

PAL



The Global State of Robotics



EINDHOVEN | 2026

Francesco Ferro

PAL Robotics | euRobotics

CEO | President

- 01** | **Robotics Market**
The current landscape
- 02** | **euRobotics**
The European Point of View
- 03** | **PAL Robotics**
The Industrial Vision
- 04** | **Conclusions**
Let's talk about robots

Market Projection

Robotics Market Projection

+260% growth

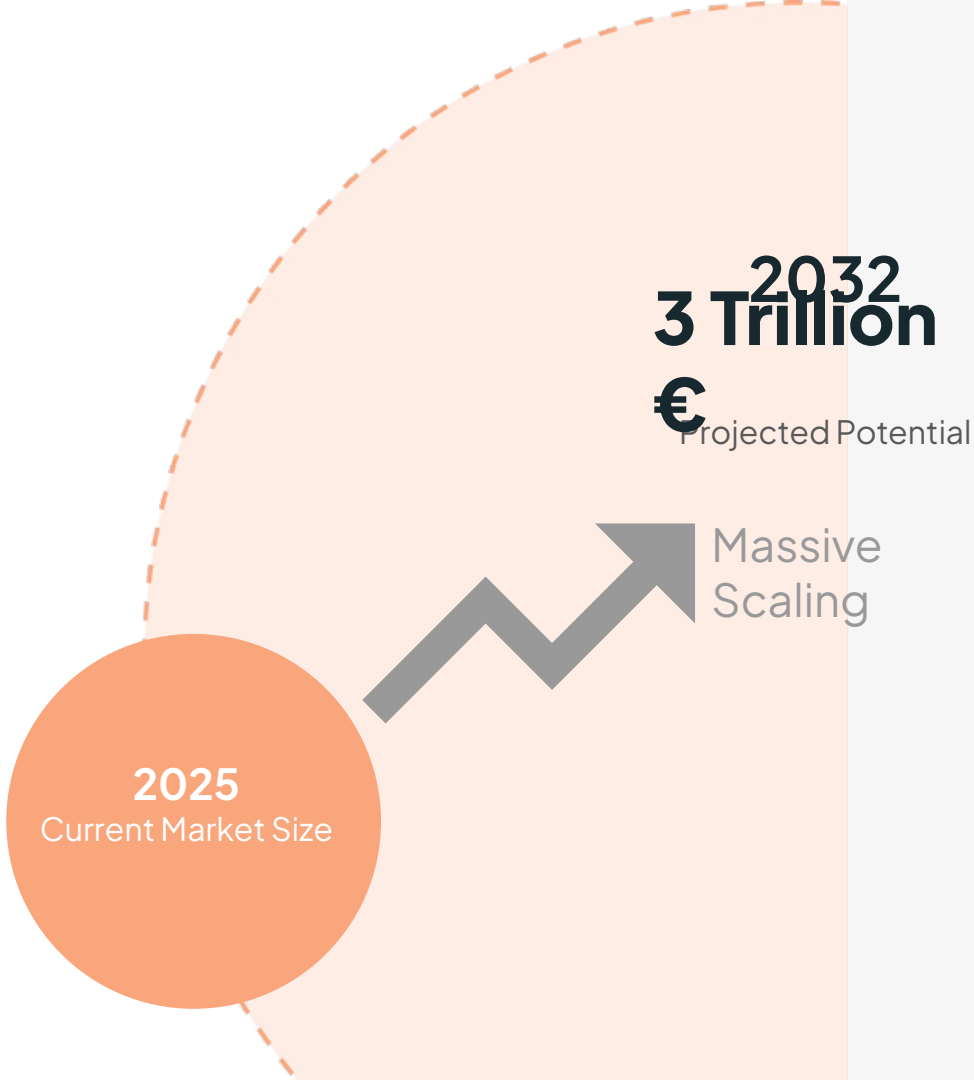
AI Market Projection

+999% growth

By 2032 the Robotics and AI Market
will reach a combined value of:

3 Trillion €

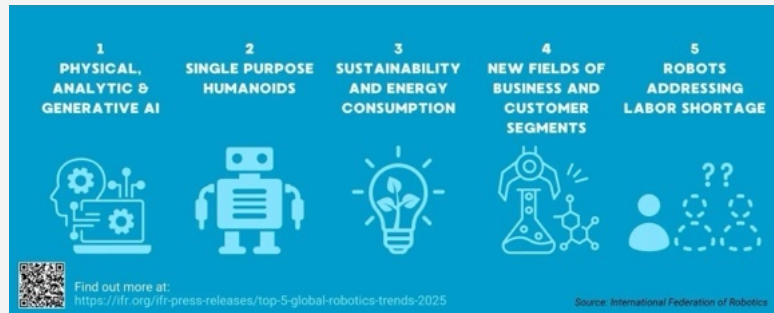
PAL Robotics is a part of this future.



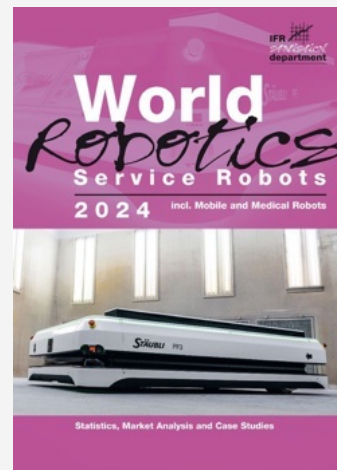
The Robotics Market

Where service robotics is and where it is heading

TOP 5 GLOBAL ROBOTICS TRENDS



As seen in:



New professional service robots (incl. AMRs)

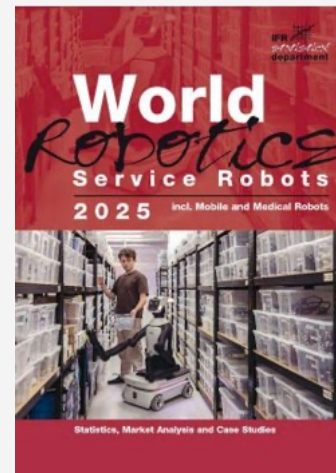
- 205,000 units (+30%)

New medical robots

- 6,200 units (+36%)

New consumer service robots

- 4.1 million units (+1%)



New professional service robots (incl. AMRs)

- 199,000 units (+9%)

New medical robots

- 16,700 units (+91%)

New consumer service robots

- 20.1 million units (+11%)

The rising global interest in Humanoid Robots





eu ROBOTICS

THE EUROPEAN POINT OF VIEW

Who are we?

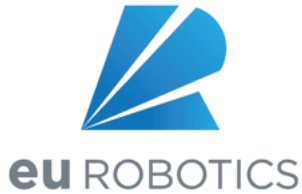


euRobotics aisbl (Association Internationale Sans But Lucratif) is a Brussels based international non-profit association for all stakeholders in European robotics.

It was founded in September 2012 with the aim to strengthen Europe's competitiveness and to ensure industrial leadership of manufacturers, providers and end-users of robotics technology-based systems and services.

The objectives of euRobotics are to boost European robotics research, development and innovation and to foster a positive perception of robotics. It aims at:

- Strengthening competitiveness and ensuring industrial leadership of manufacturers, providers and end users of robotics technology-based systems and services;
- The widest and best uptake of robotics technologies and services for professional and private use;
- The excellence of the science base of European robotics.



The European Robotics Association

Non-profit organization for all stakeholders
in European robotics, founded in 2012

~240

MEMBER
ORGANISATIONS

Largest network of roboticists and business in Europe.
From very small ones to global players

20

YEARS

Creating strong connections between research organisations,
industry and the wider ecosystem

~30

TOPIC
GROUPS

“Grass Roots” groups covering robotics-related themes,
including perception, mechatronics, AI and Cognition, etc.



Manages a range of European scale events and regular meetings



Strong links to European and national policy makers



-

Governance:

A clear message about industry-research relation

- Organisations and sub-entities can become member, not natural persons
- 24 elected Board members, 12 from industry, 12 from research
 - Each group of members elects BoD members from their group
- Also considering the subgroups
- President from industry, i.e. industry-led, but heavy research membership
- Operating on eye-level with all players



President & Board of Directors

Industry



Rainer Bischoff
VP Industry
Intrinsic



David Bisset
ExT
iTechnic



Elisabeth Schärli
Treasurer
Autonox



Franziska Kirstein
Three Robotics



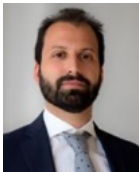
Petra Koudelkova
Delimoges



Mare Mechelinck
UKA



Mike Mayer
Schunk



Alessandro Piscioneri
Comau



Nicola Tomatis
BlueBotics



Carlos Vivas
PAL Robotics



Georg v. Wichert
SIEMENS



Rich Walker
Shadow Robot



Francesco Ferro
President
PAL Robotics

Research



Juha Rönning
VP Research
Univ. Oulu



Jon Agirre Ibarbia
ExT
Tecnalia



George Nikolakopoulos
ExT
Luleå University



Nabil Belbachir
NORCE



Hala Elrofai
TU Eindhoven



Werner Kraus
Fraunhofer IPA



Christophe
Leroux
CEA



J. Ramiro
Martínez de Dios,
Univ. Sevilla



Paolo Rocco
POLIMI



José Saenz
Fraunhofer IFF



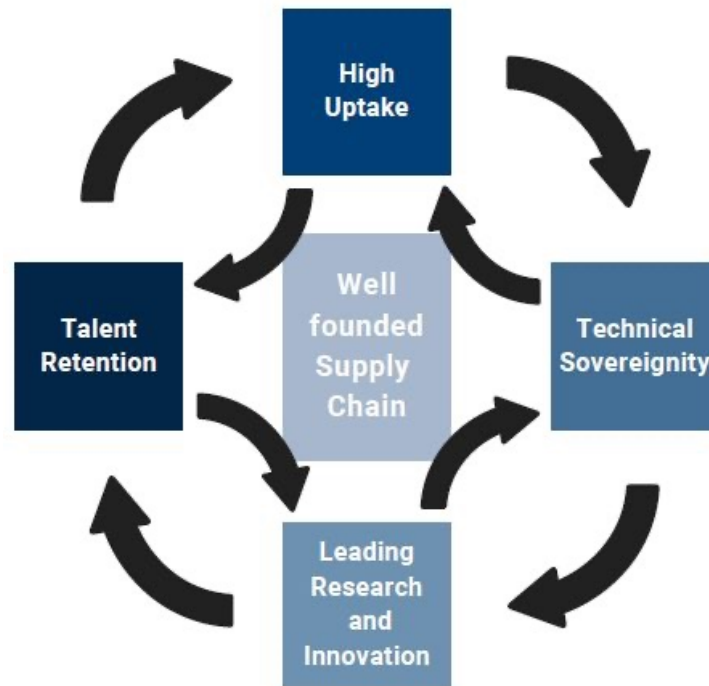
Daniel Serrano
Eurecat



Nicola Vitiello
SSSA

What is motivating us at the moment

- Connecting industry and research on different levels, from technology to policy
- Covering the whole chain research - industry - market uptake - policy
- Current challenges need to be addressed
 - Global economic situation
 - Ageing workforce and skills
 - Investment level and time-to-market for robotics systems in comparison to pure SW
 - Technical sovereignty / leadership and supply chains



What we all need

Healthcare
Good food
Clean water
Agriculture
Fresh air
Manufacturing
Infrastructure

euRobotics Activities



euRobotics Topic Groups

The Topic Groups are the crucible where ideas become innovation.



euRobotics Alliances

Find out more about the euRobotics alliances, partners and related activities.



European Robotics Forum

The most influential meeting of the robotics community in Europe.



European Robotics Week

Every year, the ERW offers one week of various robotics related activities for the general public.



European Robotics League

The ERL local and major tournaments are based in Europe and are open to international participation.



euRobotics Awards

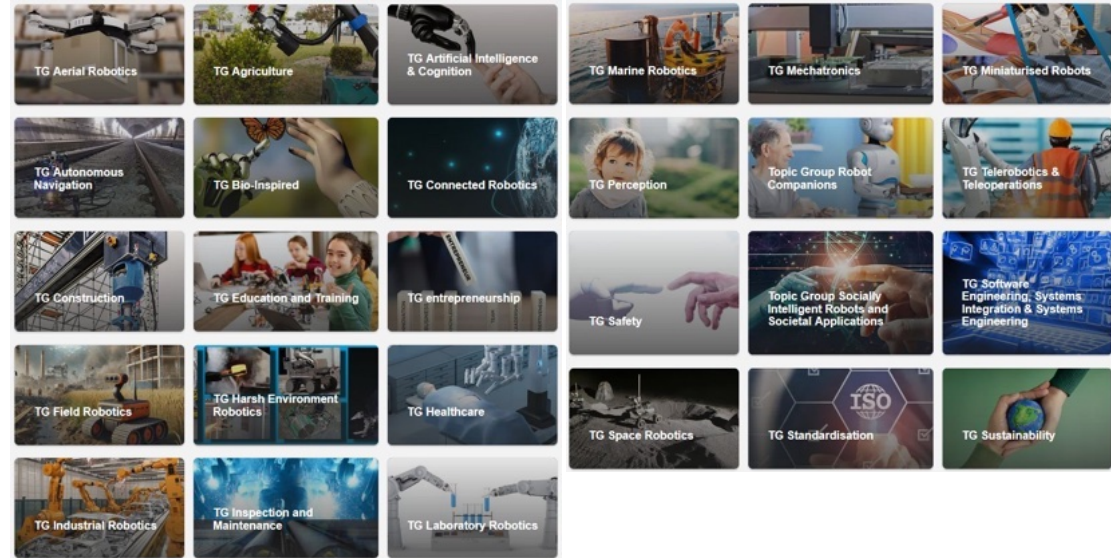
euRobotics awards three prizes annually at the European Robotics Forum.

Implementing the strategy via Topic Groups



euRobotics think tanks

- Address technical and non-technical topics
- Gather people with the same interest
- Contribute to Strategy and Roadmapping
- Create discussion documents and materials, white papers, etc
- Run workshops at the European Robotics Forum
- Annual **Topic Group Summit** to have a cross-TG event to consolidate views and collect further input



Topic Groups



About 30 topic groups including a wide range of sectors

- [Aerial Robotics](#)
- [Autonomous Navigation](#)
- [Education and Training](#)
- [Harsh Environment](#)
- [Laboratory Robotics](#)
- [Miniaturised Robots](#)
- [Telerobotics and Teleoperations](#)
- [Software Engineering, Systems Integration & Systems Engineering](#)
- [Sustainability](#)
- [Agriculture](#)
- [Bio-Inspired](#)
- [Entrepreneurship](#)
- [Industrial Robotics](#)
- [Mechatronics](#)
- [Perception](#)
- [Safety](#)
- [Space Robotics](#)
- [AI/CoR](#)
- [Construction](#)
- [Healthcare](#)
- [Inspection and Maintenance](#)
- [Marine Robotics](#)
- [Robot Companions](#)
- [Socially Intelligent Robots and Societal Applications](#)
- [Standardisation](#)

<https://eu-robotics.net/connected-robotics-topic-group/>



The Connected Robotics Topic Group (TG) aims to advance the integration of robotics with next-generation mobile technologies, including cutting-edge connectivity, radio-based sensing, and AI-native solutions. This focus is particularly relevant for future robotics such as Autonomous Mobile Robots (AMRs), Automated Guided Vehicles (AGVs), manipulators, and humanoids.

With the emergence of next-generation International Mobile Telecommunications (IMT) technologies, there is a significant opportunity to enhance autonomous systems across various sectors, including construction, autonomous maintenance and inspection, mining, and operations in challenging environments like nuclear energy or recycling facilities. The Connected Robotics TG will concentrate on communication-based enhancements for mobile robots operating in public, private, rural, and urban areas.

Key Technology Focus Areas:

- **Advanced Communication and Sensing Technologies:** Investigating advanced mobile radio technologies, such as high-reliability communication and radio sensing, to develop new protocols for real-time communication between mobile robots and their infrastructure. This includes integrating protocols across various technology domains to ensure seamless operation in dynamic environments and enhancing perception capabilities through advanced radio-based sensing systems.
- **AI-Native Solutions:** Integrating AI-native solutions in next-gen communication networks is crucial for enabling robots to operate effectively in diverse real-world scenarios. This enhances high-level reasoning and computational offloading, allowing robots to process real-time data, make autonomous decisions, and adapt to changing environments.
- **Real-Time Monitoring and Simulation:** Utilizing digital twins and advanced simulation techniques to create real-time models of physical systems. This integration facilitates continuous monitoring and allows for immediate feedback through ultra-reliable, low-latency communication, improving operational visibility and enabling proactive maintenance.
- **Co-Design for Enhanced Fleet Robotics Communications:** Advancing mobile robotics in applications like logistics and search and rescue requires decentralized control systems and local communication. Integrating robotic and communication systems demands seamless architecture and dynamic network configuration, focusing on low-latency communication and adaptive resource optimization.
- **Goal-Oriented Semantic Communication:** This approach focuses on transmitting the meaning and context of information rather than just raw data, improving the efficiency of multi-robot systems. It utilizes the ultra-low latency and high reliability of 6G for real-time communication and collaboration among robots.
- **Cyber-Physical Systems (CPS):** CPS represents an evolution of cybernetic systems, integrating computing, communication networks, and physical processes. Robots uniquely interact with the environment, actively modifying it. Combined with augmented reality (AR), CPS enhances human-machine interaction by providing immersive visualizations and real-time data overlays. The emergence of mobile networks such as 6G will accelerate AR adoption, enabling applications across sectors such as automotive, healthcare, smart manufacturing, and urban infrastructure.
- **Use Case Development:** Promoting collaboration among stakeholders to ensure compatibility and integration of diverse robotic systems while identifying real-world applications and conducting pilot projects to demonstrate effectiveness.

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Alliances – Links to other organisations

1

Sectors / verticals

2

Technology associations

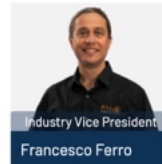
3

National and regional associations

2



Robotics Industry



Industry Vice President
Francesco Ferro

PAL Robotics



Ennio Chiatante

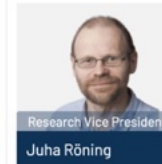
Comau



Roy Fraser

ABB

Robotics Research



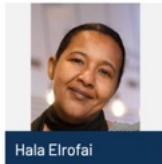
Research Vice President
Juha Rönning

University of
Oulu



Christophe Leroux

CEA



Hala Elrofai

Eindhoven
University of
Technology

1



trinity



Alliances – Links to other organisations

1 Sectors / verticals

2 Technology associations

3 National and regional associations

3



<https://www.hightechnl.nl/robotics/>



<https://i-rim.it/en/>



1975 - 2025

<https://www.robosiri.it/>



Plataforma Tecnológica Española de Robótica

<https://www.hisparob.es/en/>



<https://www.aer-automation.com/>



Comité Español de Automática

<https://www.ceautomatrica.es/robotica/>



<https://fairp.pl/polish-automation-and-robotics-association/>



<https://www.odenserobotics.dk/>



<https://www.gmar.at>



Suomen Robotiikkayhdistys

<https://roboyhd.fi/>



Serbian electronic and robotic association

Association for the Development and Promotion of Robotics in Slovenia



<https://www.fima.fi/>



<https://ffcrobotique.fr/>



<https://robotics-institute-germany.de/>



<https://www.vdma.org/robotik-automation>



<https://www.gdr-robotique.org/>

Innovation Networks

- Resulting from EU-funded projects on Digital Innovation Hub networks, we started Innovation Networks as sustainable post-project structures linked to euRobotics
- MoUs were signed all 4 sectors: Healthcare (DIH Hero), Agile production (Trinity), Agri-Food (AgRoboFood) and Inspection and Maintenance (RIMA)
- Ongoing interaction with the networks and the domain communities



Links to Regional and National Communities

- Via Board members
- In context of events
- Via the network of ERW National Coordinators
- etc.



euRobotics Activities



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European Robotics Week – Bringing it to the People

Every year last week of November

Objective: to bring robotics research and development closer to the public and to build the future Robotics Society

<https://eu-robotics.net/european-robotics-week>



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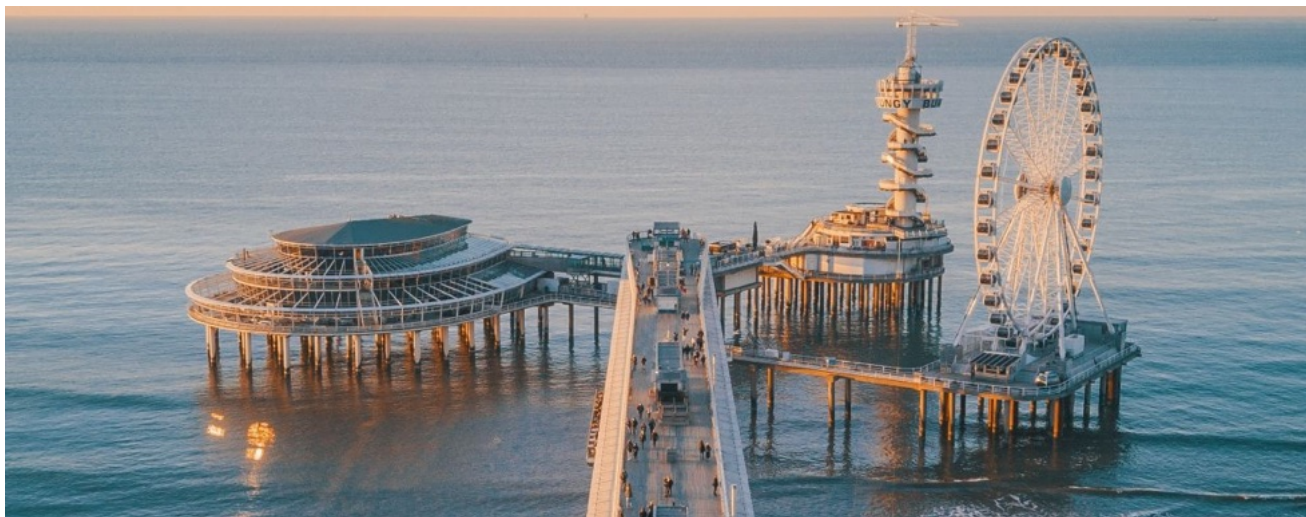


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European Robotics League (ERL) 2026

- ERL 2026: Organised completely by euRobotics. This starts a bi-annual event owned by euRobotics
- **Dates: 12 - 15 May 2026 in The Hague / Scheveningen, The Netherlands**
- 4 Day event composed of episodes & challenges and site activities
- 5 Episodes: <https://erl2026.eu/episodes/>



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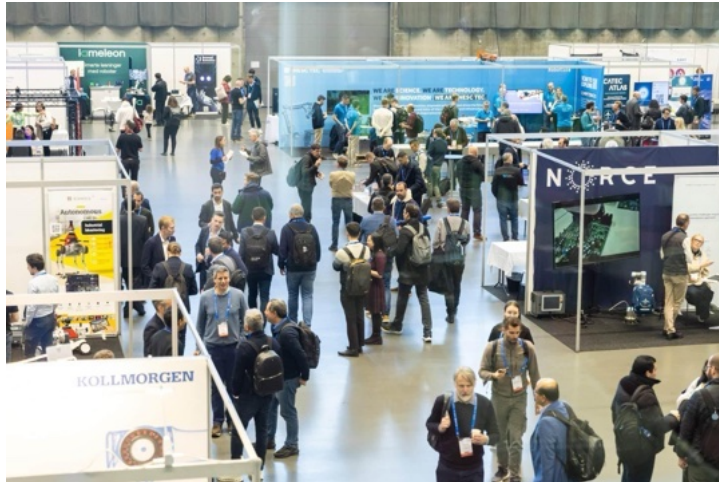


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European Robotics Forum (ERF) – the Flagship Event

- >1000 participants in Stavanger
- ERF2026 gallery here: <https://eu-robotics.net/erf2026-photos/>





ERF2027

Birmingham **UK**

2-4 March

Join us next year in
Birmingham

www.erf2027.eu



UNIVERSITY OF
BIRMINGHAM



Addressing Robotic Challenges

euRobotics views and statements



Addressing the challenges



In robotics Europe has the capability, the talent and the breadth of market to succeed globally but the current fragmentation, lack of coherent vision and limited investment are holding it back.

Europe needs to:

- ❏ **Capitalise on Europe's leading position** by reinforcing its investment in robotics to boost industrial competitiveness and deliver societal benefits.
- ❏ **Fully leverage the robotics expertise it generates** and build on the investments it has already made to ensure that they deliver value.
- ❏ **Ensure progress in AI is focused on the needs of robotics** and on the need to create AI that can inherently reason and learn within the constraints of the physical world.
- ❏ **Better connect, not merge, the different robotics related ecosystems** to ensure that opportunities are not missed because of a lack of collaboration or awareness.
- ❏ **Adopt a far more active approach** to technology investment and risk by delivering faster, more agile, and joined up, research and innovation investment mechanisms that match the robotics R&I profile.
- ❏ **Deploy more robots more widely** and do so faster and more effectively than our competitors. The economic and societal benefit of robotics comes from greater deployment.
- ❏ **Focus on maintaining a technology edge** in robotics for the benefit of everyone by addressing the challenges it has the expertise and resources to own. This requires investment funds shaped to support the long term retention of robotics technology and expertise in Europe.
- ❏ **Educate and train the current and future workforce** to prepare for the use and uptake of robotics so as to maximise their added value. This is a generational change that needs to start now and includes raising citizen awareness and acceptance of robotics.

This strategy makes a series of recommendations for action to ensure that Europe can achieve these goals.



Three non-negotiable principles for Europe



Vienna Statement

June 2026



eu-robotics.net



Robots should work with and for the people

Robots must work alongside humans. Increasing societal acceptance is critical for deployment in healthcare, industry, and agrifood.



Sustainability is a design requirement

Sustainability is a design requirement. We must minimize resource extraction and drive circular processes like repair and recycling.



Community-Driven

Solutions must be developed with communities, not imposed. We listen to expectations and fears to align with EU citizen needs.

Vienna Statement

Read the full statement

eu-robotics.net/eurobotics-vienna-statement



LEADING ROBOTICS IN EUROPE



eu ROBOTICS

01.

Contribute to Topic Groups and have an impact in the community

02.

Don't miss the European Robotics Network

03.



ERF2027
Birmingham UK
2-4 March

Come to Birmingham for the next ERF!

Humanoids
Agriculture

Social Robotics
Healthcare

Construction
AI and Cognition

Safety
Cybersecurity



ROBOTIC PLATFORMS AND INDUSTRY INSIGHTS

PAL Robotics

Leading Service Robotics



20 years

FOUNDED IN 2004

+120

TEAMPLAYERS

100%

MADE IN EUROPE



PAL 
Barcelona

PAL 
Toulouse

PAL 
Bari

Who we are



Associations



Francesco Ferro
President
Carlos Vivas
Industry Director



Francesco Ferro
VP Industry
Robotics Director



Francesco Ferro
Chair IFR Service
Robot Group



Francesco Ferro
Board Director



Francesco Ferro
Board Director



Francesco Ferro
Vice President



I-RIM
Robot Institute of Robotics
and Intelligent Machines



RoboticsPlace



Our First Robots



REEM-A
2005



REEM-B
2008



REEM-H
2010



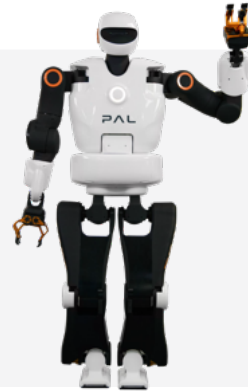
REEM
2011



REEM-C
2013



TIAGo
2015



TALOS
2017



ARI
2019

Our First Robots



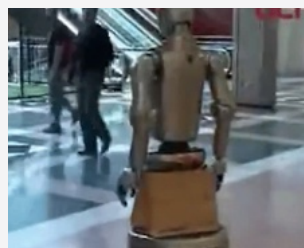
REEM-A
2005

First European Humanoid



REEM-B
2008

Autonomous Navigation



REEM-H
2010

Human-Robot Interaction



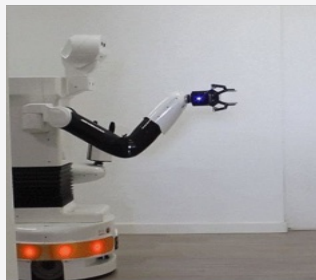
REEM
2011

Interactive & Environment Aware



REEM-C
2013

Robust & ROS Native



TIAGo
2015

Take it and go



TALOS
2017

Built for Impact



ARI
2019

Social Robotics

Public Funding and Collaborative Projects



Funded by
the European Union



Collaborative Projects

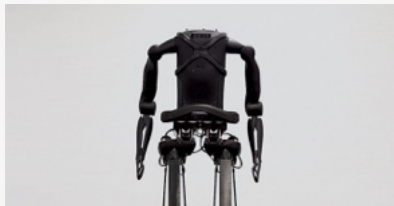
We cooperate with other European partners in order to boost innovation in several fields through more than 25 EU-funded projects.

Horizon Europe / Eureka / FSTPs /
CDTi/ Spanish Ministry

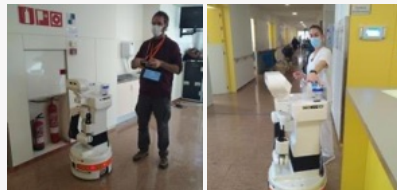


HORIZON EUROPE

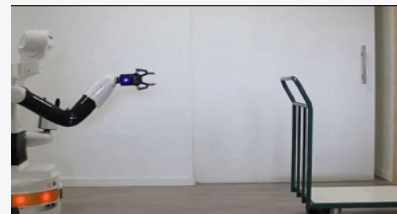
R&D Projects



Healthcare Projects



Industry Projects

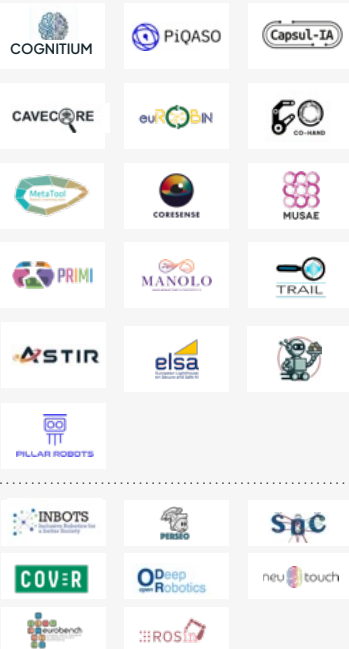


Agri-food Projects

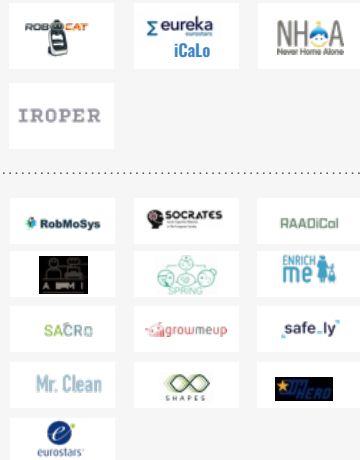


Collaborative Projects

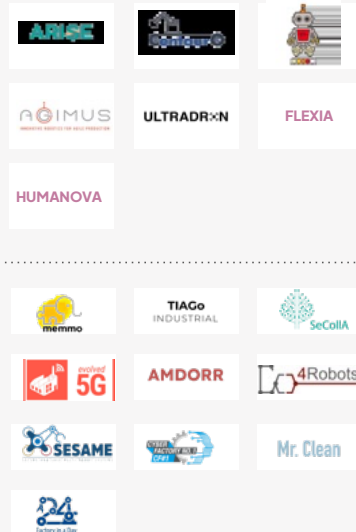
R&D Projects



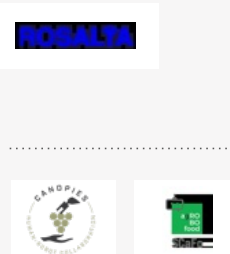
Healthcare Projects



Industry Projects



Agri-food Projects





Collaborative Projects

Areas of Innovation and Objectives



R&D
Robots



Healthcare &
Social Robots



Industry
Robots



Agri-Food
Robots



Co-creating
the Future



Open-source
Software



Embodied AI
for Robot
learning



Routine Care
Automation



Emotional
Support



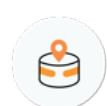
Object
Manipulation



Human-Robot
Collaboration



Construction &
Infrastructure



Intralogistics
Automation



Precision
Farming



Pruning &
Maintenance



Food
Transportation



Intralogistics

Industry proven solutions
to optimise processes and operations

StockBot



Legged

Humanoid platforms
for advanced locomotion and R&D

KANGAROO



Mobile Interaction

Multimodal, modular, open source
manipulators designed for collaboration

TIAGo Pro



Our Business Units

Retail & Intralogistics

Autonomous Solutions, Ready to be Integrated into Daily Operations





RFID Technology and robotic solutions ready for deployment

Members of the



alliance.

Increase Productivity

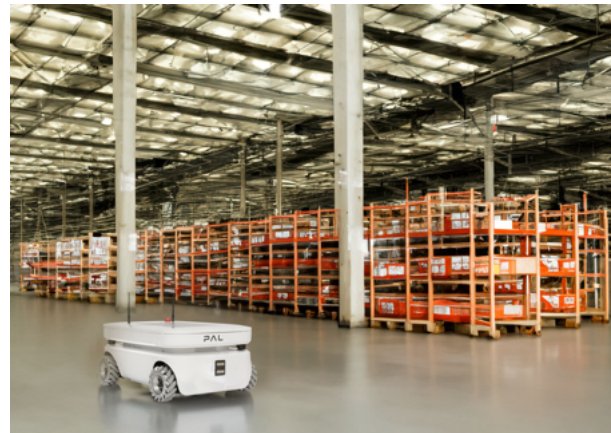
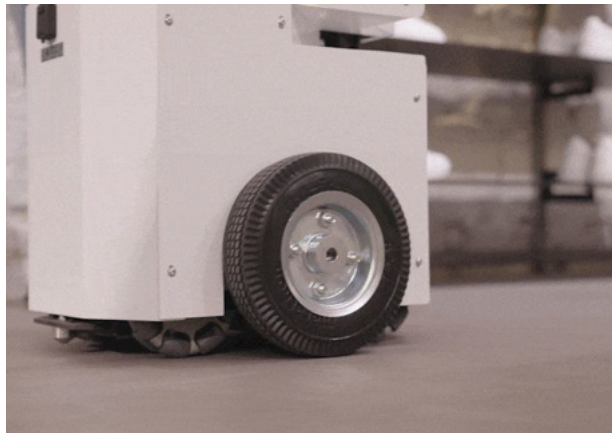
Guarantees constant production, automating low-value tasks

Optimise resources

Increases time available for workers on tasks that deliver added value

Easy to implement and use

Installation is fast and easy without changes to space, no technical knowledge needed



Use Cases

StockBot

RFID Inventory Management Robot

RETAIL AND STOREFRONT

Success case

DECATHLON



WAREHOUSE & E-COMMERCE

Success case

TENDAM
GLOBAL FASHION RETAIL

StockBot

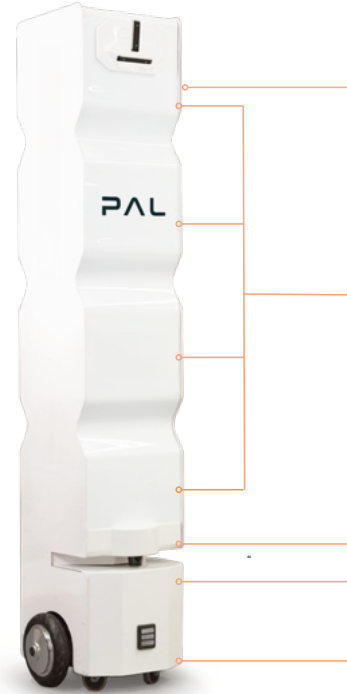
RFID Solution

Success Case:
Picking Warehouse

PAL



Embedded computer
Data generation



3D Cameras

Allows robot movements
inside very complex areas

8 RFID Antennas

4 antennas for each side.

RFID Reader

2D Laser Localization
and obstacle avoidance

Dock Station Connectors
to charge the robot
automatically

Deployment

+200 robots working
daily in over 15 countries

StockBot in Action



RFID-Powered Autonomous Solution for inventory management and data-driven operations

Legged Robots

Humanoids, Physical AI,
Locomotion Platforms



Meet our Bipeds

The state-of-the-art humanoid physical AI platform

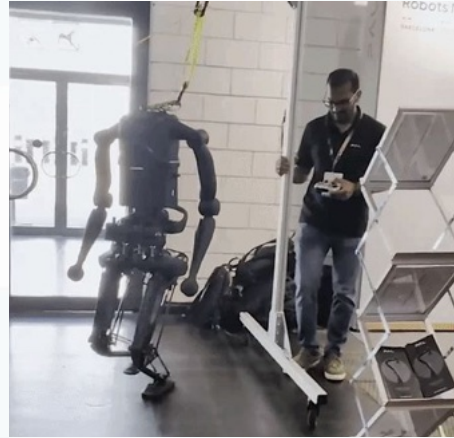
Advancing Locomotion Research

Cutting-edge platforms for walking, balance, and agility research



Trusted by Leading Institutions

Used globally in top labs driving robotics, AI, and human-centered tech



Physical-AI & Versatile Control

From model-based algorithms to AI-driven robot learning and sim-to-real pipelines



Use Cases

KANGAROO

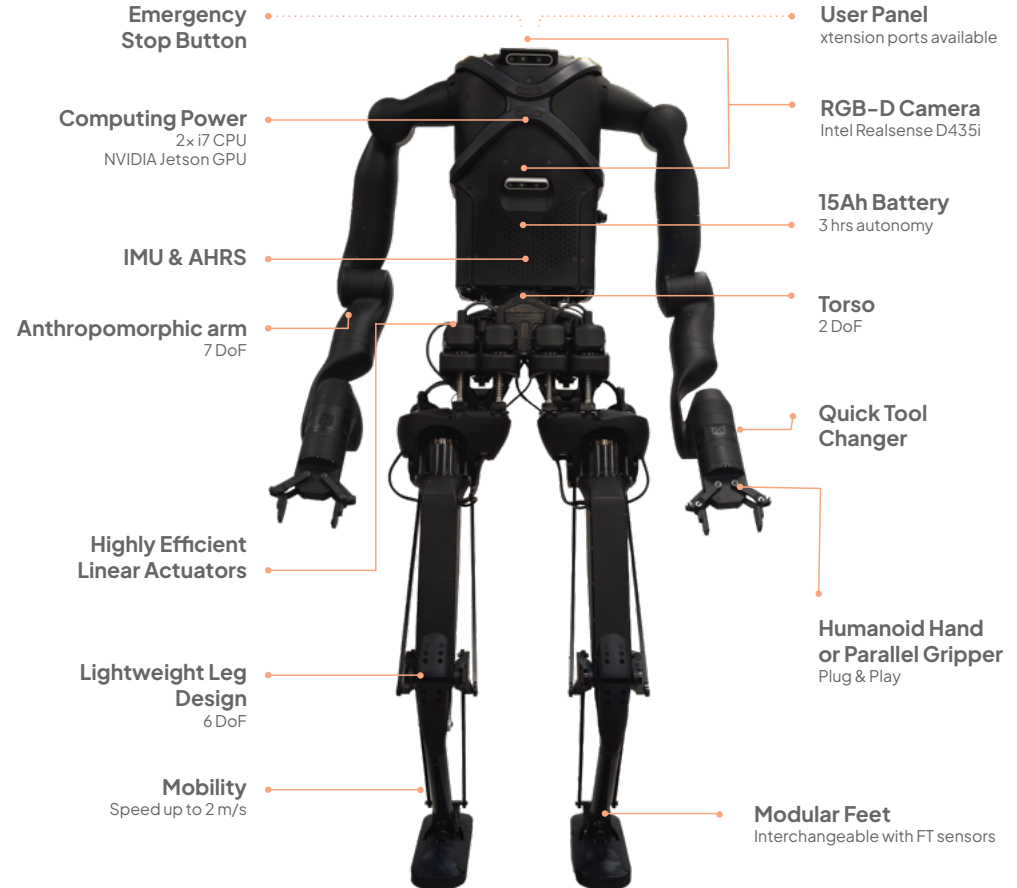
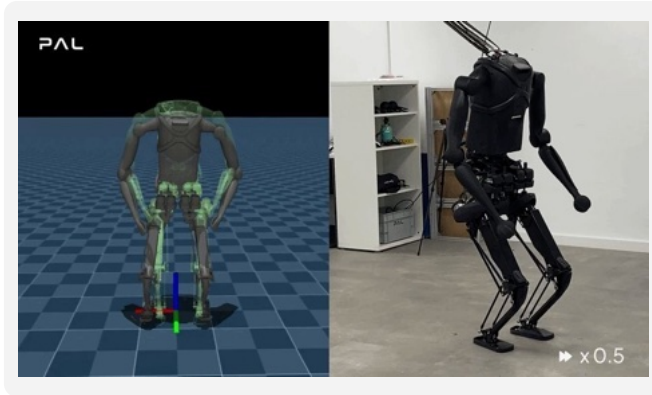
High Performance, Agile, Dynamic Biped

Dynamic & Robust

Built for high-speed,
high-torque movement

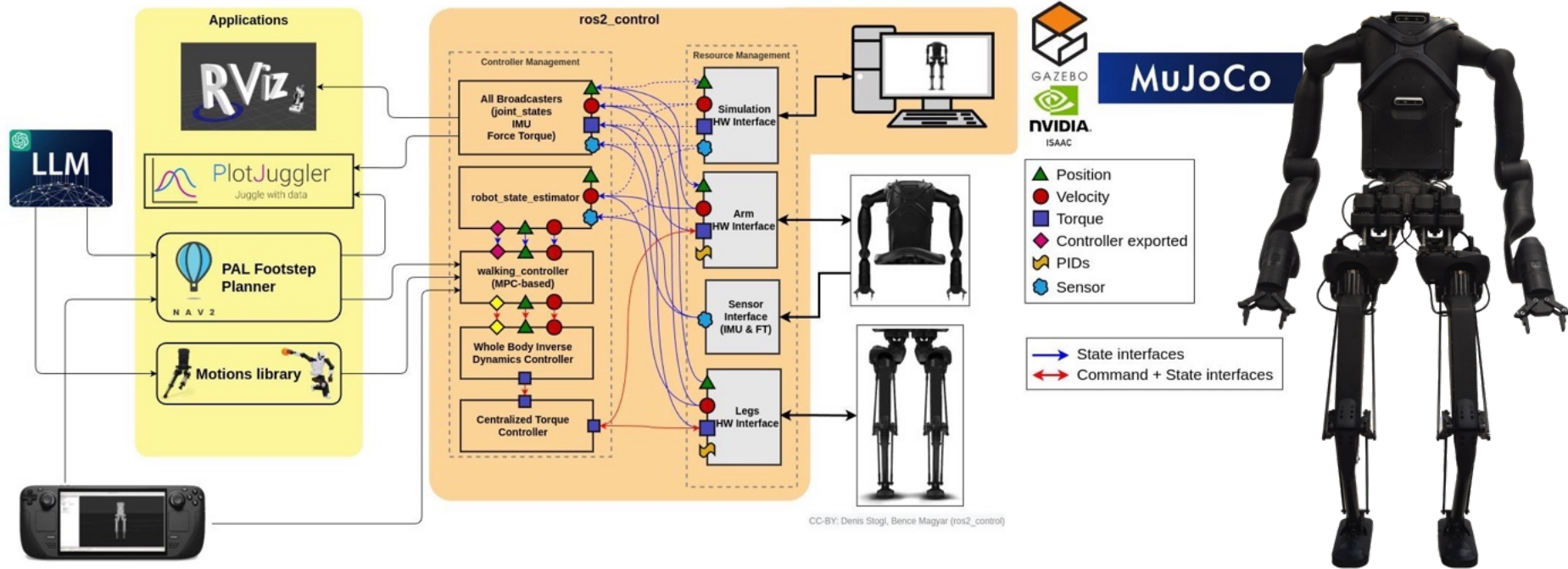
Human-Centered Design

Precision and safety for research
and the real-world

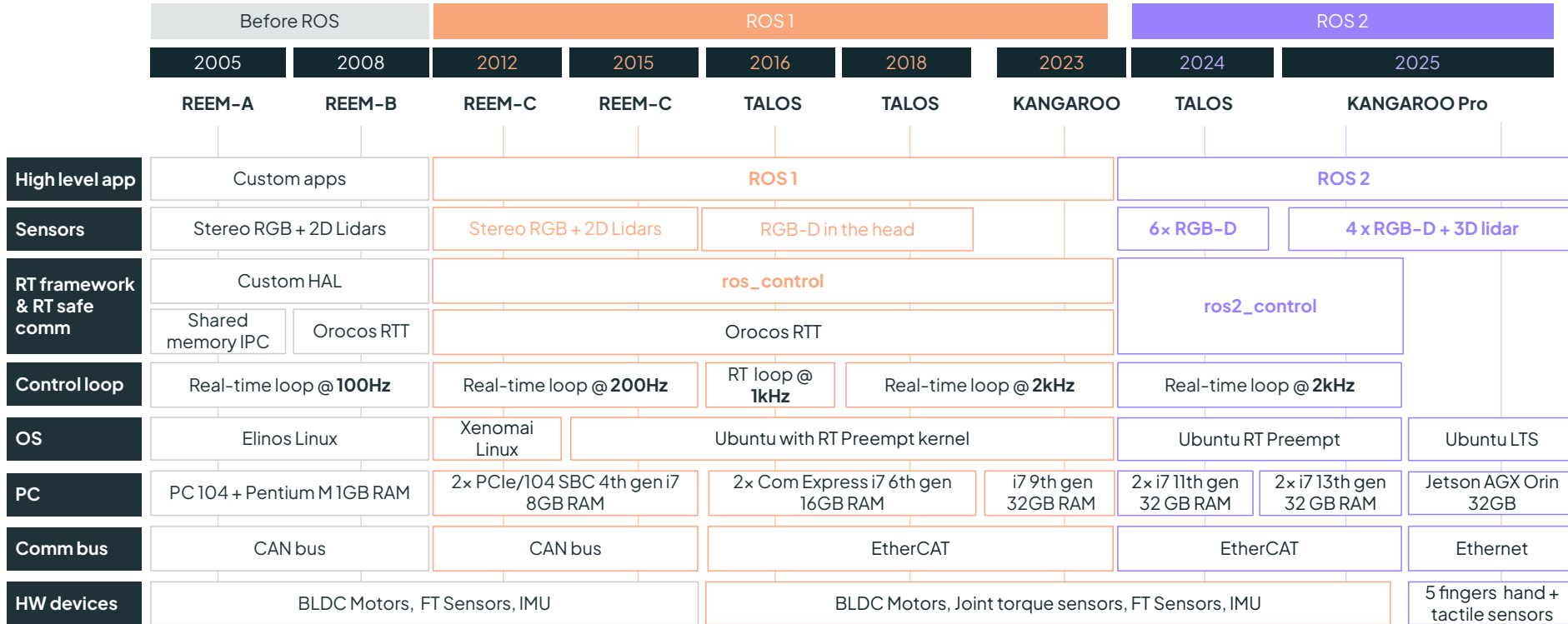


Humanoids Control Architecture

General overview of PAL Robotics Humanoids software architecture



Our system architecture over the years...



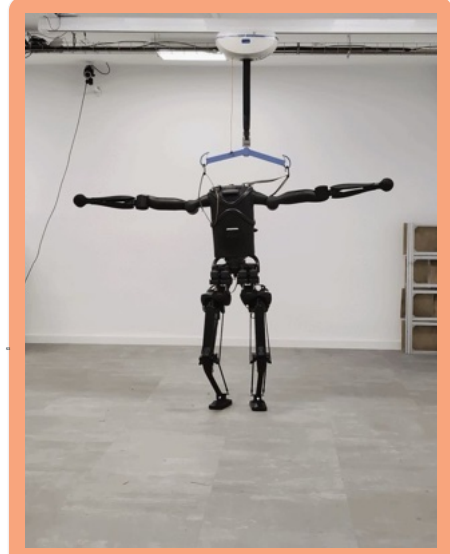
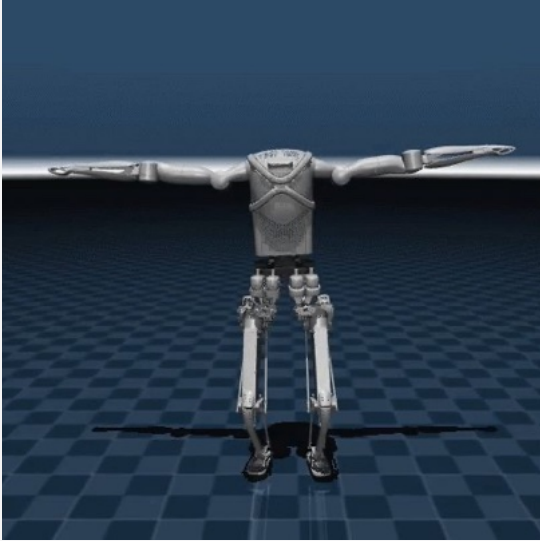
Embodied AI

Imitation Learning: Walking

Human-to-robot retargeting
of data recorded from human

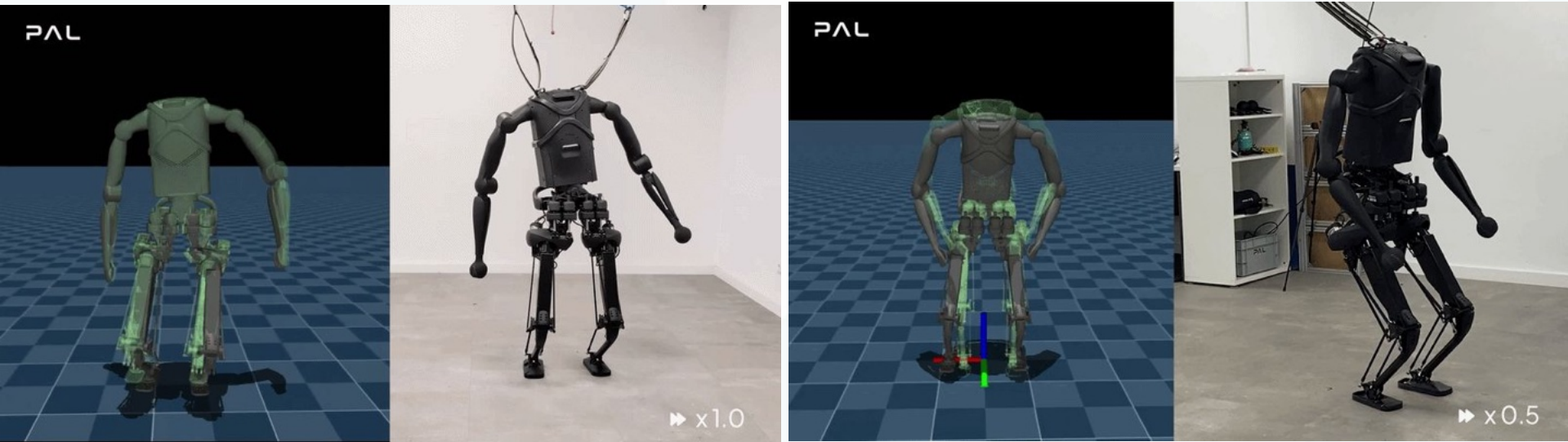
Model training (Behavioral
Cloning or Inverse
Reinforcement Learning)

Policy Execution

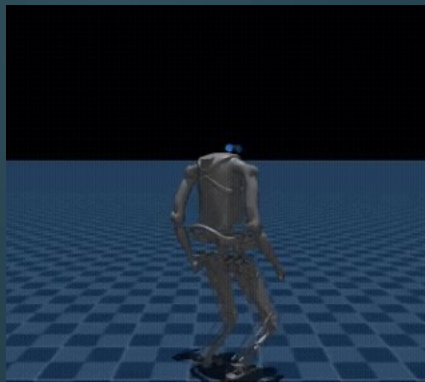


Embodied AI

Imitation Learning: Complex Motions



KANGAROO in Action



Multimodal, modular, open source manipulators designed for collaboration

Mobile Interaction

Manipulation,
Navigation, Interaction,
Embodied AI

The TIAGo Pro
Ecosystem



Mobile Interaction and Social Robots

Designed for collaboration

Diverse Applications

Mobile manipulators working in diverse environments and social, assistive platforms.

Interactive Service Robots

Robots working together, interacting and collaborating with humans.

User-friendly

Easy to use, intuitive and developed to integrate into existing setups.



Use Cases

TIAGo Pro Highlights

Designed for collaboration

Safety and Compliance

Safety brakes, collision-aware navigation, series elastic actuators

Open & Compatible

AI-ready, 100% ROS 2 integrated fully open-source



Interchangeable End-Effectors and Modularity



PAL Parallel Gripper



Seed Robots
Humanoid Hand



Inspire robots
Hand



Allegro Hand



Arm Flange
ISO 9409-1



TIAGo Pro Teleoperation Station

Accessory for data collection and embodied AI

Real-world **data collection**, to solve
real-world **needs across areas**.

AI Ready, with a **ROS 2 control layer**
for **VLA model training** & policy execution



SEA Arms

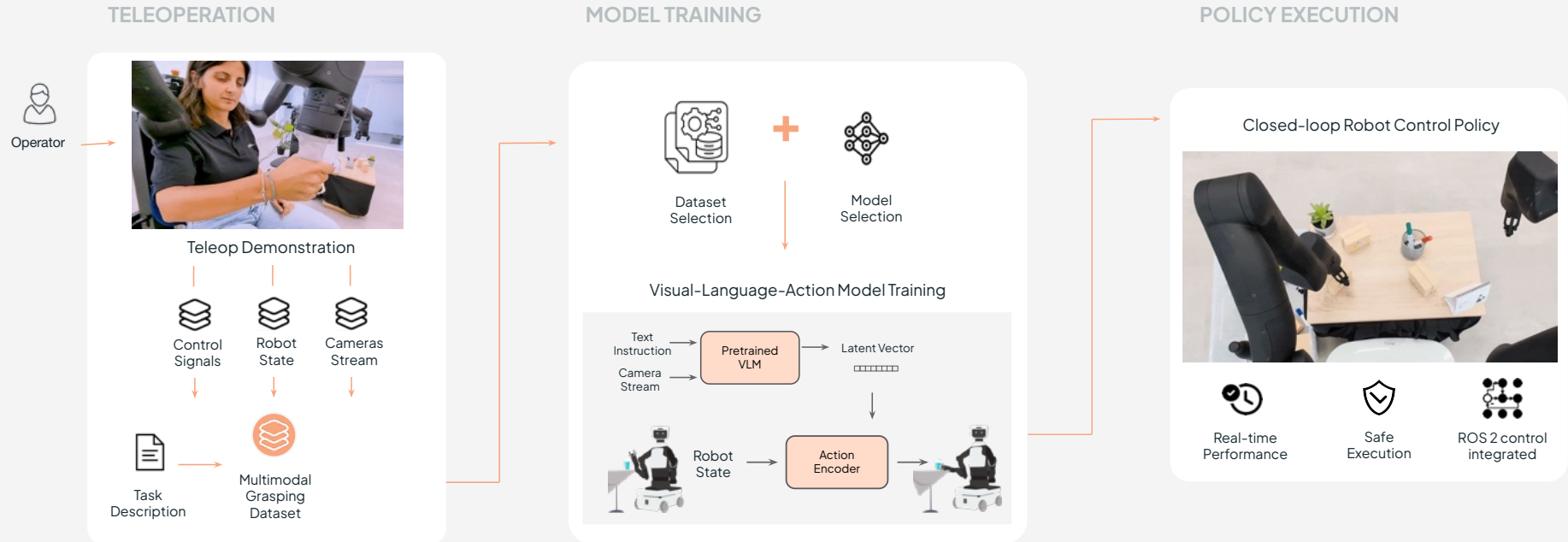
2x 7 DoF with 96cm reach
Fully Torque Controlled at 1 KHz



Custom Handle for
Gripper Control

The Pipeline Teleoperation & Data Collection

A platform enabling real-world data collection for robot learning and adaptive behavior



LEMNI

Manipulation, made easy

Plug & Play Solution

Drastically reduces integration cost. Modular design, easy sensor & vision integration

Open, Compatible Control

AI-ready, with a fully open-source native ROS 2 software and high bandwidth control loop



PAL

Proven Technology
PAL Robotics' proprietary
Series Elastic Actuators

Communication Bus
1kHz EtherCAT

Lightweight Arm Design
7 DoF

Robot PC
No Bulky Control Box

On/Off Button
Status LEDs
Brake Button

Parallel Gripper
Interchangeable
End-Effector

Payload
3 kg

Workspace
95cm reach

Infinite Rotation
On joints 1, 3, and 5



TIAGo Pro & LEMNI in Action



Multimodal, modular, open source mobile manipulator designed for collaboration

PAL Robotics' Platforms

TIAGo Pro



Low level functionalities



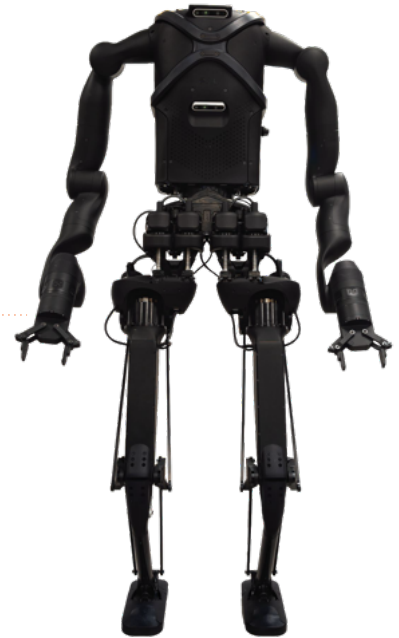
Mid Level skills



High Level applications



KANGAROO Pro



Service Robotics has to be built **together**
Real needs require strong **partnership**
Passion is our core engine.



Teamwork makes the dreamwork

Strong partnerships are essential to demonstrate research excellence and tackle societal challenges through robotics.

PAL wasn't built in a day



Pilot Deployments in
Logistics and Smart
Industries



Humanoid Robotics
R&D and
Robot Learning



Smart Logistics and
RFID Solutions for
Scaling Operations



Smart Agriculture
Food Safety Protocols



Physical AI
Connectivity
Internet of Things



Smart Hospitals & Centers
Assisted Living
Healthcare Assistance



PAL



Thank you



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