

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
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UNIQUE EDUCATIONAL PROGRAM IN ORBIT: KIBO ROBOT PROGRAMMING CHALLENGE

Abstract

The Kibo Robot Programming Challenge (Kibo-RPC) is a unique educational program in which students solve various problems by programming the free-flying robots (NASA's Astrobees and JAXA's Int-Ball) in the International Space Station (ISS). It also allows any students in Asia who are interested in this competition to participate without any age requirements. JAXA hosts this program in cooperation with NASA. More than 1300 students participated from seven Asia-Pacific countries and region. Participants of this program will have the chance to learn cutting-edge methodologies and to hone their skills in science, technology, engineering, mathematics (STEM), teamwork, creativity, and will learn to develop innovative minds through this unique program. It designed to provide opportunities for bright students to work with professional scientists and engineers; they will be inspired to develop their own educational and professional goals to a high level. The students create an Android package (APK) to move Astrobees in a simulated environment to compete in the preliminary round in their own countries. The selected winning teams participate in the final round to compete to move Astrobees in the real environment in orbit using the same APK. The attraction of this program is that students' programs have the opportunity to move Astrobees dynamically in orbit.

This program allows student in any age range to participate. The youngest student who enrolled in this program was 9 years old, and the oldest student was 28. The winner of the Programming Skills Award is a team of 15-16 years old students.

Since it was the first time holding the Kibo-RPC, all groups involved learned many valuable lessons. There were many unexpected problems happened on both the JAXA and NASA sides, such as simulation program problems, Astrobees commissioning problems, coordinating/communication problems, and so on. Yet, the Kibo-RPC concluded successfully since all the teams were able to run the Astrobees in the end. The winning team earned The Best Onboard Award and displayed impressive intellectual ability: even though they had never previously learned to code in JavaScript they still managed to win the competition, impressively by learning the coding language on-the-fly. Because of its rewarding educational effects, JAXA and NASA are planning to hold the second Kibo-RPC in 2021.