Robots Helping @Home and @Work

RoCKIn

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Robot Competitions Kick Innovation in Cognitive Systems and Robotics

Consortium and Boards

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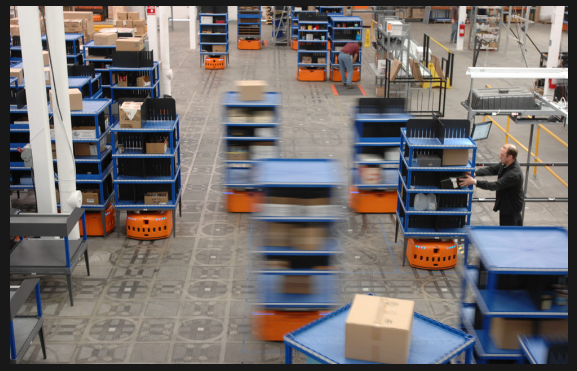
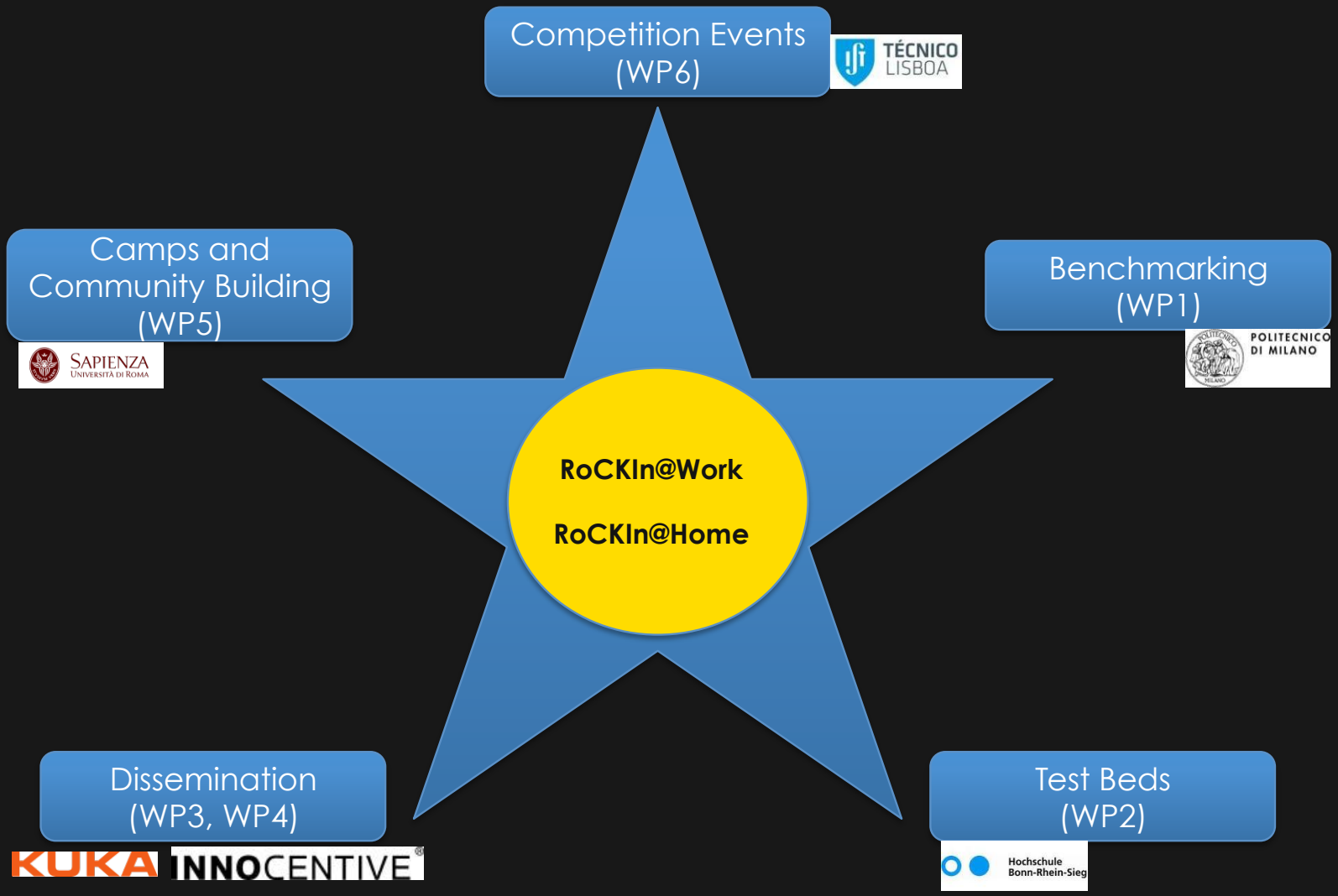
Vision

Robot competitions as a powerful mean to foster progress in Robotics R&D





RoCKIn@Work

Innovative robot applications in industry that:

- Work interactively with humans
- Have reduced initial programming requirements
- Contribute to the continued commercial competitiveness of European industry

- **Typical applications**
  - Factory of the future
  - Mobile manipulation, mobile robots with high visual perception capabilities, human-robot co-workers, cooperative robot teams, cloud robotics

RoCKIn@Home

Socially beneficial domestic service robots that

- Have enhanced networking and cognitive abilities
- Support the impaired and the elderly
- Contribute to an improved quality of life for the population of Europe

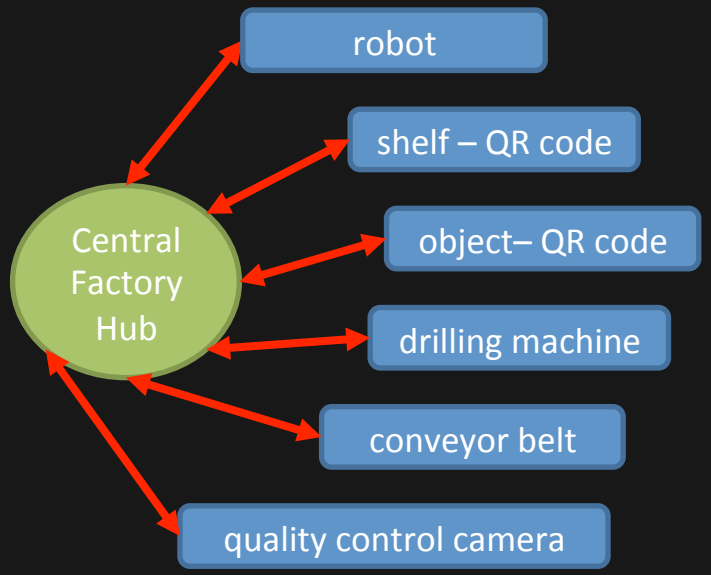
- **Typical applications:**
  - Internet of things
  - Home assistance to elderly and/or handicapped
  - Human-robot interaction through speech, gesture, and haptics, mobile manipulation in home and office scenarios, people recognition, following, and guidance, cloud robotics, tele-presence

RoCKIn@Work User's Story

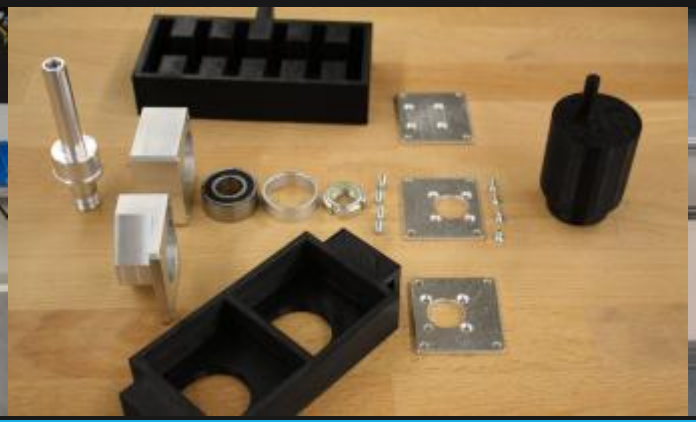
- RoCKIn'N'RoLLIn Factory
  - "Assisting assembly and manufacturing"
- Vision
  - Robot can reproduce itself
- Realization
  - CAD design and real setup at BRSU and the Competition Event

RoCKIn@Work Environment

- Central Factory Hub
  - Serves as central for production planning, task execution and benchmarking
  - Sends orders to and gets reports from the robot
- QR codes on shelves and objects
  - Are used as identifier to control stock level and process status
  - Objects structured in types (AX, ER, EM)
- Networked devices
  - Are controlled by the robot via the CFH

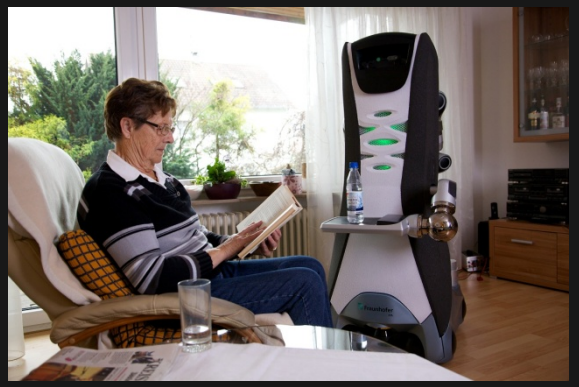






RoCKIn@Home User's Story

- Support an elderly person in daily life
  - Episode 1: Wake-up procedures
  - Episode 2: Breakfast business
  - Episode 3: Bathroom duties
  - Episode 4: Bridge round and tea party



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- Target environment
  - Ordinary European apartment
  - Several connected spatial areas
  - Equipped with furniture and everyday objects

RoCKIn@Home Environment

- Furnished with regular IKEA items
- Networked ambient devices

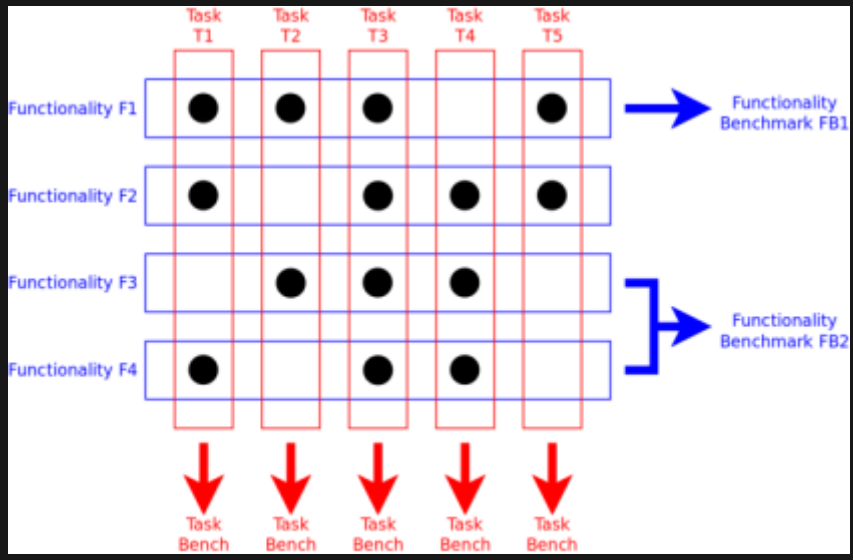
@ IST-ID

@ Toulouse

2014

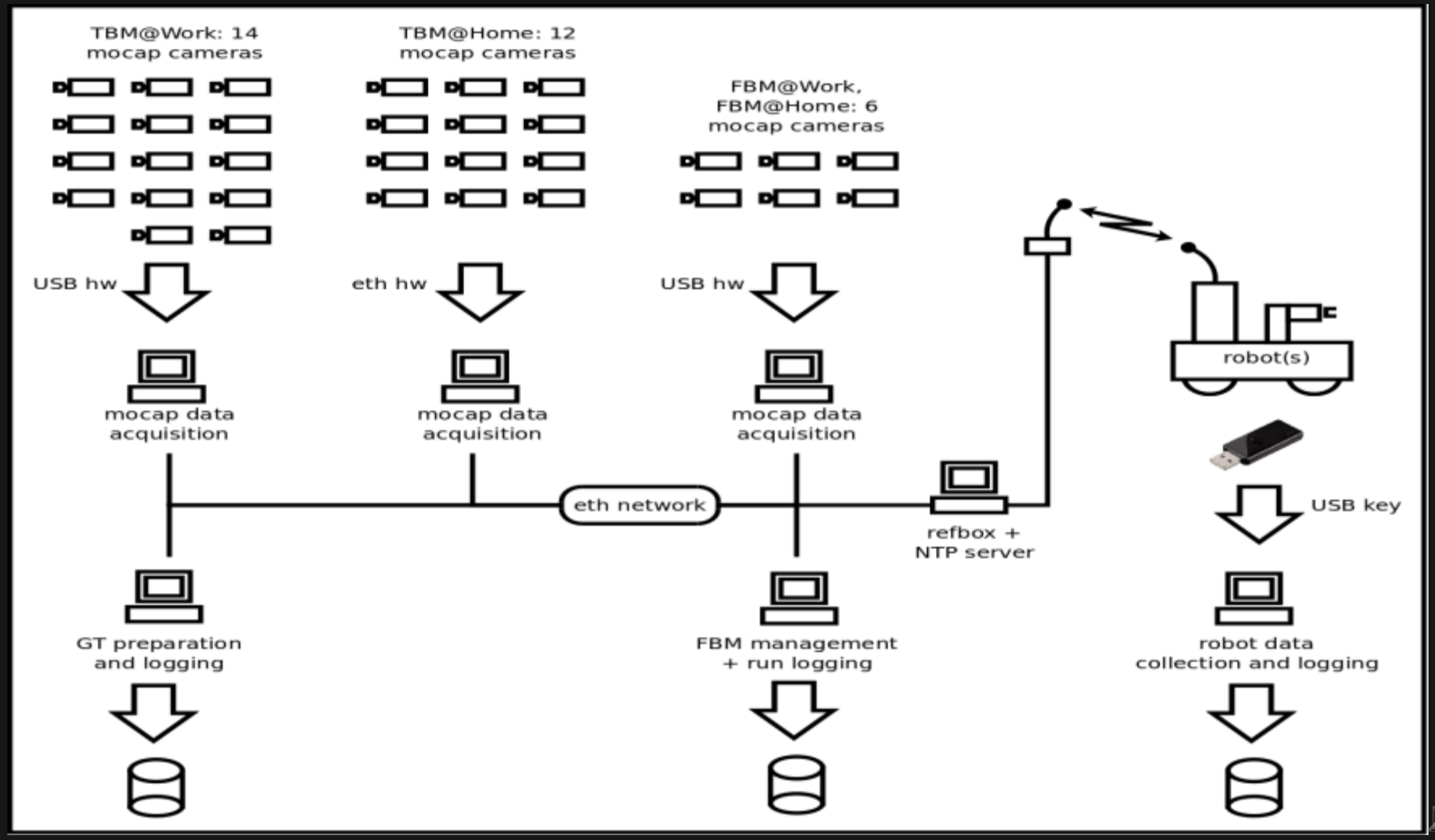
Benchmarking

- RoCKIn challenges participating teams at two different levels
  - Functionality Benchmarks (FBM)
    evaluate performance of modules dedicated to specific functionalities
  - Task Benchmarks (TBM)
    assess performance of integrated robot systems facing complex tasks



- Evaluation criteria requirements
  - Measure overall success of an integrated system
  - Evaluate functionalities in a focused manner
  - Provide insights on the interplay between functionalities and tasks
  - Always clearly define a ranking

RoCKIn 2014 Ground Truth System

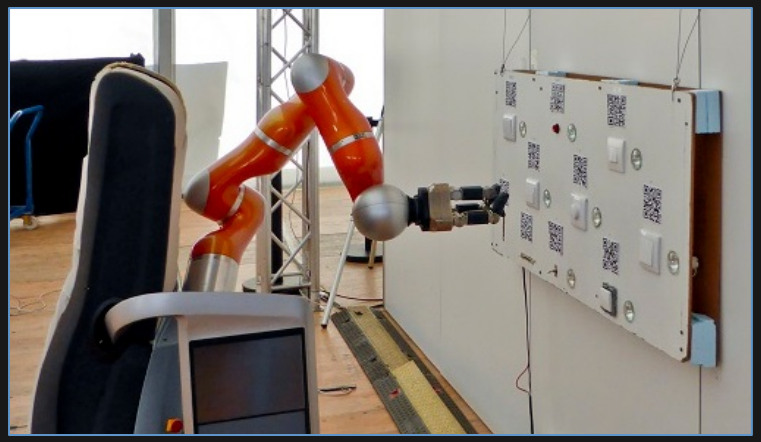


RoCKIn 2014 Ground Truth System

RoCKIn@Home 2014 FBM Tests

Speech Understanding

Object Recognition



Object Manipulation

Camps

2014 Camp (Rome, 26-30 Jan)

- 19 teams
  - 11 @Home
  - 8 @Work
- 63 students and researchers from 13 countries

2014 Camp dissemination video

RoCKIn Competition 2014

Funded by the European Union

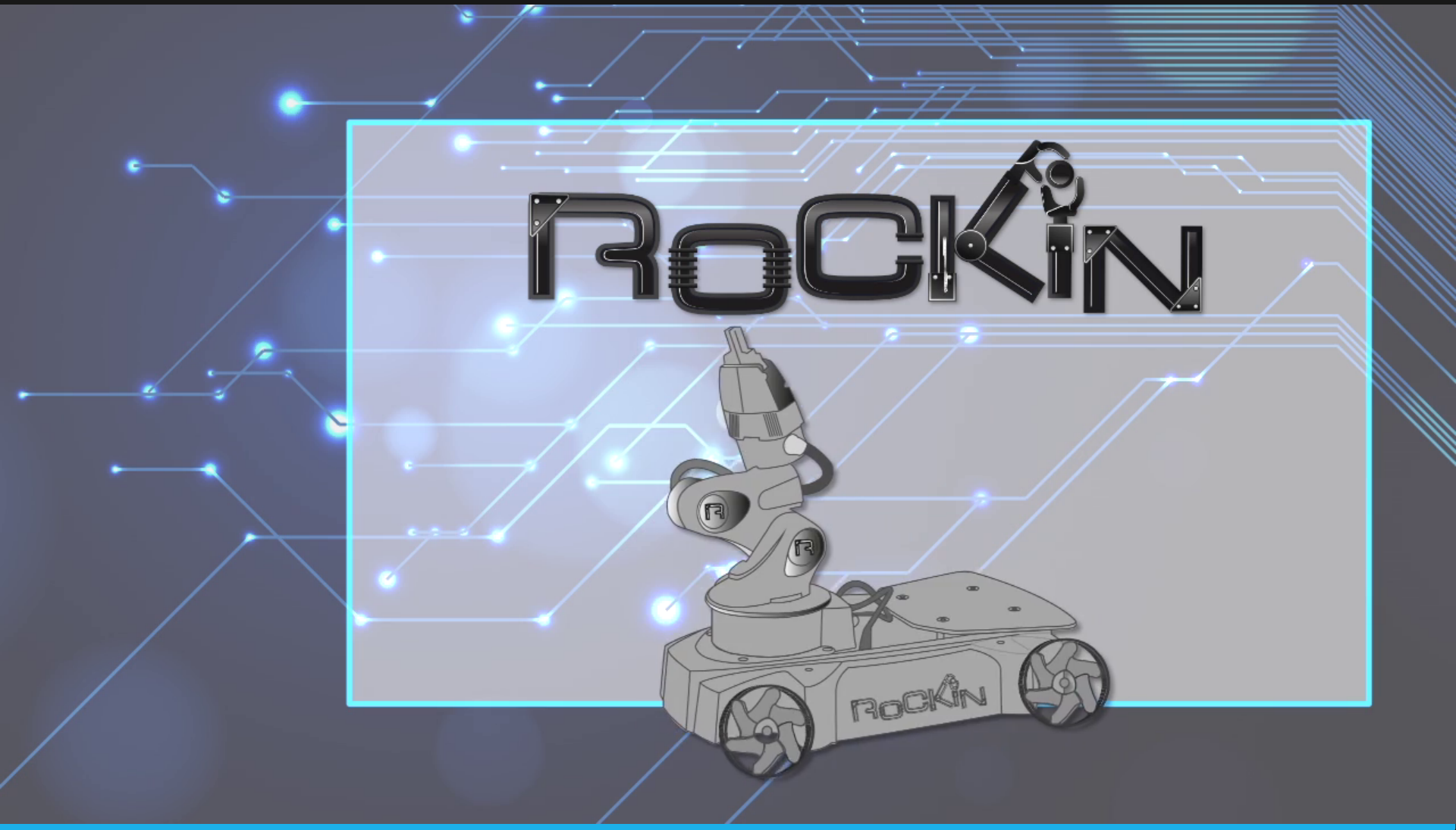
RoCKIn Competition 2014

- Dates
  - 24-25 Nov: assembly of the competitions team areas and arena;
  - 26-27 Nov: team arrival and set up days;
  - 28-30 Nov: competition days, open to the public

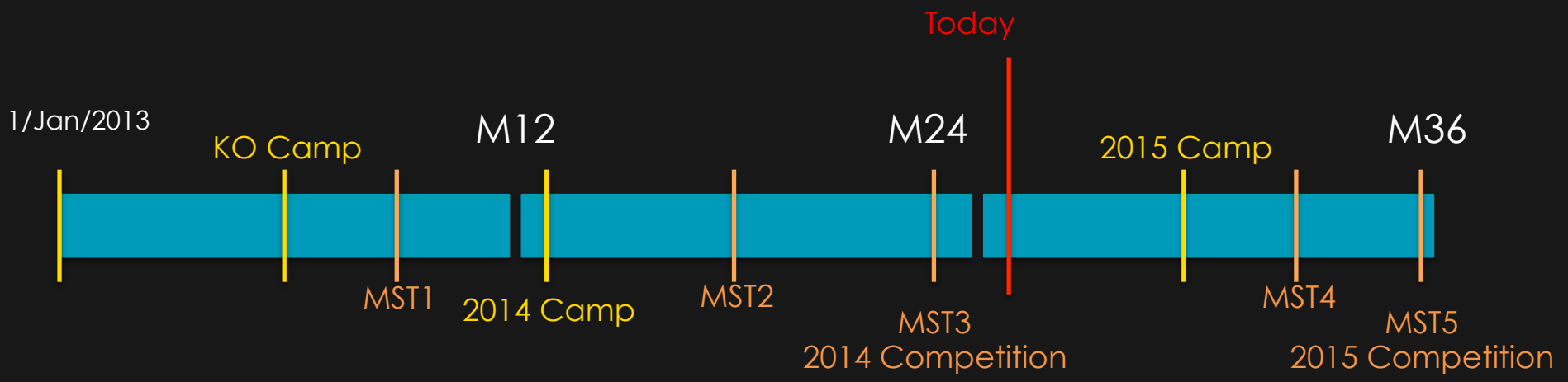
- Participants
  - 10 teams (7 @Home, 3 @Work)
  - 79 participants from 6 countries

- Selection process
  - Evaluation of team description
  - Technical details of the robot system
  - Research goals and past performance in competitions

RoCKIn Competition 2014 Video



Timeline



RoCKIn Camp 2015 (Field Exercise)

Venue: Echord ++ RIF @ Peccioli (Firenze, Italy)

Dates:

- 18-22 March

Teams:

- Best teams in Toulouse + RoCKIn partners + on going call

Aims:

- Make the RoCKIn competition infrastructure transparent to teams
- Support teams by creating/adapting software packages to the needs of RoCKIn challenges
- Collect data sets in the RIF facility to make them available
- Test, test and test FBMs and TBMs

RoCKIn Competition 2015

Venue: Knowledge Pavilion (Science Museum) @ Parque das Nações, Lisboa

Dates:

- 17-18 Nov: assembly of the competitions team areas and arena;
- 19-20 Nov: team arrival and set up days;
- 21-23 Nov: competition days, open to the public

Satellite Events:

- ROBOT2015: 2nd Iberian Conference on Robotics
- Communications Center of the European Robotics Week 2015

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