TECNALIA

European Robotics Forum 2014
Workshop on
"Dual arm robots for skilled manufacturing operations"

Dual arm robot in aeronautics assembly operations

tecnalia Inspiring Business

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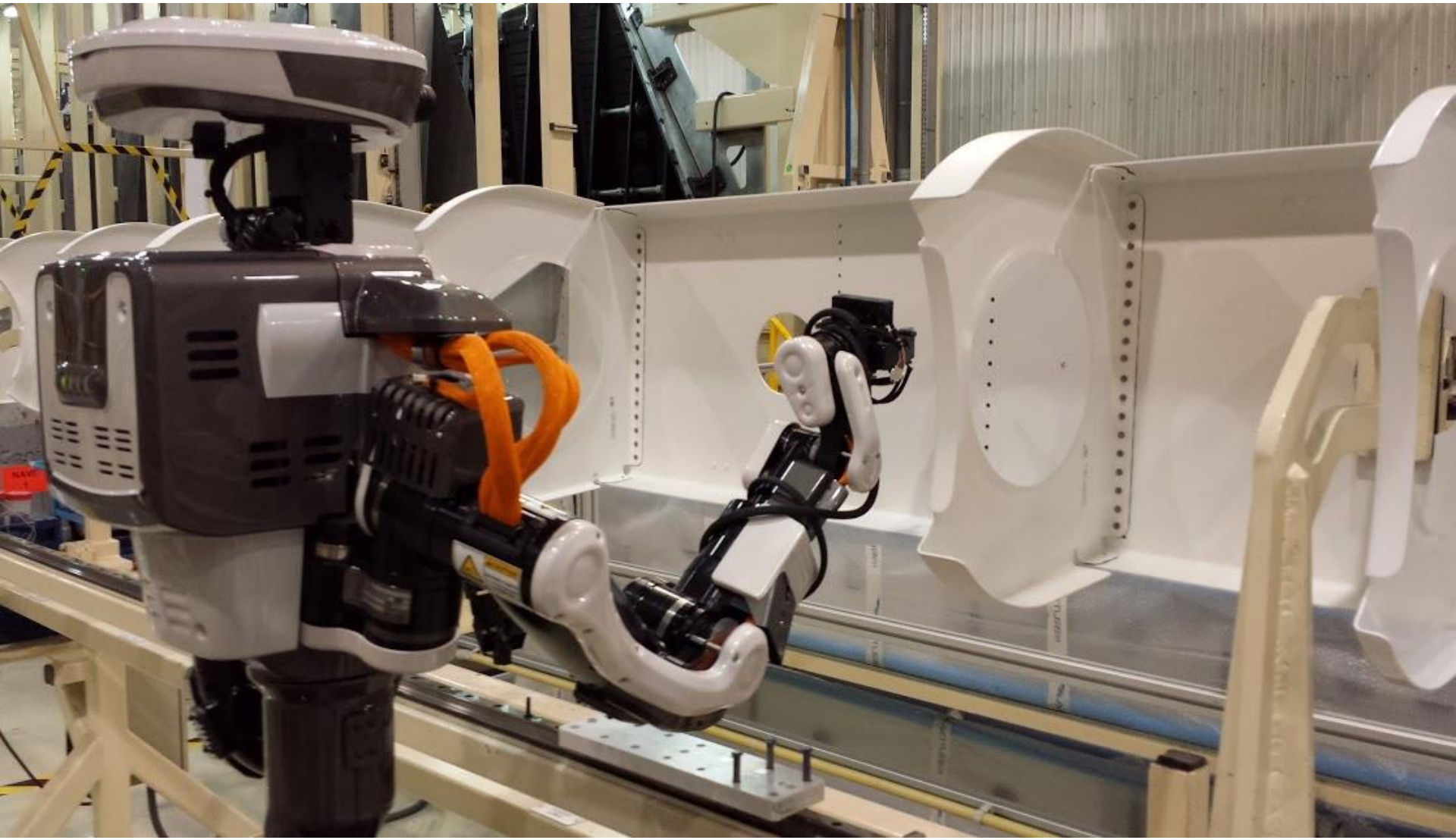
Dual arm robot in aeronautics assembly operations



Context

Spanish and European manufacturing are in deficit of Competitiveness in the worldwide economy:

- At product level
- At production cost level

Robotics is identified as a Key solution to stop offshoring and maintain productive plants in Europe.

Competiveness improvements using robotics can be obtained through increases in Productivity, Flexibility and Quality

Major countries are clearly understood it and support Robotics through public plans: USA, France, Korea, Germany, Japan… as well as EU in H2020

TECNALIA has an entire team working towards this objective.

Why dual-arm robots ?

There are hundreds of industrial robots integrators companies.

BUT there is still a lot of manual operations in factories required to:

- Build airplanes
- Build and layup complex composite parts
- Proceed to the final assembly of cars
- Perform manipulation and assembly of small components

And many more!

We first had to convince end-users!

On internal funding, Tecnalia prototyped a concept validation demonstrator for Airbus Spain

Automation of HiLite rivet installation on a A380 rib using the Kawada Hiro robot

TECNALIA won the European Manufacturing Award 2012 – Factories of the Future

Factory of the Future Award

Very interesting project with great collaboration of partners. Key expected results for this factory of the future strategy are about flexibility, safety and elevating plant worker to more value added activities.

Winner

TECNALIA

We first had to convince end-users!

Si no funciona: http://youtu.be/XTCSDBg_HQk

And now what? From demonstrator to pilot plant!

- We convinced Airbus of the potential of this technology to further automate their production.

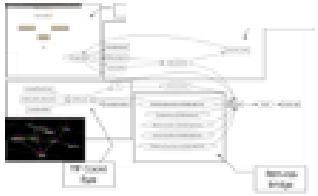
- We are implemented various operation processes, such as deburring or HiLite and Blind rivets installation
  - With o a lots of variability on the operations
  - In areas where the robot needs mobility along the jigs
  - In areas where there are strong accessibility issues
  - On parts of very high cost and high criticity

What do we need for that?

The biggest difference between a Human and a robot:

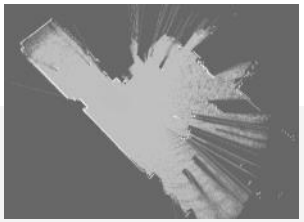
The Human perceives its environment and adapts its plan

Control Architecture:



Mechatronics:

Mobility and Autonomy:

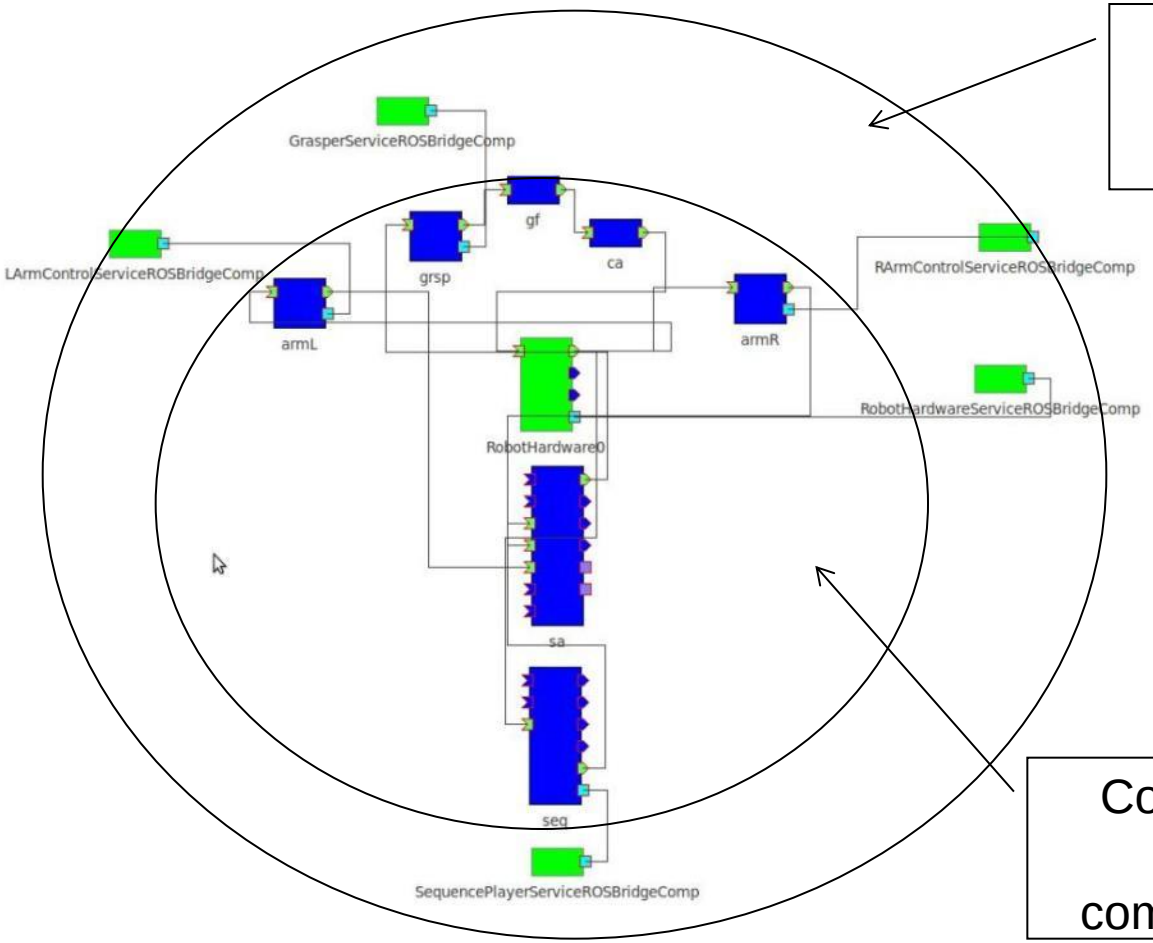


Perception

Planning and simulation:

Architecture

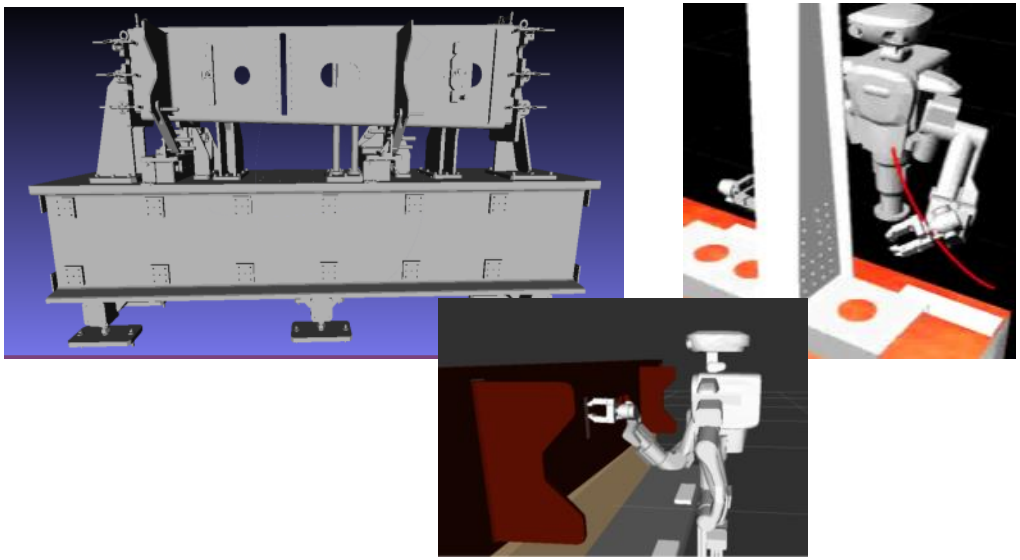
- Co-developped a bridge between open-RTM and ROS



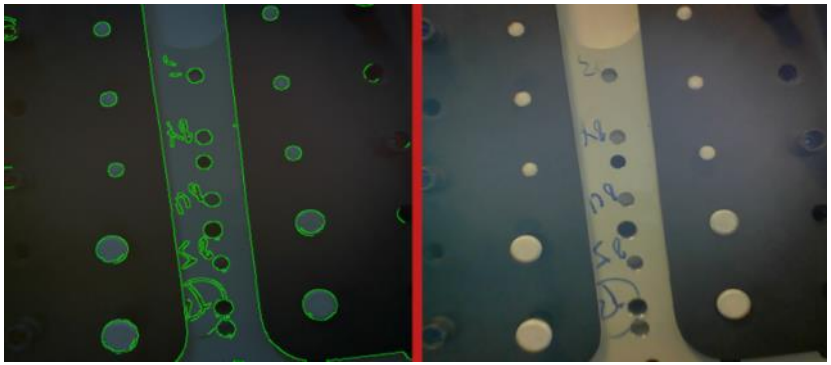
Some of the functionalities

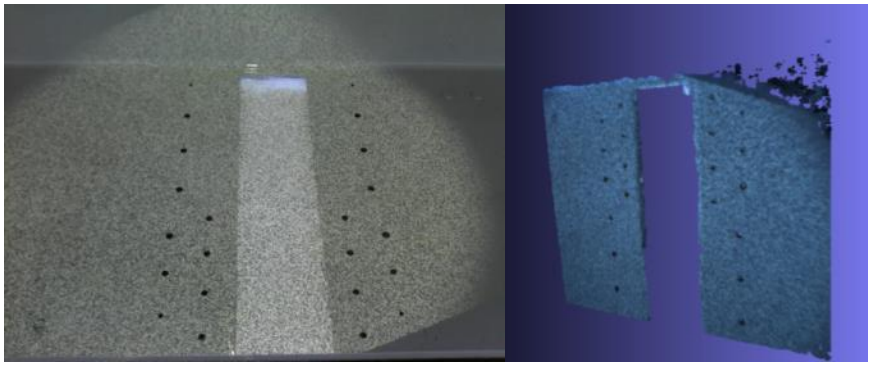
Teach by Demonstration

Automatic path planning and simulation



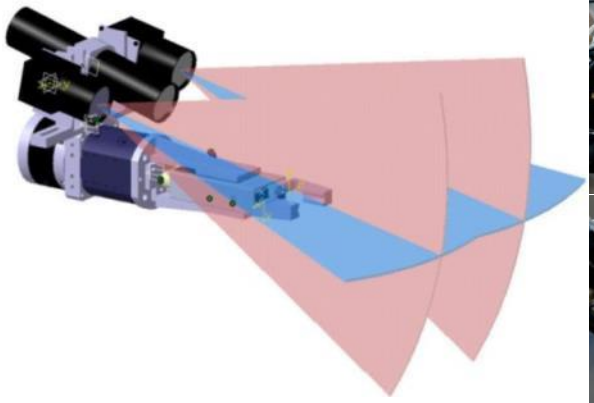
3D vision guiding and environment reconstruction





Some of the functionalities

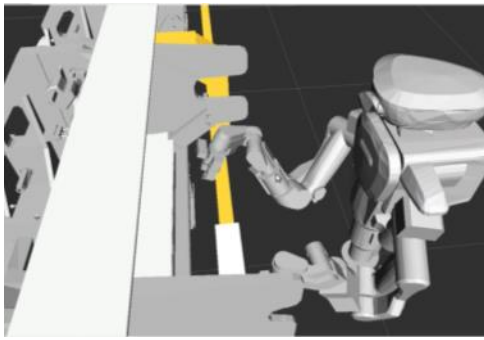
Complex lightweight grippers



Autonomous navigation in the station

Some of the early demonstrators

Automatic path planning for rivet installation with obstacle avoidance in constrained environments



Some of the early demonstrators

Dual-arm robot for automatic deburing of aeronautics drillings

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