Smart Integrated Robotics System for SMEs controlled by IoTs based on Dynamic Manufacturing Processes

I4MS DIH summer School
Conventry, 21st Septembre 2016
CEA, TCS, TNO, TUM
What are the Centres of Competence, in HORSE?

• Settings representative of manufacturing installations
• Hold robotics equipment and supplies used in production lines.

Their role?

• Aim at simplifying usage and facilitating access to robotics by European industry and especially first users SME.
• Offer expert support for advising on deployment and fast assessment of robotics solutions in manufacturing.
• Help to define, implement, assess the HORSE framework
• Used to customize the HORSE framework for Application in real settings.
• Capitalise lessons learnt and best practices.

Their scope?

• Aim at supporting the “robotisation” of industrial ecosystem in regions
HORSE Centres of Competence

Four Centres of Competence (CoC) across Europe

- France – Paris-Saclay, CEA,
- Germany – Munich, TUM,
- The Nederland – Delft, TNO.

Three CoCs equipped and set up from existing facilities, equipment, experience and network,

- Slovenia – Celje, TCS,

One CoC to be established by HORSE

Seed for the Innovation Hubs

A model for the deployment of Competence Centres in Europe.
<table>
<thead>
<tr>
<th>Services</th>
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<tr>
<td>Places for feasibility trials, demonstration of robotics for manufacturing</td>
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<tr>
<td>Places to find experts advises on robotics for manufacturing applications</td>
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<tr>
<td>Places for networking with integrators and researchers, financers, public authorities, heart of the regional ecosystem</td>
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<td>Places for advises on IPR, market opportunities,</td>
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<td>Outreach, communication</td>
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Competence Centre typical equipment

- Robot for manufacturing with controllers and supervisor
- Tools for processes welding, trimming, painting, handling and grasping
- Production line equipment: conveyors, machine tools
- Equipment for user safety: sensors for detection of intrusion and posture analysis, sensitive carpets, etc.
- Simulation equipment: workbench, cave, simulator
- HORSE framework with modules (incl. Sensors, BPM, robots, etc.)
Examples of scenario covered

| Painting | Welding | Trimming, deburring, grape separation, disking | Human robot co-working, co-manipulation |
Equipment

Sybot 6X

Sybot 3X

Cobomanip

A6-15

A6-15

BA systèmes

Stäubli

Stäubli
Eco system

Connected to two French platforms (NFI) for ICT for manufacturing: automotive, aeronautics, ship building, etc.

FLOR, Metz, inauguration October 2016

Factory Lab, Paris-Saclay, inauguration September 2016
Examples of scenario covered

- Pick and Place
- Sensitive Manufacturing
- Environment Modelling and Perception
- Human robot co-working
Equipment

- KUKA LBR iiwa
- Stäubli TX 60
- Stäubli TX 40
- Meca Arm
- Saparo Floor
- ABB IRB120
Examples of scenario covered

- Mobile robot system for material handling from bin to racks
- Augmented Reality & Operator support systems in operations and machine set up
- Human robot co-working & co manipulation in flexible assembly work
Equipment

LRMate200iB

X sense movement and posture measurement systems

UR 5 robot

OPS Light Guide Systems

Augmented Reality system
ROBOFLEX  Slovenia Mission

• Organizer of the “regional value space” for promotion, demonstration and implementation of advanced robotics systems for the needs of manufacturing SMEs and their business ecosystems,

• Demonstrate, promote and support the introduction of advanced robotics systems and solutions in the manufacturing SMEs value chains and their business ecosystems,

• Promote, enable and support regional and international collaboration with industry-academy research and development of new robotic systems and applications,

• Development and utilization of new business models of sustainable partnering and collaboration in the areas of recognized interests,

ROBOFLEX  Slovenia Vision

The vision of ROBOFLEX Slovenia is to be a regional “one-stop shop service” with the support of the EU network of Competence Centres, and focusing on advanced flexible collaborative robotic systems for the needs of manufacturing and service SMEs.
Competence Centre ROBOFLEX Slovenia
As Virtual - Partnering Organization

Competence Centre ROBOFLEX Core Partners:

1. **C-TCS Institute** – legal representative of the Toolmakers Cluster of Slovenia (TCS)
   **Role:**
   - Legal representative of the Competence Centre ROBOFLEX Slovenia,
   - Network of manufacturing, R&D organizations and industrial clusters,
   - Project office services

2. **Company ETRA Ltd** – robotic systems developer and integrator
   **Role:**
   - Operator of the ROBOFLEX demonstration centre

3. **INTESO Group** – legal representative of the international virtual living laboratory LENS Living Lab
   **Role:**
   - Developer and coordinator of the regional ROBOFLEX Technologies collaboration platform,
   - Collaboration with the LENS Living Lab portfolio of existing technology platforms (Smart Machines & Systems, ICT, logistics, laser additive manufacturing, new business models and emerging competences),
   - ICT systems and services

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Collaboration Platform Partners:

1. **ROBOFLEX Core Partners** – collaboration platform co-organizers and enablers,
2. **Robot Companies** – regional and international robotic systems developers and integrators,
3. **Service Companies** – providers of supporting services (technical and non-technical) needed for the successful implementation of robotics systems in the industrial environment,
4. **Manufacturing Companies** – advanced users (early birds), technology promoters, demonstrators and co-developers,
5. **R&D Organizations** – providers of R&D services, new technologies and industry strategic or project partners (present partners: Faculty of Logistics and Faculty of Mechanical Engineering from the University of Maribor),
6. **Competence Development Organizations** – developers and providers of lifelong education, training and HR services,
7. **Network of the HORSE Competence Centres** – outsourcing and partnering in the initiation and implementation of R&D projects
8. **Regional Digital Innovation Hubs (DIHs)** – partnering on the agreed areas of collaboration,
9. **International Partners of the Virtual Living Laboratory LENS Living Lab** – searching and exploiting potential application and collaboration opportunities with members from other complementary technology platforms
Potential financing ideas

• Services based
• Sponsoring by big organisation
• Membership approach
• Public and private financing. I.e. alignment with other initiatives