

IAF SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)

Ignition - Primary Space Education (1)

Author: Ms. Alana Bartolini
ESA, The Netherlands

Ms. Erin Brindley
Raspberry Pi, United Kingdom
Mr. Oliver Quinlan
Raspberry Pi, United Kingdom
Ms. Olympia Brown
Raspberry Pi, United Kingdom
Ms. Elsa Alfonso Sanchez
ESA, The Netherlands
Mr. Richard Hayler
Raspberry Pi, United Kingdom
Ms. Sabine Ansel
ESA, The Netherlands
Mr. David Honess
ESA, The Netherlands
Mr. Benjamin Nuttall
Raspberry Pi, United Kingdom
Mrs. Monica Talevi
ESA, The Netherlands
Mr. Hugo Marée
European Space Agency (ESA/ESTEC), The Netherlands

THE EUROPEAN ASTROPI CHALLENGE – UTILIZING THE INTERNATIONAL SPACE STATION AS AN EDUCATIONAL PLATFORM FOR STEM SUBJECT LEARNING

Abstract

The European AstroPi Challenge is an annual computer coding-based educational programme developed by the European Space Agency (ESA) Education Office, in collaboration with the Raspberry Pi Foundation (RPF). The primary objective of the challenge is to enrich the competencies and skills of pupils across Europe in Science, Technology, Engineering and Mathematics (STEM) subjects, and so, motivate them towards further study and careers in these fields. This paper outlines the technical development of the AstroPi payload and reviews the 2015 to 2017 educational ground-programmes.

Two augmented Raspberry Pi Model B+ computers, called AstroPi's, equipped with a suite of peripheral sensors and cameras were uploaded to the ISS in 2015. Upgrades to the AstroPi software were made in 2016, allowing the Pi's to be connected to the ISS Joint Station LAN (JSL) network, and thus, operated directly from ground, thereby minimizing required crew-time support, while maximizing autonomous capabilities.

The challenge evolved out of the 'AstroPi Competition', created in conjunction with the UK Space Agency for Timothy Peake's Principia mission to the ISS. Two competitions were organised from December 2014 to July 2015, aimed at primary and secondary school age groups, respectively, across the UK. The winning teams in both categories had their computer codes executed on the ISS.

The European Astro Pi Challenge 2016/17, linked to the educational programme around the Proxima mission, expanded educational learning objectives and aimed to increase pupil engagement across Europe. Pupil teams were tasked to design a scientific experiment related to living in the ISS and to write the computer code needed to run their experiment, using one of the two on-board Astro Pi computers. In support of the programme, dedicated training resources were produced, online and hands-on training courses for teachers were held, and 600 AstroPi kits were produced and distributed to participating teams. Demographics showed 295 teams participating, with 184 teams from 15 ESA Member States passing the final selection and submitting their scientific missions and computer codes for the challenge.

Following the success of the first instalment, the European Astro Pi Challenge continues with a 2017/18 cycle. Thematic mission assignments have been designed for the participating teams and are used to guide pupils' learning and experimentation process, based on the model of real-life science investigation practices. The recent launch of an online emulator, with supporting classroom resources, has allowed greater accessibility to the programme for pupils and teachers throughout Europe.