

RoCKIn

The Journey So Far and the Upcoming Final Competition

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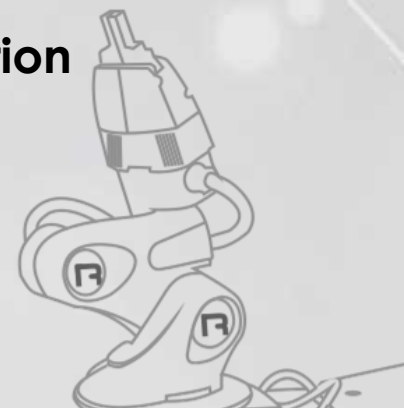
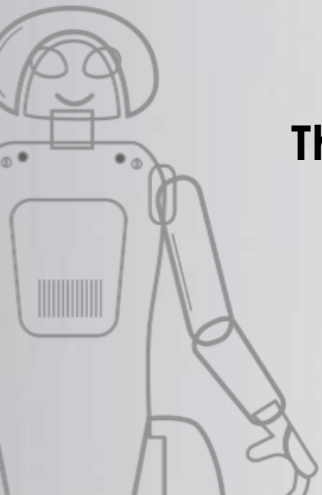




ROCKiN

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OVERVIEW

Project aims, events, project development and dissemination activities.

Overview

RoCKIn is an EU-funded project aiming to **foster scientific progress** and **innovation** in **cognitive systems and robotics** through the design and implementation of **competitions** and **benchmarking procedures**.

Additional objectives of RoCKIn are to:

- **Increase public awareness** of the current state of the art in robotics in Europe
- Demonstrate the **innovation potential** of robotics applications for **solving societal challenges** and **securing the competitiveness of European industry in global markets**.



RoCKIn

In order to achieve these objectives, RoCKIn has developed two challenges for:

- Domestic service robots (**RoCKIn@Home**)
- Industrial robots in factories (**RoCKIn@Work**)



The Consortium

IST-ID

Associação do Instituto Superior Técnico
para a Investigação e Desenvolvimento



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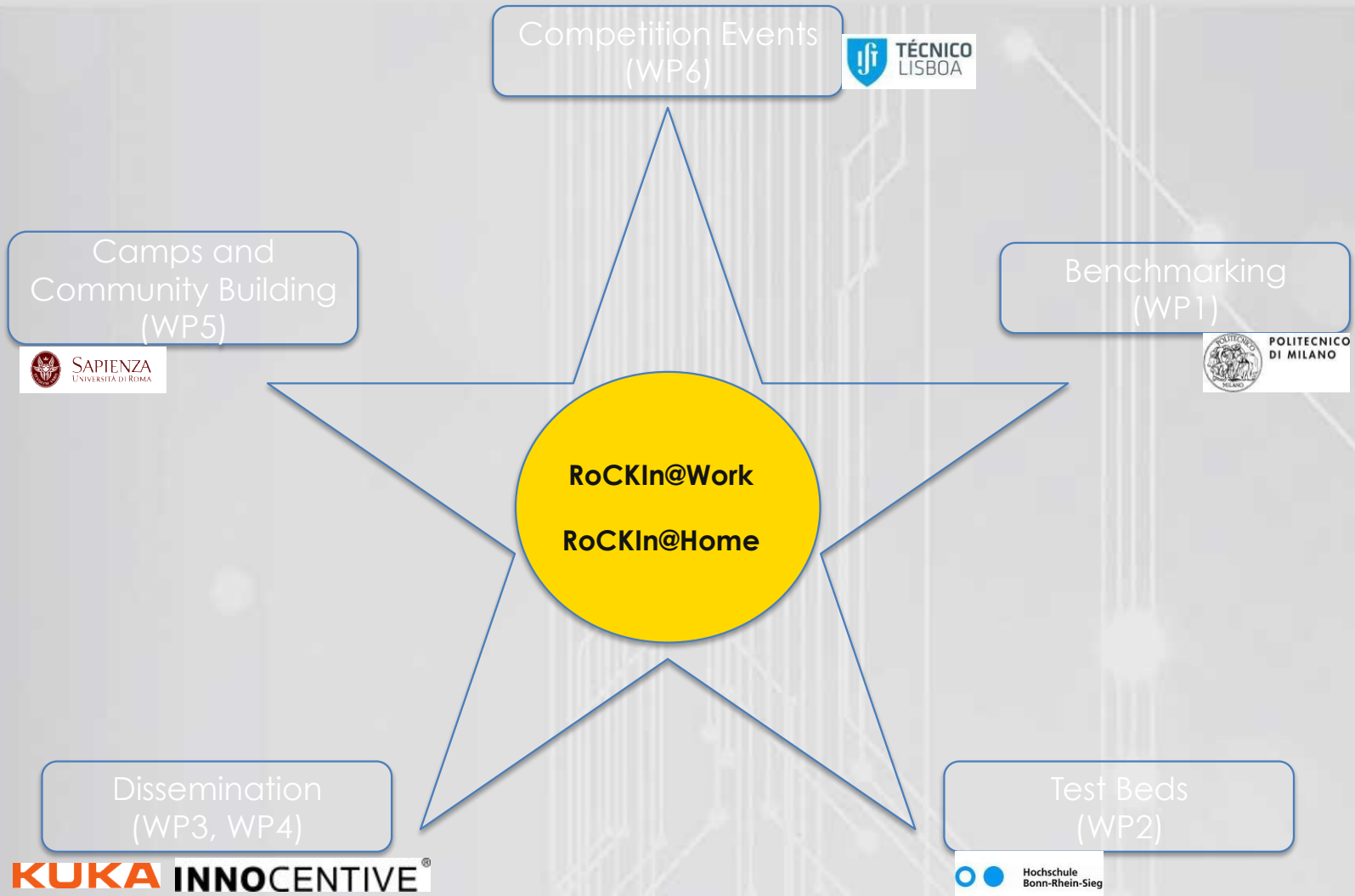


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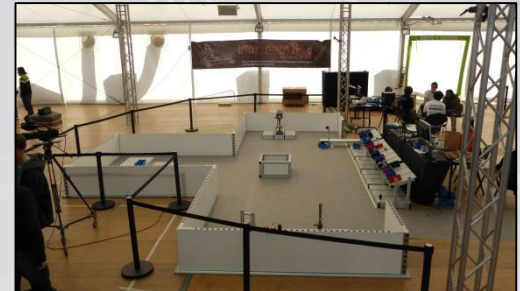
[rockinrobotchallenge.eu](#)

Overview – Project Activities



Overview – Challenge Development and Benchmarking

- Developing **competition infrastructure and testbeds**
- Producing final versions of **rulebooks**
- Developing **benchmarking and scoring procedures**, including **evaluation criteria** and the **motion capture system for ground-truth data collection**.





ROCKIN 2014

Our first competition event.

RoCKIn2014

- **Cite de l'Espace**, Toulouse, France
 - 26 – 30 November 2014
- **10 teams** from **6 countries**
- Communication Centre of **European Robotics Week 2015**
- Completely open to the public, **attracting hundreds of visitors**
- **Satellite events** for general public, industry and academia were organised by partners. They included:
 - SPARK Technology TG meetings
 - Robotics EU Cluster Regions Meeting
 - Film screening
 - Live robot demonstrations
 - Networking event
 - *'The Robots'* exposition



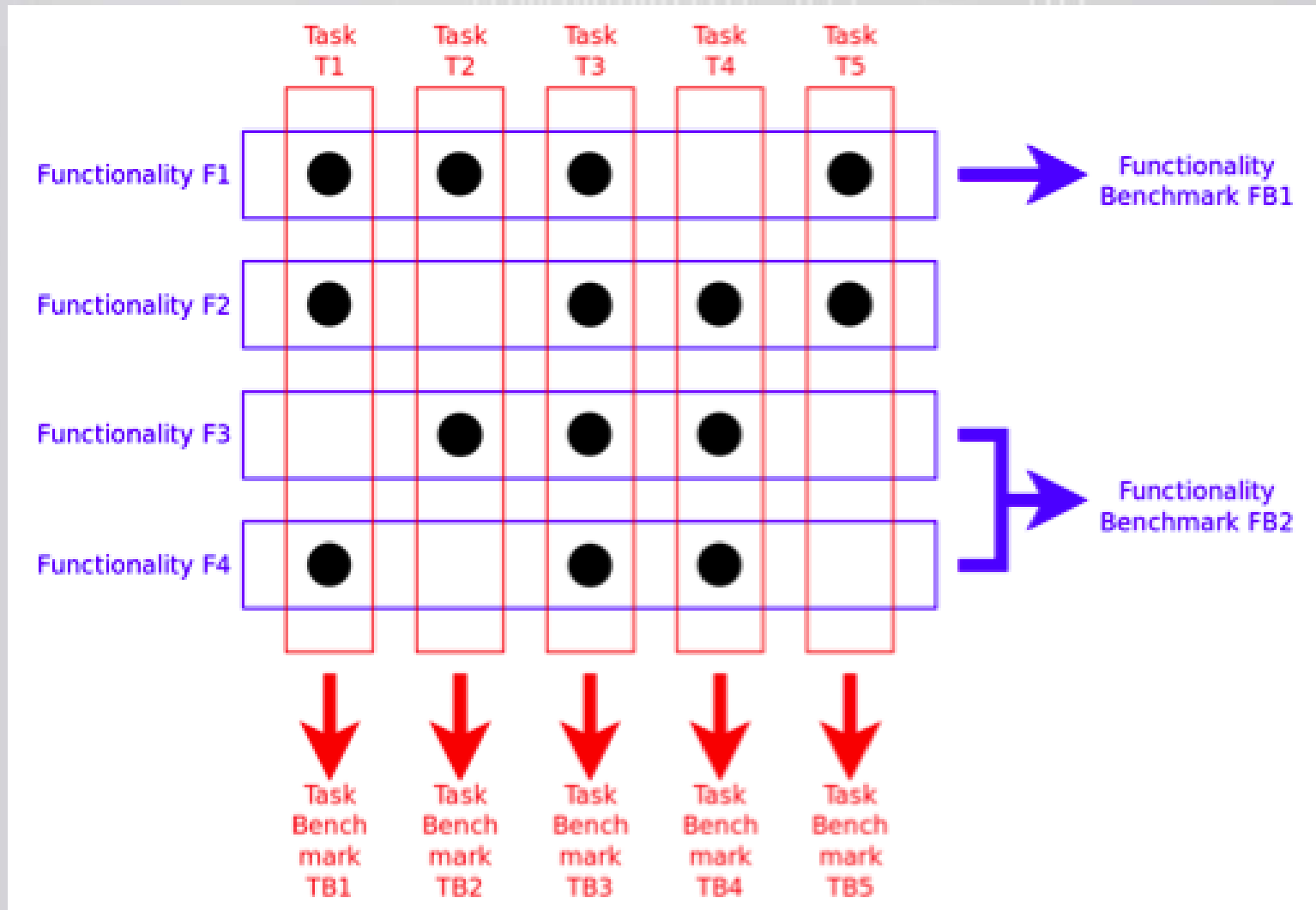
RoCKIn2014 - Video





CHALLENGE AND TESTBED DESIGN

Tasks and Functionalities



RoCKIn@Home

- Improving the quality of home life for the people of Europe
- Set in **Granny Annie's** apartment, the robots will help keep her healthy and doing the things she loves
- Robots are benchmarked on **3 tasks** and **3 functionalities**
- **Practice testbed** set up at **IST**



RoCKIn@Home – Task Benchmarkings

1. Getting to know my home

- Here the robot will be required to **generate a map** of its environment and **detect random changes** in the location of furniture and other items that will be made before each task.

2. Welcoming Visitors

- This task assesses the robot's **ability to interact effectively with humans** and to **demonstrate different behaviours when dealing with known and unknown people**.

3. Catering for Grannie Annie's Comfort

- Granny Annie will ask the robot to **help her with general tasks throughout her day**, including lifting the shutters, tilting the windows and switching off the lights.

RoCKIn@Home TBM3

Catering for Granny Annie Needs



<http://rockinrobotchallenge.eu>

RoCKIn@Home - Functionality Benchmarkings

- Object Perception
- Navigation
- Speech Understanding



RoCKIn@Work

- Ensuring the continued competitiveness of Europe's manufacturing industry
- Set in the RoCKIn & RoLLIn factory, a robot will **assist with the assembly of a drive axel** - one component of the robot itself and therefore a step towards **self-replicating robots**.
- Robots are benchmarked on **3 Tasks** and **3 Functionalities**.
- **Practice testbed** set up at **BRSU**



RoCKIn@Work – Task Benchmarkings

1. Assemble Aid Tray for Force Fitting

- Assembly-aid trays, bearing boxes and bearings are identified, transported to the relevant rig and fitted together with the help of another machine.

2. Plate Drilling

- Cover plates coming along a conveyer belt are individually inspected using a quality control camera and sorted, with those in need of drilling being taken to the relevant rig and placed ready for another machine to perform the drilling.

3. Prepare a Box for Manual Assembly Step

- After taking verbal instruction from a human worker, the robot goes around the various Workstations in the arena and collects a machined cover plate, pre-assembled bearing box, and motor with gearbox and encoder. The robot then delivers this box to a human worker for him/her to finish assembling the drive axel.

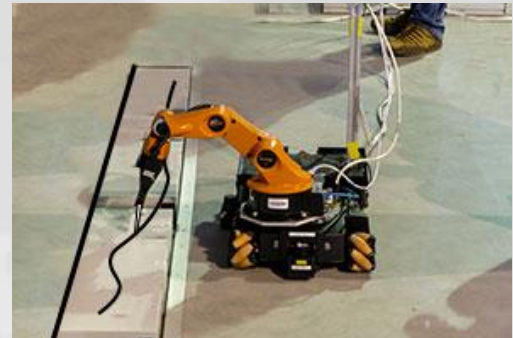
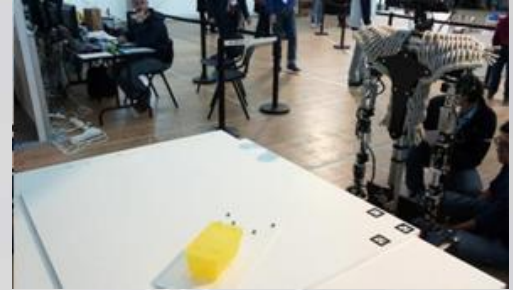
RoCKIn@Work TBM 2

Plate Driling



RoCKIn@Work - Functionality Benchmarkings

- Object Perception
- Object Manipulation
- Control



RSBB

- Referee, Scoring and Benchmarking Box (RSBB)
 - Common communication layer
 - Automated scoring functionality for FBMs
 - Separate visualization for the audience

Time	Team	Benchmark	Round	Run
2014-Nov-28 15:02:30	homer	Object Manipulation Functionality	1	1
2014-Nov-28 15:02:30	bit-bots	Object Manipulation Functionality	1	1
2014-Nov-28 15:32:30	Pumas	Object Manipulation Functionality	1	1
2014-Nov-28 15:32:30	Watermelon	Object Manipulation Functionality	1	1
2014-Nov-28 15:47:30	Watermelon	Welcoming visitors	1	2
2014-Nov-28 16:02:30	BARC	Welcoming visitors	1	2
2014-Nov-28 16:17:30	homer	Welcoming visitors	1	2
2014-Nov-28 16:32:30	Pumas	Welcoming visitors	1	2
2014-Nov-28 16:47:30	SocRob	Welcoming visitors	1	2
2014-Nov-28 17:02:30	bit-bots	Catering for Granny Annie's Comfort	1	2
2014-Nov-28 17:17:30	BARC	Catering for Granny Annie's Comfort	1	2
2014-Nov-28 17:32:30	homer	Catering for Granny Annie's Comfort	1	2
2014-Nov-28 17:47:30	Pumas	Catering for Granny Annie's Comfort	1	2
2014-Nov-28 18:02:30	SocRob	Catering for Granny Annie's Comfort	1	2
2014-Nov-28 18:32:30	ALL	Catering for Granny Annie's Comfort	1	2
2014-Nov-29 08:02:30	BARC	Speech Understanding Functionality	2	1
2014-Nov-29 08:17:30	homer	Getting to know my home	2	1
2014-Nov-29 08:32:30	Pumas	Getting to know my home	2	1
2014-Nov-29 08:47:30	SocRob	Getting to know my home	2	1
2014-Nov-29 09:02:30	homer	Object Manipulation Functionality	2	1
2014-Nov-29 09:32:30	Pumas	Object Manipulation Functionality	2	1
2014-Nov-29 09:47:30	Watermelon	Welcoming visitors	2	1
2014-Nov-29 10:02:30	bit-bots	Object Manipulation Functionality	2	1
2014-Nov-29 10:02:30	BARC	Welcoming visitors	2	1
2014-Nov-29 10:17:30	homer	Welcoming visitors	2	1
2014-Nov-29 10:32:30	Watermelon	Object Manipulation Functionality	2	1

RoCKIn Camp 2015

RoCKIn Camp 2015



March 18th – 22nd

Italy, Pisa

ECHORD++ facility

- A **hands-on event** to prepare teams for the final competition event in November 2015
- Selected Teams (4 from @Home, 5 from @Work) had the chance to **perfect their performances** in the **task and functionality benchmarks** using the **realistic ECHORD++ and RoCKIn testbeds**
- Benchmarking data acquired



RoCKIn Camp 2015





UPCOMING EVENT

RoCKIn2015



- The **second and final RoCKIn competition event.**
- **10 teams qualified for @Home**
- **5 teams qualified for @Work**

RoCKIn2015 (2)

Satellite Events (tentative, planning on-going)

- ROBOT 2015: 2nd Iberian Robotics Conference
- EU Robotics Cluster Regions Workshop
- RoCKIn-RoboCup Workshop

