



RoboCup Federation Call for Tenders: A Standard Robot Platform for RoboCup@Home

RoboCup¹ is an international joint effort to promote Artificial Intelligence, Robotics and related fields. It aims at fostering AI and intelligent robotics research by providing challenging problems where a wide range of technologies can be integrated and compared. Comparison of different solutions is implemented in the form of standardized scientific competitions, thereby increasing attractiveness for participants.

RoboCup@Home² is an international competition performed since 2006. It aims at developing intelligent service robots able to properly interact with people in a home environment, to understand their needs and to act properly to satisfy them. RoboCup@Home is currently the largest world-wide scientific competition for service robots, with about 50 teams active in the world. Videos of robots performing typical tests in RoboCup@Home are available in the @Home web site² and in the web pages of the teams.

Following the success of the Standard Platform League in RoboCupSoccer, which led to the development and successful commercialization of the Nao robot by Aldebaran, the RoboCup Federation hereby announces a call for tenders to develop and distribute a new standard platform for RoboCup@Home. The standard platform will be used in the new "RoboCup@Home Standard Platform" competition, where all the teams will be required to use the same platform. This new competition will be run in parallel to RoboCup@Home (where any custom platform can be used).

Functionalities and other desired features of the RoboCup@Home Standard Platform as well as schedule and contact information are described in the following pages. Additional information, including a Q&A section, will be provided during the opening of the call at

<https://sites.google.com/a/dis.uniroma1.it/robocup-home-sp/>

1. Functionalities

The standard platform is expected to be used for developing applications integrating the following functionalities. New functionalities not yet addressed in RoboCup@Home are also welcome.

- Full autonomy: on-board sensing and computation must be sufficient to execute the desired tasks. A configuration that allows for an additional external laptop to be used to increase on-board computation is also acceptable.

¹ <http://www.robocup.org>

² <http://www.robocupathome.org/>



- Navigation capabilities to move in the environment approximately at the same speed of a person also for relatively long paths.
- Ability to move in an indoor environment where small gaps (e.g., spaces between door, small gaps at the entrance of an elevator, etc.) may be present, not excluding the possibility of addressing more complex mobility challenges (e.g., stairs).
- Manipulate (e.g., pick and place) small objects (5 to 20 cm) normally found in a house, in an office, etc. (e.g., glasses, small bottles, cans, cereal boxes, books, etc.)
- Grasp objects at table level (but possibly also at higher levels and on the ground)
- Enough visual and depth field of view to see a person around the robot and to see possible obstacles on the ground
- Ability to interact with humans in a natural way using speech (through on-board frontal microphone(s) and speakers), gesture (through on-board cameras and robot arm) and GUI (through an on-board touch-screen).

2. Software

Software requirements are summarized in the following table.

Feature	Minimum requirement	Optional
SDK	full programming of the robot full access to the sensor data open source ROS-based	basic functions (e.g., localization and navigation) compatible with PCL and MoveIt
SDK documentation	full documentation in English web site for support Q&A	organization of workshops to teach and demonstrate how to use the platform
Simulator	Gazebo simulator support	

3. Hardware

No hardware specifications are given, since we are open to many solutions. Creative innovative solutions are very welcome. In general, the robots should have a nice looking appearance. Moreover, the appearance must be politically correct and acceptable in our daily lives. It should be designed for users with diverse backgrounds including gender, age, and physical capabilities.



4. Price

- **Price will be an important selection criterion.**
- The platform must be affordable for university research groups and must be usable (with minimal revisions) for at least 3 years. Expected **maximum price** should be around 50K€.
- Expected service and maintenance yearly costs should be described in the proposal.
- The platform must be modular so that upgrades can be done with minimal effort and cost.

5. Availability and support

- The robots should be available for about 12 teams (negotiable) in the first year (2017) and 24 teams for following years (2018 onwards). RoboCup is an international event and teams from all the countries are expected.

6. Transportation

- A transportation package would be an important optional feature. The robot should be easily assembled and disassembled and packed in one or more special suitcases that can be brought as standard checked luggage on a normal flight.

7. Schedule

- The schedule of this initiative will be the following:
 - October 25th 2015:** deadline for submission of proposals
 - November 9th 2016: evaluation procedure and selection of a short-list of candidates
 - Selected platforms will be invited for a demonstration at RoboCup 2016 in Leipzig, Germany.
 - RoboCup 2016: real demonstration of prototypes
 - Summer 2016: final decision by RoboCup Federation
 - RoboCup 2017: first competition (12 teams)
 - RoboCup 2018: second competition (24 teams)

8. Submission of proposals

Interested companies are invited to submit a full proposal containing **detailed technical specifications of the proposed platform**. Multiple options or optional parts or features are also welcome. The proposal should also include details about company profile, price of the platform for RoboCup teams, price of optional parts (upgrades) and maintenance (including warranty), production and delivery schedule, world-wide support to teams, support at competitions, interest in becoming global sponsor of RoboCup Federation, and any other information that can be useful for the evaluation of the proposal.



Proposals must be submitted as a single PDF document and may optionally contain links (i.e., URL) to additional material (e.g., photos, videos) showing some capabilities or features of the proposed platform.

Proposal must be sent by e-mail to both the following e-mail addresses:

Luca Iocchi, iocchi@dis.uniroma1.it
Komei Sugiura, komei.sugiura@nict.go.jp

by **October 25th 2015** with a subject starting with **[@Home-SP]**

To avoid possible problems with mail servers, the following procedure is suggested: send a first e-mail with only text (no attachments and no URLs) and then a second e-mail with attachment and URLs. A confirmation e-mail will be sent upon receipt of the proposal.

9. Contact

Members of the *RoboCup@Home-SP Committee* are available to provide additional information at any time during the opening of the call.

RoboCup@Home-SP Committee

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