

SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)

Lift-Off - Secondary Space Education (2)

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ASTRO PI: LAUNCH YOUR CODE INTO SPACE

Abstract

A team of leading UK space companies, in collaboration with the Raspberry Pi Foundation, created The Astro Pi Project (www.astro-pi.org) in order to exploit the outreach possibilities offered by the upcoming flight of British ESA Astronaut Tim Peake to the ISS in November 2015. The activities related to this project are intended to encourage and strengthen the teaching in science, mathematics, engineering, computing and coding curricula, and through this stimulate the curiosity of students and motivate them towards further study of STEM subjects.

At the core of the Project is the Astro Pi Payload which was not only developed to be taken to the ISS, but also into classrooms and used by students. It consists of a Raspberry Pi B+ computer, Hardware Attached on Top (HAT) board, and a camera. The Astro Pi HAT board was designed to host a variety of sensors and input/output devices that are useful for experiments aboard the ISS and in the classroom. Suggested experiments included thematic software/hardware challenges covering some of the diverse needs of the space industry – e.g. attitude determination, measurement and calibration, hardware reconfiguration, image processing, and even games for astronaut entertainment.

There are two phases to the Astro Pi Project: one is a competition and the other is a long term data logging activity. The competition phase, geared towards primary and secondary school aged children in the UK, will allow students to propose, code, and test their ideas on their Astro Pi Payload. The winners will then have their code executed aboard the ISS by Tim. The long term data logging phase will use the payload aboard the ISS to monitor sensor readings over an extended period of time. Data gathered on board the ISS in both phases will be made available for students to compare with measurements made in their classrooms using their own software. The project is further enriched by the teaching resources and dedicated lesson plans on how to use the Astro Pi across a variety of space related themes, such as earth sciences, remote sensing, and attitude determination.

This paper is divided into two sections: the first presents the hardware and the ISS flight qualification process for educational payloads; the second is dedicated to the competition and outreach activities surrounding the project. This includes detailing the organisation of the competition, its impact and engagement, dissemination of teaching resources, evaluation process, results, and lessons learned.