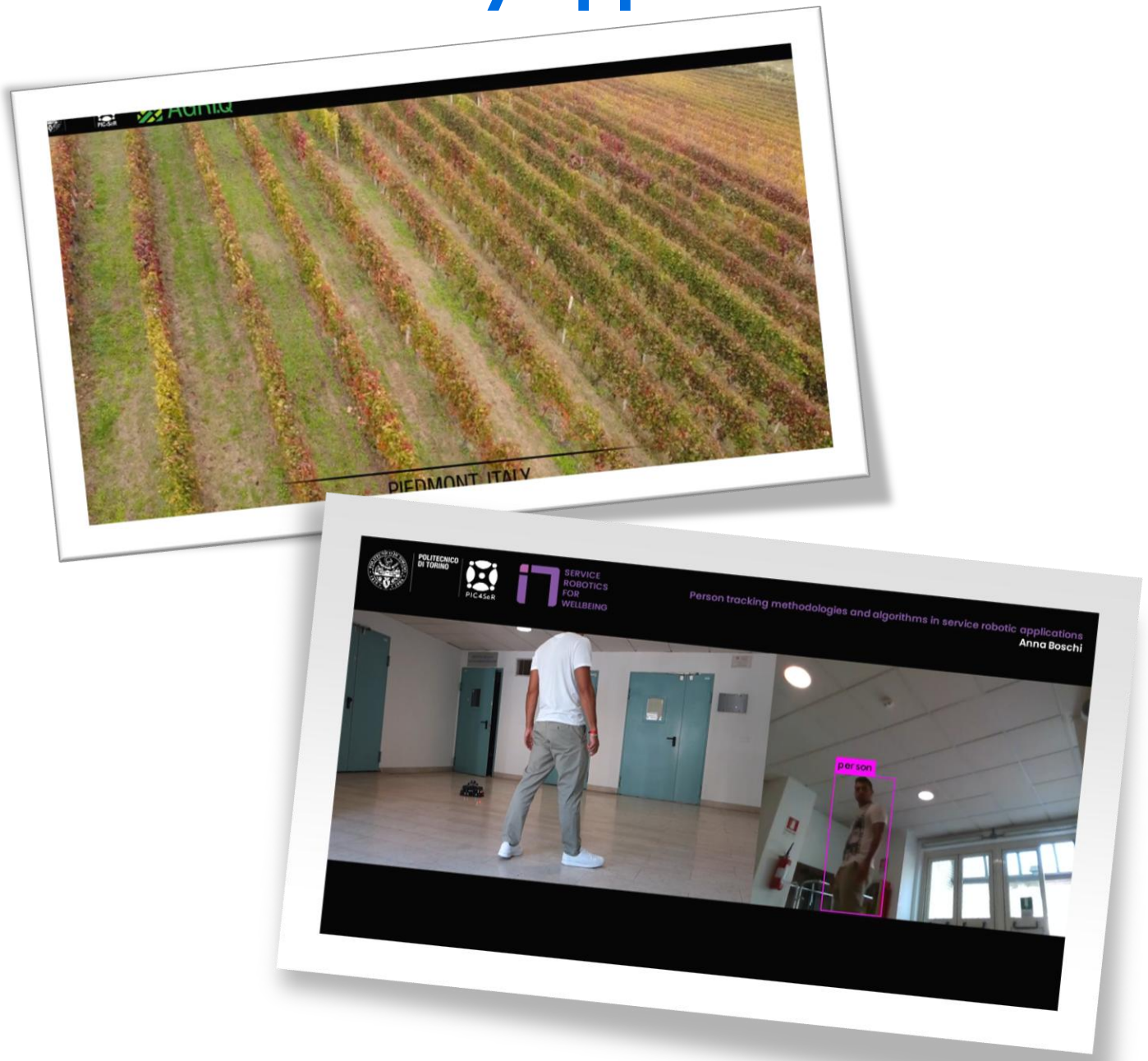




PIC4SeR – key application areas

PRECISION AGRICULTURE

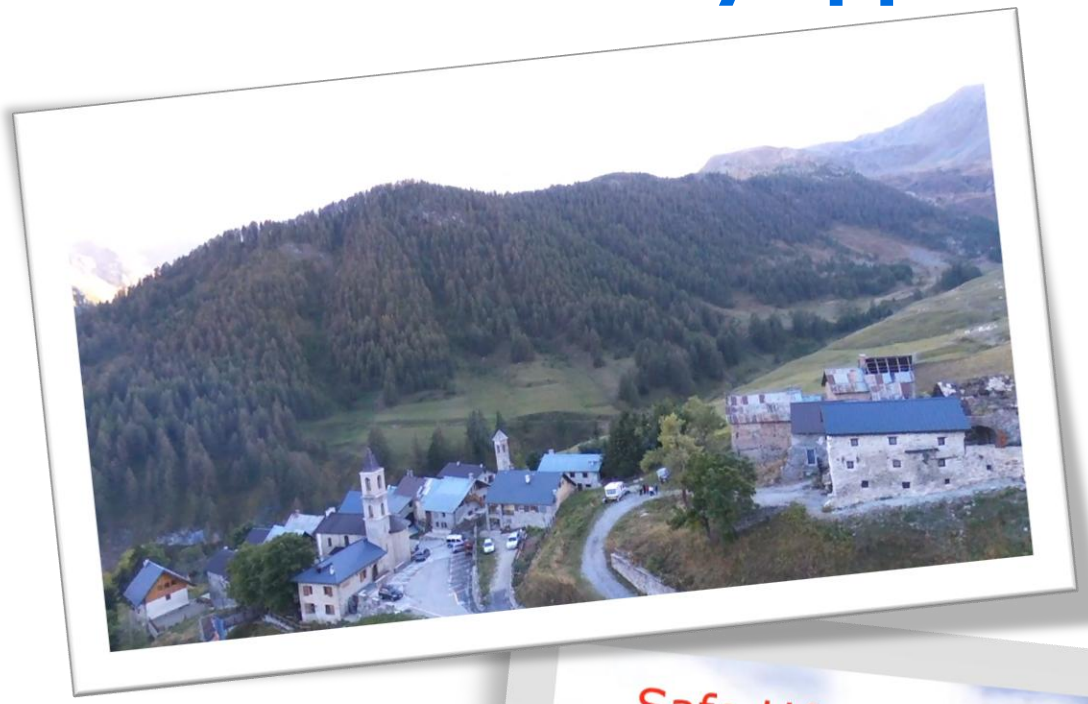
SERVICE ROBOTICS FOR WELLBEING



PIC4SeR – key application areas

CULTURAL HERITAGE

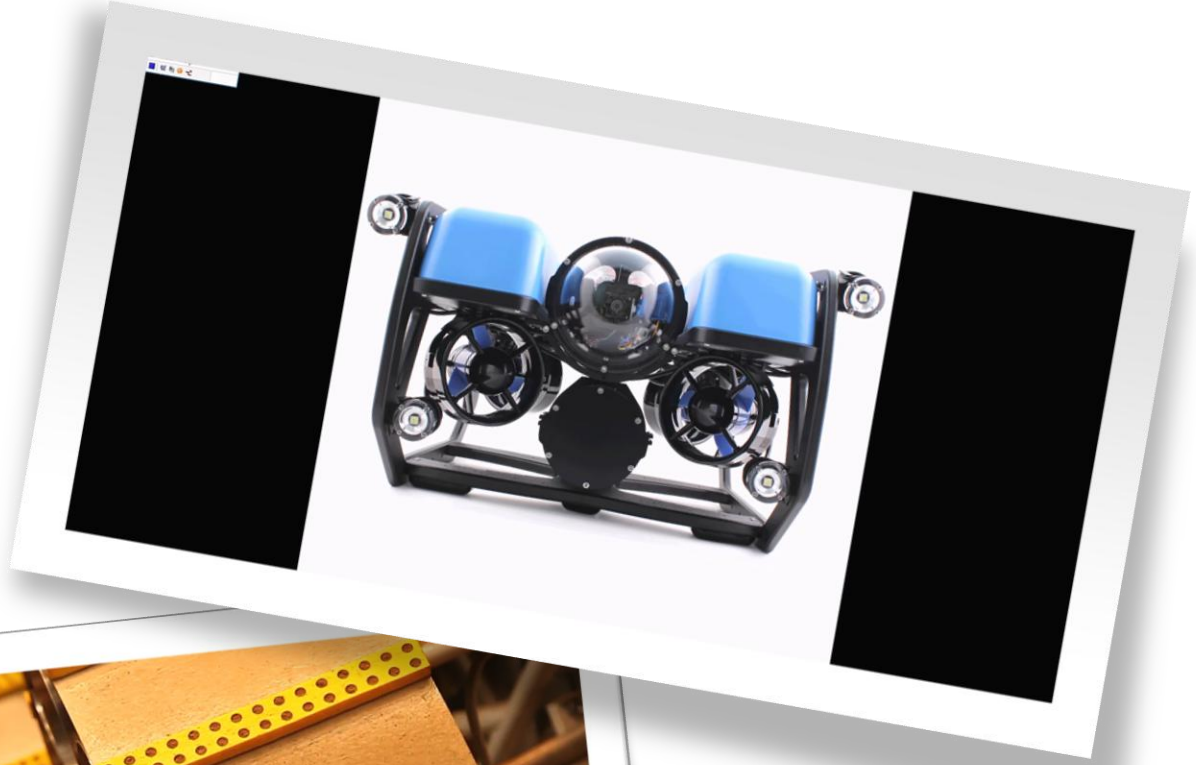
SMART CITY
SEARCH & RESCUE



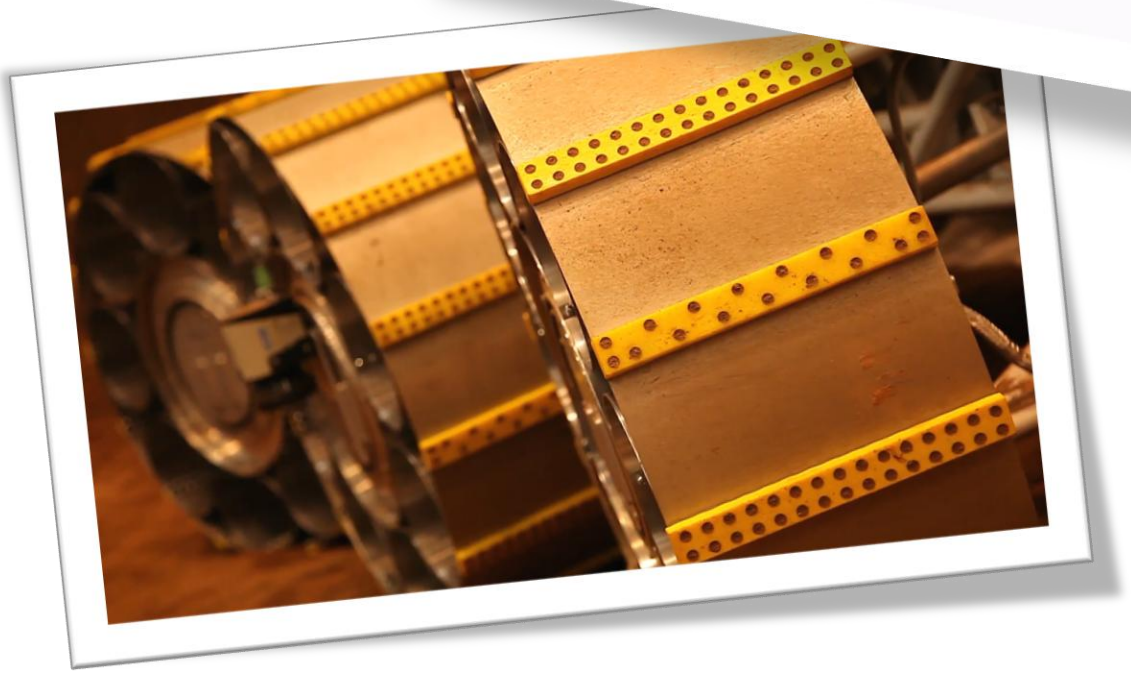


PIC4SeR – key application areas

UNDERWATER



SPACE



PIC4SeR – Enabling technologies

/Energy optimization

/GNSS navigation

/4G and 5G Networks

/Path planning

/Cooperative positioning

/SDR receivers

/Sensor integration

/Locomotion platforms

/Soft robotics

/ROS 2

/Multimedia communication

/Control

/Coding

/Autonomous Service Robots

/Internet of Things

/Machine Learning

/Interaction visualitazion

/Artificial Intelligence

/Data fusion

/Interaction design

/System Co-Design

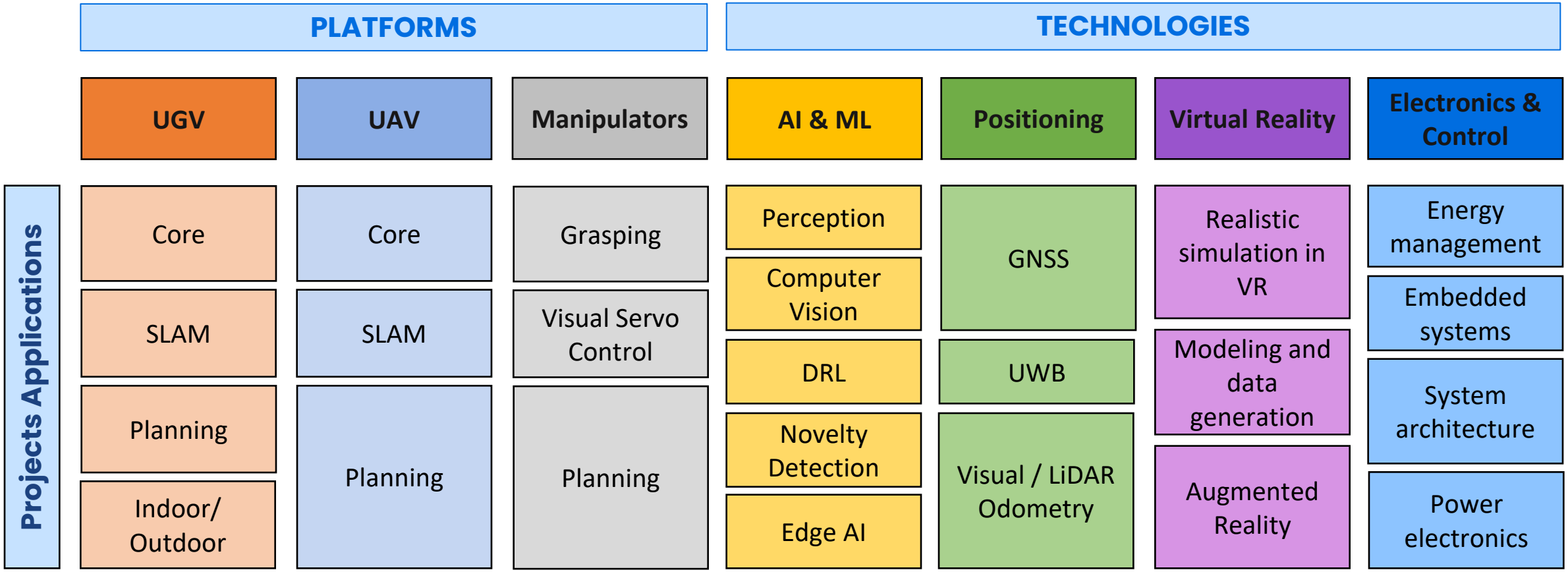
/Edge-Fog-Cloud Computing

/Ethics

/Co-living Design

/Embedded Computing

PIC4SeR – Internal organization



Politecnico di Torino | PIC4SeR

Companies & Research partners























European Space Agency



Jet Propulsion Laboratory
California Institute of Technology











































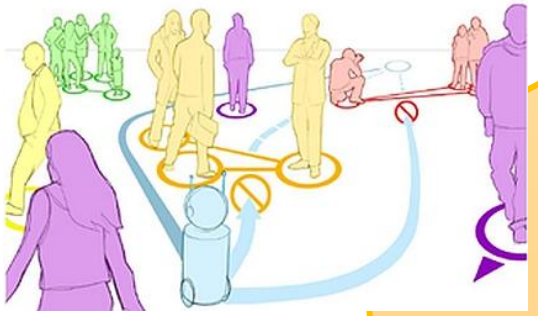








PIC4SeR Research





Social Indoor Service Robotics

Precision Agriculture

Edge-AI

Robot Navigation

Space, Exploration, Inspection



= Application field

= Technical area

Thank you

Watch PIC4SeR Reel

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PIC4SeR website
www.pic4ser.polito.it