

INESCTEC
TECHNOLOGY & SCIENCE
| ASSOCIATE LABORATORY

U. PORTO

FEUP FACULDADE DE ENGENHARIA
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WHAT FUTURE FOR EUROPEAN ROBOTICS

27TH JANUARY 2021

PANEL

ECONOMIC IMPACT OF ROBOTIZATION ON

EMPLOYMENT, PRODUCTIVITY AND COMPETITIVENESS

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ROBOTICS: GLOBAL TRENDS

- Robotics is encompassing and pervasise (bio inspired soft robots, AI softbots)
- Basic “blind” and “brainless” pick-and-place, robotised cells, welding, paint-shop and warehouse automation gave way to
 - robots that can touch, sense and see, handle, move in complex paths, execute planned tasks, react and adapt to the environment ...
 - communicate in groups and with humans, process data, understand algorithms ... becoming more reliable and safer than humans
- Robots outperform humans in more and more different tasks
 - sophisticated, high-precision surgery
 - 24 hour assistance to elderly, disabled and hospitalised people
 - on-shore and off-shore infrastructure repair
 - inspection and rescuing in harsh catastrophe environments

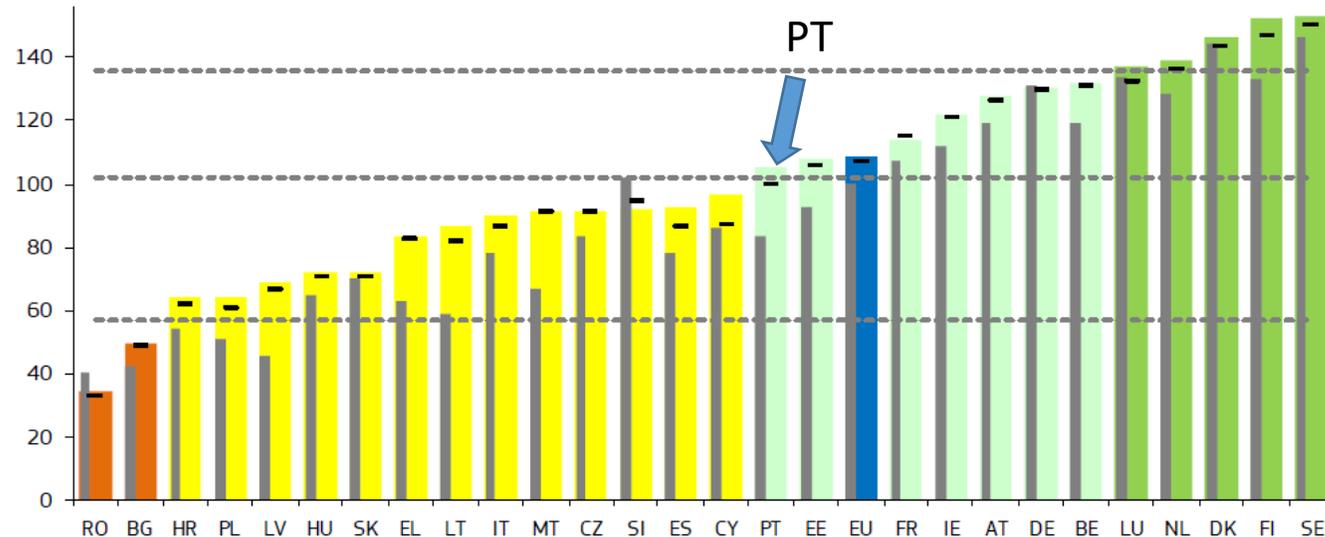
TECHNOLOGY IN EU RECOVERY AND TRANSFORMATION

- In Europe, three priorities are driving the post-pandemic recovery towards sustainable growth: resilience, digital transition and climatic transition
- Demand transformations in
 - economic fabric: industry, services, businesses, value chains
 - employment profile, people's qualifications
 - public services: administration, hospitals, security forces, etc.
- Technological change is key (... including robotisation ...)
 - addresses both societal challenges and potential markets
 - is pervasive, fast-spreading and it precedes social, economic, legal and educational reforms

THE CASE OF A SMALL INNOVATIVE EUROPEAN COUNTRY

Portugal is a small and open economy that needs innovation to compete

- exports 40% GDP in goods and services (2019)
- SMEs compete globally in many setors
- FDI looks for production, but also engineering and research capacities (Bosch, Siemens, VW, Continental, BMW, Vestas, ...)



Coloured columns show countries' performance in 2019, using the most recent data for 27 indicators, relative to that of the EU in 2012. The horizontal hyphens show performance in 2018, using the next most recent data, relative to that of the EU in 2012. Grey columns show countries' performance in 2012 relative to that of the EU in 2012. For all years, the same measurement methodology has been used. The dashed lines show the threshold values between the performance groups.

- Strong Innovator in 2020 European Innovation Scoreboard

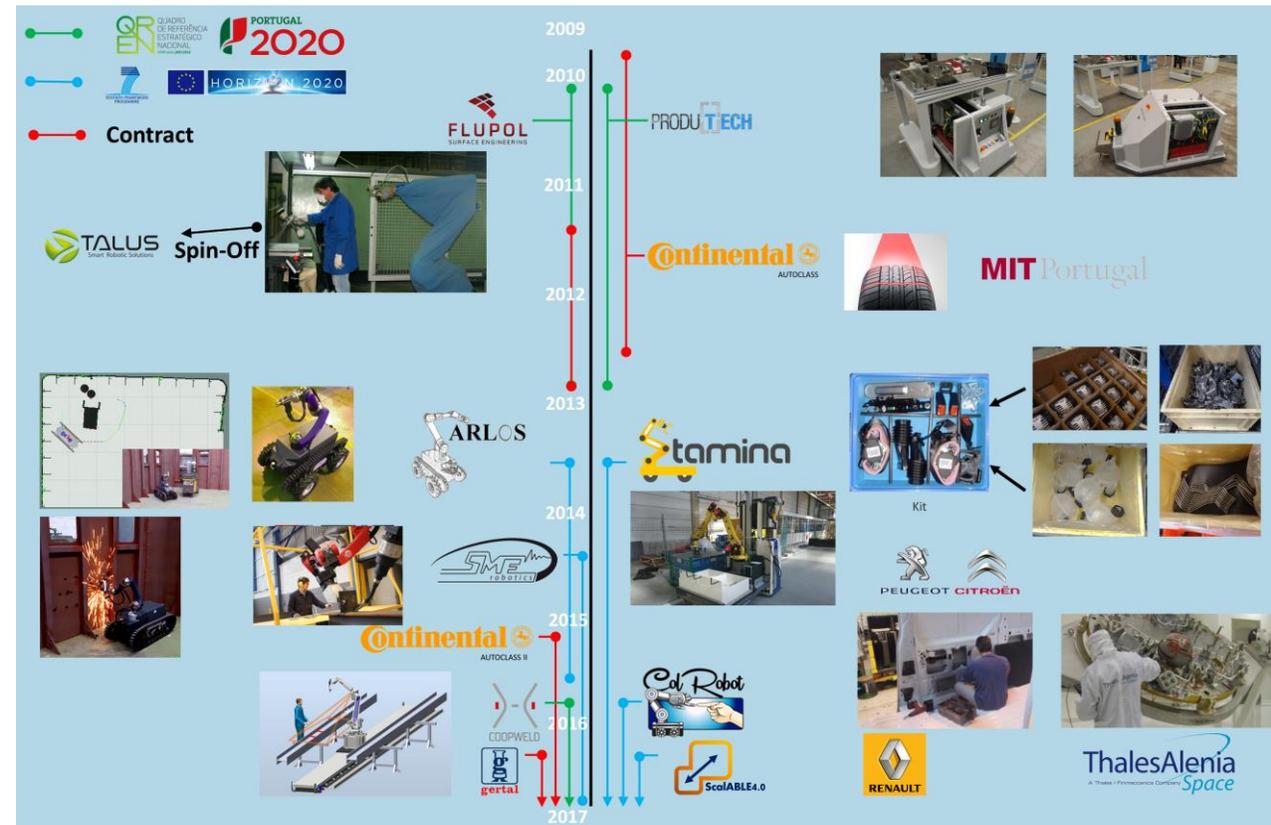
- Better performance in
 1. Innovating SMEs
 2. Innovation-friendly environment
 3. Attractive Research System
 4. Human Resources

AFFORDABLE COMPETITIVE ROBOTIC SOLUTIONS FOR SME

- Industrial robots are now commodities sold by multinationals – ABB, YASKAWA, FANUC, KUKA, Comau, Mitsubishi, etc. – to growing markets in automotive, electronics, machinery, pharma and other industries
- But affordable “boutique” solutions emerge from research and SMEs pulled by lead-users in many businesses where intelligent, flexible, autonomous, cooperative robots may be used to increase human labour productivity (faster, cheaper and better), for exemple in
 - hospitals, nursing and residential care homes
 - large buildings, warehouses, airports and other infrastructures
 - agriculture, forestry and mining
 - manufacturing SMEs supplying large OEMs

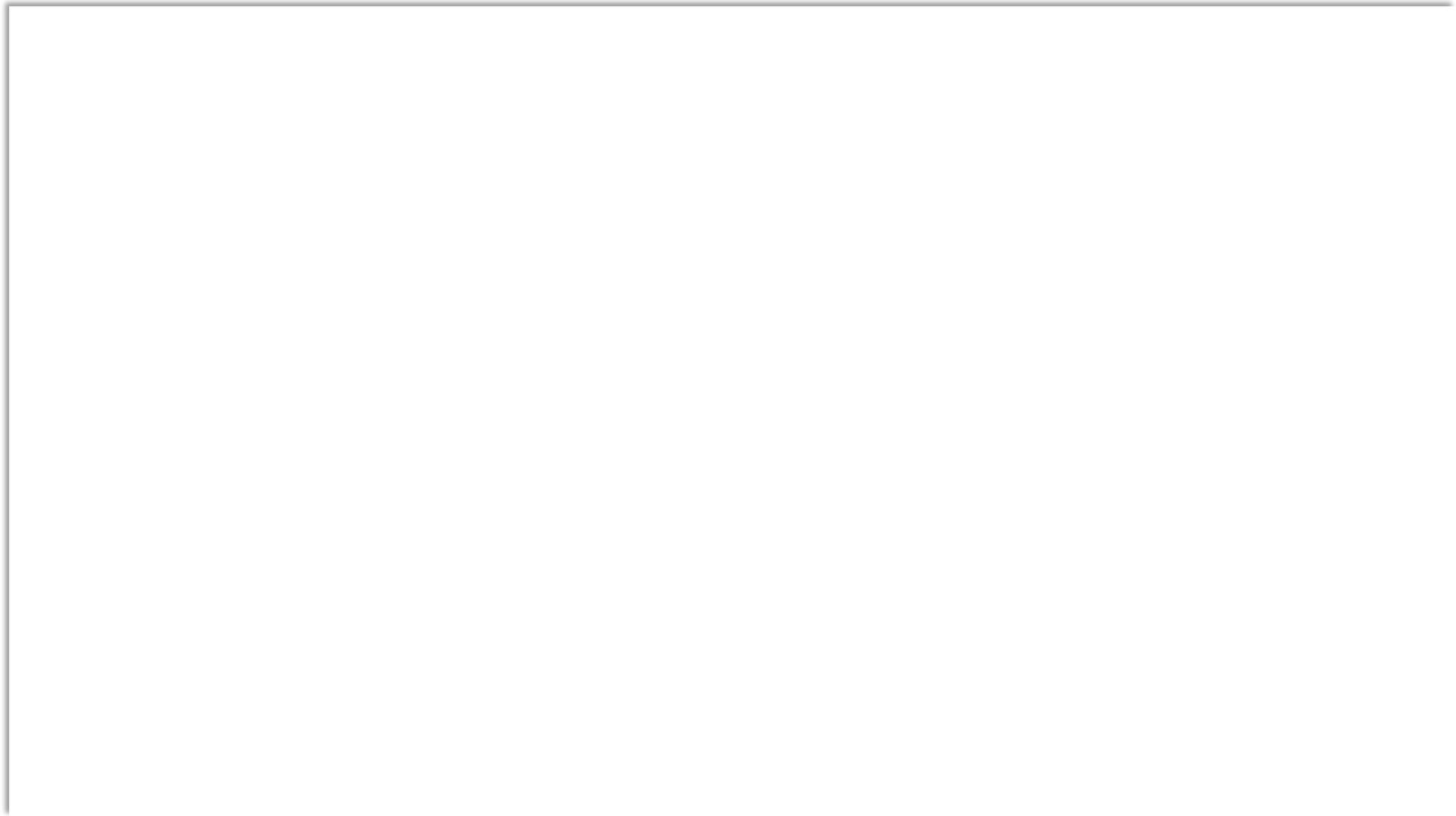
RESEARCH AND TECH-TRANSFER IN ROBOTICS

- A few examples of the outcome of the work of European research Labs and companies that were challenged to focus on research with impact in people and in business
- The technological platforms built led to robotic technologies, components and systems for affordable robotisation in many different domains



NEW OPPORTUNITIES FOR EUROPEAN ROBOTICS

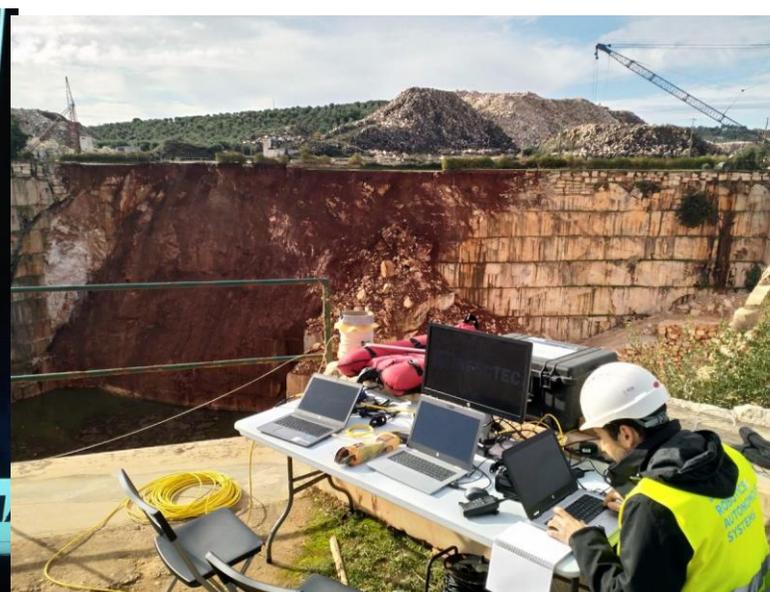
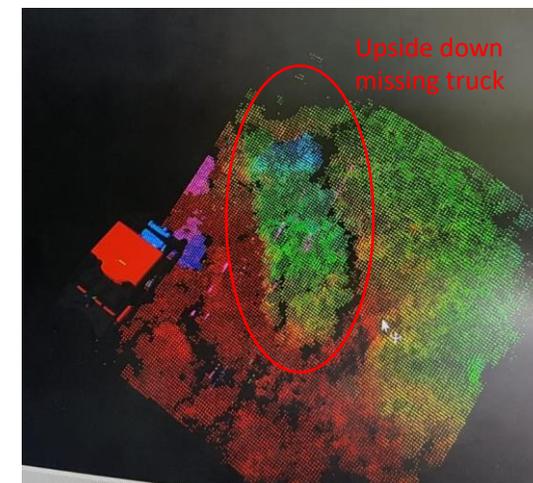
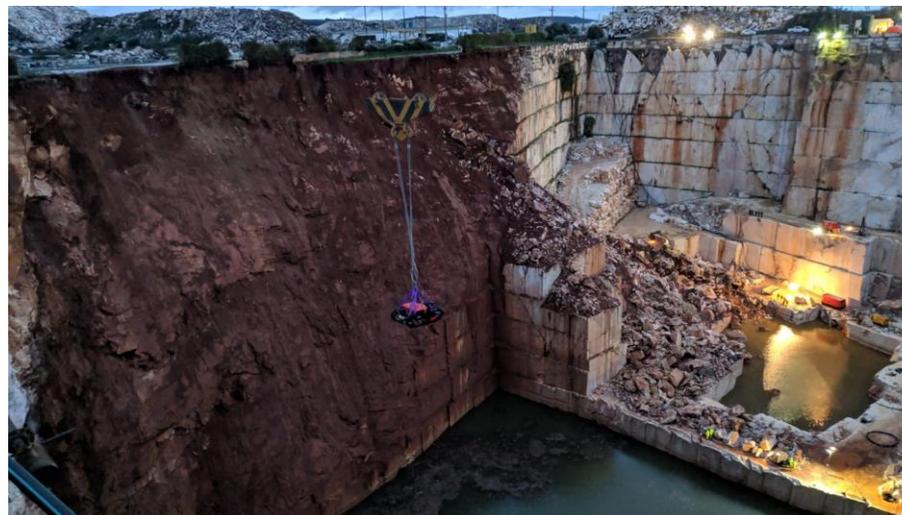
- **We'll now look at simple, affordable, impactful applications of robotic systems**
- **They all portray lead-user innovation supported by applied research and innovative SMEs**



Borba Road Collapse - 2018 November 19th

- SEARCH AND RESCUE IN A CATASTROPHE SCENARIO

- ◆ Underwater mining technology
- ◆ Two vehicles missing in a marble quarry flooded pit
- ◆ Support to the Portuguese Navy



FOR DISCUSSION

- 24 billion US\$ market (2020) expected to 3 x increase to 74 billion (2026)
- Novel applications/markets for robotics
 - service robots, domestic, defense
 - post-COVID touch-less automation
 - more AI/ML & sensing & vision & communication
 - robotics for heavy duty machinery in agriculture, forestry and mining
- Employment / training / inequality issues
 - are CPs are worst than robots?
 - will doctors be replaced by CPs in diagnosis before nurses are replaced by robots?
 - what about the jobs that people do not want at all for their children?
- Safety, security, data protection (GDPR specifics?)