



World Robot Summit Call for Tenders: A Standard Robot Platform for School Robot Challenge

The Japanese Ministry of Economy, Trade and Industry (METI) and the New Energy and Industrial Technology Development Organization (NEDO) will hold the World Robot Summit (WRS) in 2020 that consists of a robot competition and a robot exhibition. WRS aims to bring together the most advanced robot technologies from all over the world and overcome the limits to solve challenges that arise; deepen people's understanding of robots; and induce positive discussions that would lead to concrete uses and applications of robots. WRS will feature two events: 1) World Robot Challenge (WRC), in which robots compete with one another and 2) World Robot Expo (WRE), where the latest robotic technologies will be exhibited. A total of 7 challenges under 4 categories (Industrial Robotics, Service Robotics, Disaster Robotics and Junior) are planned to be held.

The Junior Category of WRC that targets students up to 19 years old aims to promote the learning of STEM and computing as well as the understanding of human-robot co-existence among participating students. In addition, it prepares participating students for taking part in robotics and A.I. research and development in the future.

Under the Junior Category, Junior Home Challenge is a task-oriented competition where a team of students is required to build and program a robot that completes a set of domestic tasks.

School Robot Challenge, on the other hand, is an open-task competition where a team of students is required to program and/or develop a software to control a social robot to be used in school. Each team has to come up with a creative idea of using a social robot in school and realize their idea using a social robot. The social robot used in School Robot Challenge is a standard platform which will be used by all teams.

The WRS hereby announces a call for tenders to develop and distribute a standard platform for the School Robot Challenge. One platform will be chosen after careful consideration.

The following sections describe the functionalities and other desired features of the School Robot Challenge as well as the call schedule and the contact.

Additional information, including a Q&A, will be provided during the call at

1. Functionalities

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

- **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.
- **Navigation capabilities** to move in the environment approximately at the same speed of a person, also for relatively short 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).
- **Ability to manipulate** (e.g., pick and place) small objects (5 to 20 cm) typically found in schools. (e.g., pencils, markers, glasses, cups, small bottles, cans, small boxes, books, notebooks etc.)
- **Ability to grasp objects** on tables/school desks and possibly at other heights, high or low.
- **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

Feature	Minimum Requirements	Optional
SDK	Full programming of the robot; Full access to the sensor data; Open source; Middleware (ROS, RTM...)	Basic functions (e.g., localization and navigation); Compatibility with PCL and MoveIt; Graphic-based entry level programming tool
SDK Documentation and Support	Full documentation in English; Website for support; Q&A	Organization of workshops to teach and demonstrate how to use the platform
Simulator	Simulator support	

3. Hardware

- No hardware specifications are given, since we are open to many possible solutions.
- Creative and innovative solutions are strongly preferred.
- The robot design is one of the important selection criteria for this call and the robot should have a friendly and/or attractive appearance.
- The appearance must be politically correct and acceptable by any society. It should be designed for users with diverse backgrounds including gender, age, and physical capabilities.

4. Price

- Price is an important selection criterion.
- The platform must be affordable for schools and must be usable (with minimal revisions) for at least 4 years. Expected maximum price is around 10,000 USD.
- Expected yearly cost of service and maintenance 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

- Robots should be available, at least, for 3 to 6 teams 2 to 3 months prior to the trials in late summer 2017 and 2019.
- Robots should be available 6 to 12 months prior to the 2018 Preparatory Summit and for 2020 World Robot Summit for about 40 teams (negotiable) each.
- WRS is an international event, and teams from around the world are expected to participate.
- Support should be provided at least in English and also in the native language of the team if possible.

6. Transportation

- The robot should be easily packed in one or more special cases that can be transported easily by land, air, or sea.

7. Schedule

February 28, 2017	Deadline for submission of proposals
March 15, 2017	Final decision by WRC
Late summer 2017	Trial Competition

October 2018	World Robot Summit 2018 (Preparatory Summit)
2019	Trial Competition (Tentative)
October 2020	World Robot Summit 2020

8. Submission of Proposals

Interested companies and organizations are invited to submit a full proposal in English containing detailed technical specifications of the proposed platform. Multiple options (optional parts or features) are also welcome to be addressed in the proposal. In addition, the proposal should include the following details:

- Company profile;
- Price of the platform for School Robot Challenge teams;
- Price of optional parts (upgrades) and maintenance (including warranty);
- Production and delivery schedule;
- Status of worldwide support for teams;
- Support at competitions;
- Company's interest in becoming a global sponsor of WRS; 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 materials (e.g., photos, videos) showing some capabilities or features of the proposed platform.

Proposals must be sent to the following e-mail addresses with a subject line that contains [SRC-SP]:

h.okada@tamagawa.ac.jp and amy.eguchi@gmail.com

The deadline is February 28, 2017.

To avoid possible problems with e-mail servers, the following procedure is suggested:

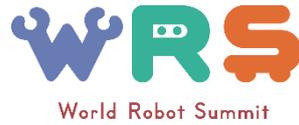
1. Send a first e-mail with only text (no attachments and no URLs)
2. Second a second e-mail with attachment and URLs.

A confirmation e-mail will be sent upon receipt of the proposal.

9. Contact

Junior Competition Committee is available to provide additional information at any time during

the call period at h.okada@tamagawa.ac.jp and amy.eguchi@gmail.com.



A Standard Robot Platform for School Robot Challenge

Evaluation Sheet

Company/Organization: _____ Country: _____

Model/Type of Robot: _____

Category	Parameters
Functionalities	<p>The robot has:</p> <ul style="list-style-type: none"> • autonomy • navigation capabilities to move in the environment approximately at the same speed of a person also for relatively short paths. • the ability to move in an indoor environment with small gaps may be present. • the manipulation capability of small objects typically found in schools. • the capability to grasp objects on table/desks and at other heights. • enough visual and depth field of view to see a person around the robot and to see possible obstacles on the ground. • the ability to interact with humans in a natural way using speech, gesture and GUI.
Software	<p>The company/organization will provide:</p> <ul style="list-style-type: none"> • SDKs • SDK documents in English • Graphic-based entry level programming tools (additional points) • Simulator support
Hardware	<ul style="list-style-type: none"> • The weight and size of the robot are appropriate for use at school. • The appearance is politically correct and acceptable by any society.

Price	<ul style="list-style-type: none"> • The platform is affordable for schools and is usable (with minimal revisions) for at least 4 years.
Availability and Support	<ul style="list-style-type: none"> • Enough number of robots offered. • Worldwide support for teams is provided.
Transportation	<ul style="list-style-type: none"> • The robot can be easily packed and transported easily by land, air, or sea.
Additions	<ul style="list-style-type: none"> • Interest in becoming global sponsor of WRS is shown. • Other (specify):
Deductions	<ul style="list-style-type: none"> • (Specify if any)