EUROPEAN ASTRO PI CHALLENGE 2021/22 MISSION ZERO GUIDELINES

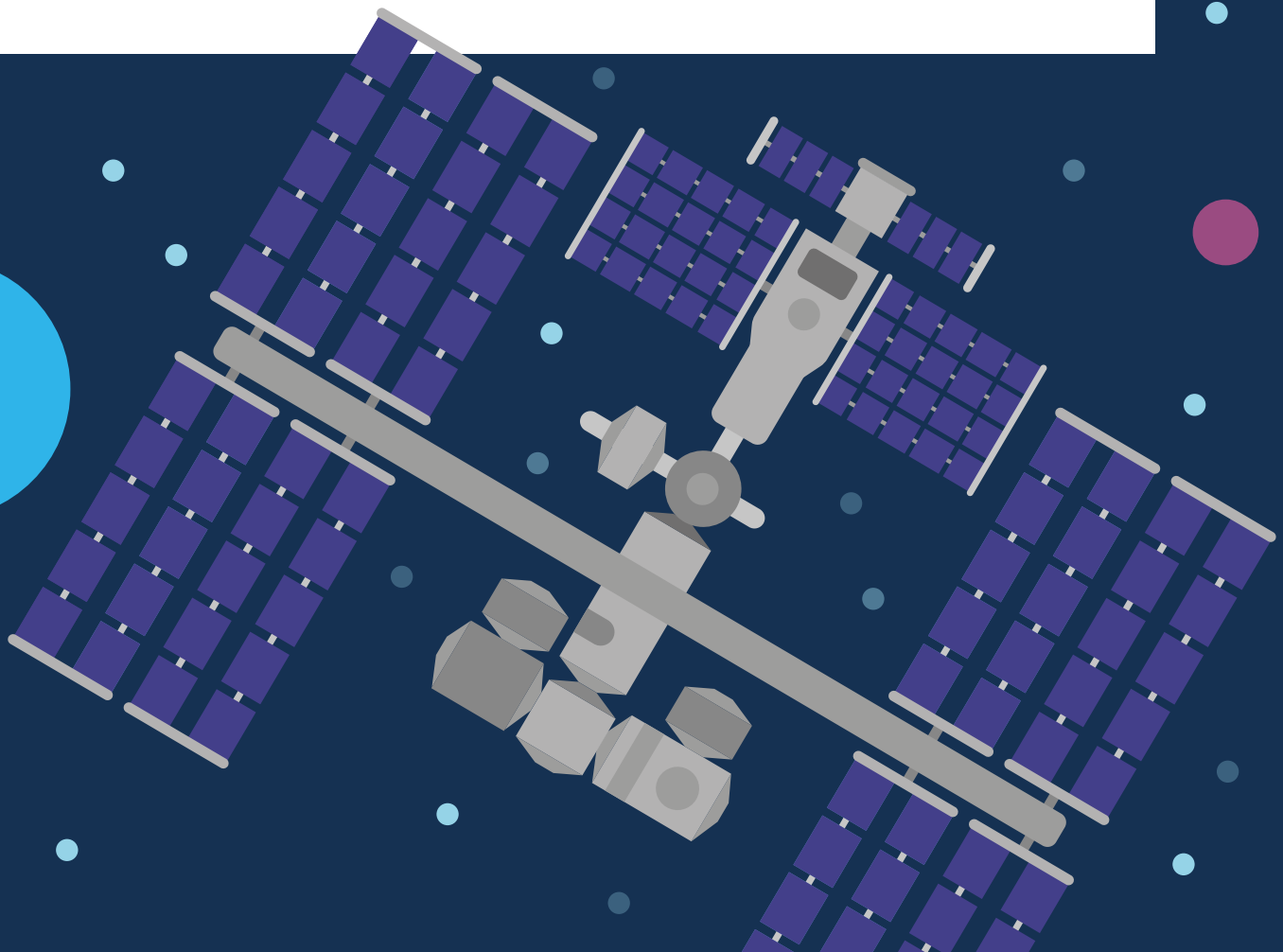
Raspberry Pi esa

INTRODUCTION

The European Astro Pi Challenge is an ESA Education project run in collaboration with the Raspberry Pi Foundation. It offers students and young people the amazing opportunity to conduct scientific investigations in space by writing computer programs that run on Raspberry Pi computers on board the International Space Station (ISS).

The Astro Pi Challenge is divided into two missions with different levels of complexity: Mission Zero and Mission Space Lab. This document is your guide to participating in Mission Zero.

Mission Zero offers participants up to 19 years old the chance to have their code run on the ISS! It is suitable for beginners to programming and/or primary school-aged children. Teams or individuals write a simple program to display a message and humidity reading on an Astro Pi computer, for the astronauts to see as they go about their daily tasks on the ISS. No special hardware or prior coding skills are needed, and all participants who follow the challenge rules are guaranteed to have their programs run in space!



MISSION ZERO GUIDELINES 2021/22

Mission Zero can be completed in a single 60-minute session and on any computer with internet access. Students and young people work either individually or in teams of two to four people, and follow along with our **handy guide (rpf.io/mzproject)** to write a short Python program that shows their chosen message for the ISS astronauts and a humidity reading on the Astro Pi's LED matrix. No extra hardware is needed, and everything can be done in a web browser.

Activity	Date
Challenge launch	13 September 2021
Submissions close	18 March 2022
Confirmation of flight status	May 2022
Certificates delivered to participants	June 2022

RULES FOR PARTICIPATION

To take part, participants must:

- Be submitting either as an individual or as a team of two to four members
- Be no older than 19 years
- Be supervised by a teacher, mentor, or educator, who will be the point of contact with the Astro Pi team
- Be part of a team made up of at least 50% team members who are citizens of an ESA Member State[1] or of Canada, Latvia, Lithuania, Slovenia, or Malta

In addition, each participant must be at least one of the following:

- Enrolled full-time in a primary or secondary school in an ESA Member State or in Canada, Latvia, Lithuania, Slovenia, or Malta
- Homeschooled (certified by the National Ministry of Education or delegated authority in an ESA Member State or in Canada, Latvia, Lithuania, Slovenia, or Malta)
- A member of a club or after-school group (such as Code Club, CoderDojo, or Scouts) located in an ESA Member State or in Canada, Latvia, Lithuania, Slovenia, or Malta

Note: If the mentor is a parent participating from home, they must only register their own children. If children wish to participate in Mission Zero as part of a larger team, they should ask their teacher or club mentor to register them as a group.

Provided the participant's/team's program follows the guidelines and doesn't contain any bad language or unpleasantness, it's guaranteed to run on the International Space Station for 30 seconds in May 2022. Each participant will then receive an electronic certificate recording the exact start and end times, and the position of the ISS when their program ran — their piece of space science history to keep!

The teacher/mentor has the responsibility to register the participants/teams that they are supervising on **astro-pi.org**.

There is no limit to the number of entries a school or club can submit, but each student or young person can only enter once, either individually or as part of a team.

[1] **ESA Member States in 2021:**
Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, and the United Kingdom.

Further to the 22 Member States, also Canada, Latvia, Slovenia, and Lithuania based on their agreements with ESA, qualify to fully participate in the programmes of the ESA Education Office.

ESA will also accept entries from primary or secondary schools located outside an ESA Member State only if such schools are officially authorised and/or certified by the official education authorities of an ESA Member State (for instance, French schools outside Europe officially recognised by the French Ministry of Education or delegated authority).

HELP US NAME THE NEW ASTRO PI COMPUTERS

This year, all Mission Zero participants will have the opportunity to vote for the names of the two new Astro Pi computers that we are sending to the International Space Station in December. This isn't a requirement to participate in Mission Zero.

We will name the Astro Pi computers after two inspirational European scientists. There are hundreds of men and women who have contributed to science and technology; participants can suggest their own names or pick from our list of suggestions:

- Ada Lovelace
- Caroline Herschel
- Hedy Lamarr
- John Edmonstone
- Nikola Tesla
- Alan Turing
- Edsger Dijkstra
- Hypatia
- Marie Curie
- Tycho Brahe

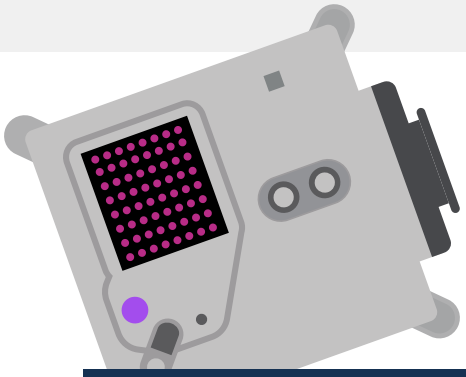
To vote, participants should add a short message to their Mission Zero program to show their chosen name on the Astro Pi's LED display. You need to start your message with the words "**My name should be**".

For example, if a participant or team wanted to vote for Ada Lovelace, their code would look like this:

```
sense.show_message("My name should be Ada Lovelace")
```

If you would like to vote, your message must start with these words, otherwise we won't be able to count your entry.

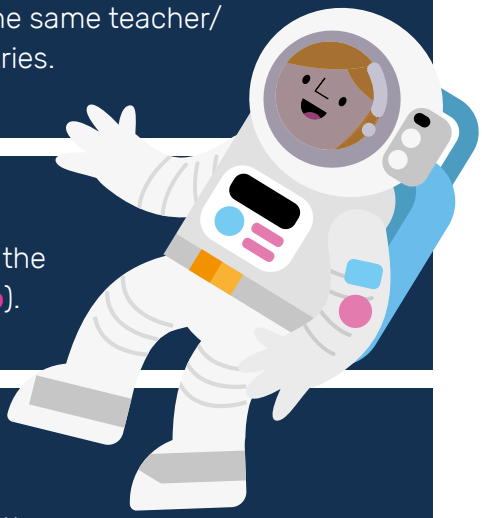
For full instructions on how to include a name choice in a Mission Zero submission, please refer to the Mission Zero project guide at **rpf.io/mzproject**.



HOW TO PARTICIPATE

1. Head to the Astro Pi website (**astro-pi.org**). If the Mission Zero challenge hasn't launched yet, sign up to the Astro Pi newsletter on the website to keep in touch.

2. Teachers/mentors register for Mission Zero via the Astro Pi website and receive a unique classroom code. All participants/teams that are supervised by the same teacher/mentor use the same classroom code when submitting their entries.



3. Students and young people follow along with our guide (**rpf.io/mzproject**) to complete the programming activity using the Mission Zero Sense HAT web emulator (**trinket.io/mission-zero**).

4. Students and young people submit their finished programs through the Mission Zero Sense HAT web emulator. A program cannot be changed once it has been submitted. For each entry, the teacher/mentor receives an email receipt with the participants' details and a link to a snapshot of their program.

5. All entries that follow the challenge rules are automatically granted flight status.

6. The successful students and young people get to have their programs run in space in May 2022.

   In June 2022, teachers/mentors receive the participants' official Mission Zero certificates by email.

The deadline for submitting entries for Astro Pi Mission Zero is **18 March 2022**. Late entries, and entries that are not submitted through the Sense HAT web emulator for Mission Zero, cannot be accepted.

Thank you for your interest in the European Astro Pi Challenge: Mission Zero!

If you'd like more information, or updates on the challenge, head to: **astro-pi.org**

For resources and project ideas, head to: **astro-pi.org/resources**

If you have any questions, reach out to the Astro Pi team at **astropi@esa.int** or follow us on Twitter **@astro_pi**

The European Astro Pi Challenge is an ESA Education programme run in collaboration with the Raspberry Pi Foundation.

For more information on ESA Education programmes, head to: **www.esa.int/Education**

For more information on the Raspberry Pi Foundation, head to: **www.raspberrypi.org**

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