

The ICRA 2016 Robot Challenges

By Raj Madhavan

Robot challenges (RCs) are now an integral part of the IEEE Robotics and Automation Society's (RAS's) flagship International Conference on Robotics and Automation (ICRA). In 2016, the RC organizers solicited calls for challenges to be held in conjunction with ICRA 2016 in Stockholm, Sweden. The goals of these challenges are to advance the state of the art in robotics and automation, to integrate them tightly with the technical aspects, and to maximize interactions and discussions between the teams and the attendees of the conference.

Prospective organizers were asked to submit a proposal, and both academic

and industrial organizers were encouraged to participate. The received proposals were then evaluated based on relevance, originality, feasibility, implementation plan, and availability of space. Based on the evaluation, ICRA 2016 hosted four challenges:

- the Airbus Shopfloor Challenge (SFC)
- the 2016 Mobile Microrobotics Challenge (MMC 2016)
- the 2016 Humanitarian Robotics and Automation Technology Challenge (HRATC 2016)
- the Formal Methods for Robotics Challenge (FMRC).

While the MMC and HRATC were continuing challenges from previous years, the SFC and FMRC were events that debuted at ICRA 2016. The

challenges ran on 17 and 18 May 2016. The winners were announced during the awards lunch on 19 May 2016. The following provides additional details about the four challenges, including the motivation behind their organization, the criteria unique for each challenge in deciding the winner(s), and how the teams fared during the two-day event.

The RC chairs would like to acknowledge the support provided by the conference and the cooperation of the individual challenge organizers. Special thanks are due to the RAS Competition Committee for providing travel support to the participating teams and to the challenge organizers. More information about each of the challenges is available at <http://www.icra2016.org/conference/challenges/>.

Digital Object Identifier 10.1109/MRA.2016.2587918
Date of publication: 13 September 2016

The 2016 Airbus Shopfloor Challenge

With a backlog of almost 7,000 aircraft orders, the leading global aircraft manufacturer Airbus wants to improve its manufacturing processes. New robotics technologies offer the potential to reduce the number of repetitive manual tasks like drilling and tightening. But any new solutions would

need to be incorporated into the existing shopfloor manufacturing lines (with life spans of over a decade) and also meet the limited space and weight restrictions.

The SFC was launched in October 2015, inviting top robotics enthusiasts and experts alike to tackle this real-world manufacturing challenge. In a global call for entries, the teams were asked to develop a lightweight, agile robotic system able to target accurate point-based assembly pro-

cess operations such as drilling, tightening, and measurement.

Seven teams were selected from 21 entries from around the world to attend the final competition at ICRA 2016. They were selected based on a video demonstration of their robotic concept and evidence of their ability to complete the drilling required. In the time up to the final competition, the teams had weekly calls with Airbus robotics and manufacturing

Digital Object Identifier 10.1109/MRA.2016.2587919
Date of publication: 13 September 2016