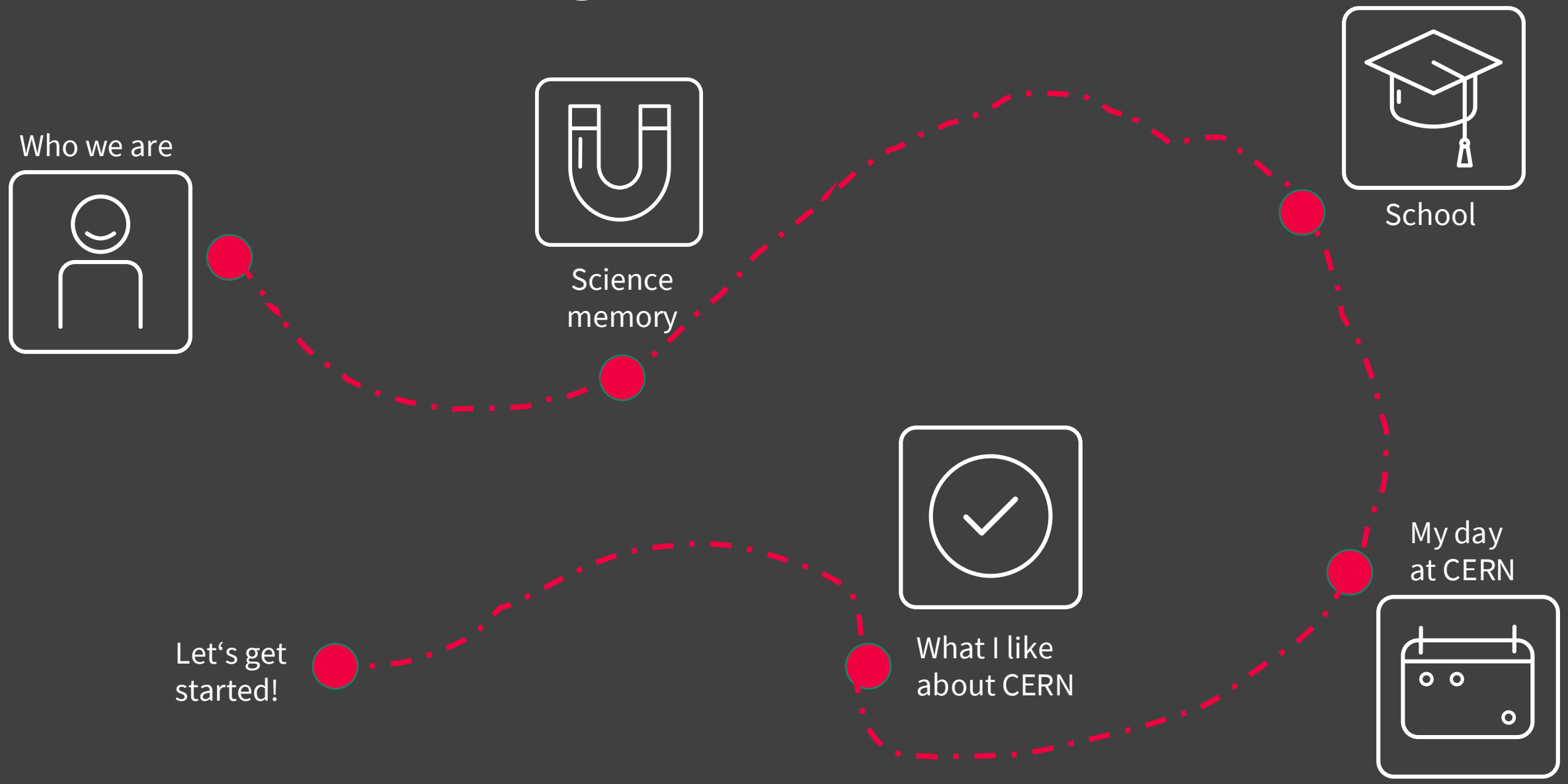
CERN | CERN Science Gateway

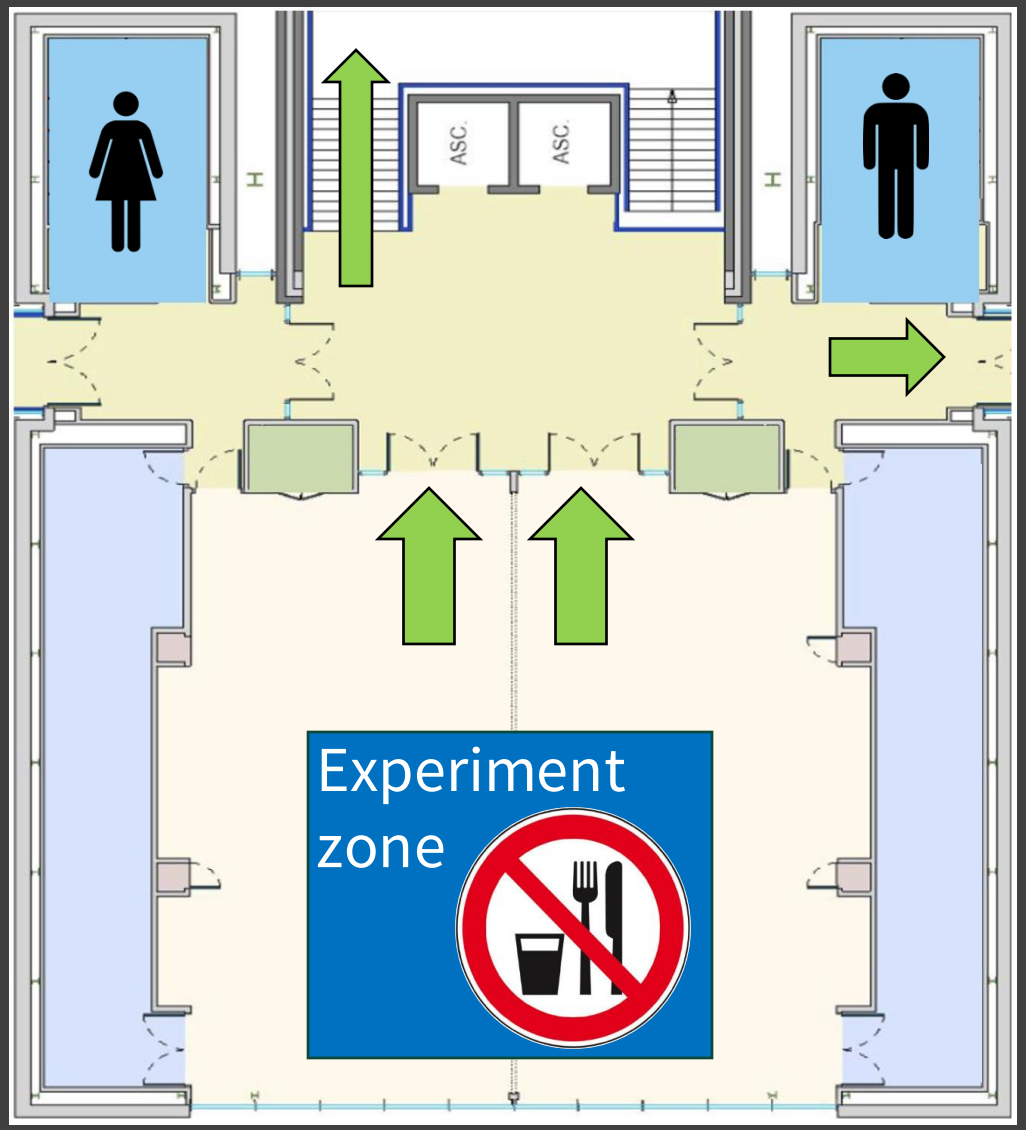
Lab workshop
Cosmic SOS

Discover particle detectors as you travel through space!

We are your guides for this workshop



Emergency exits and general rules



In case of an evacuation alarm:

- Leave your bags behind
- Follow guides to the nearest emergency exit and assembly point
- Wait for the CERN fire brigade

No open flame / No smoking

Toilets

Eating & drinking

Pictures

#CERNScienceGateway

Welcome on board!

You and your fellow crew members are on a critical mission to save Earth. An unknown signal from deep space has caused malfunctions in our spaceship's systems, and it's up to you to troubleshoot and repair the damage. Each activity you complete will bring you one step closer to deciphering the signal and ensuring the safety of our planet.

Safety Instructions

Sensitive and very expensive equipment.

Resistors and batteries might heat up during operation. Turn off after use.

Keep rock in box. Shine the UV torch downwards, away from other participants.

Group Roles & Responsibilities

Systems Engineer

Responsible for handling the equipment.

Mission Safety Officer

Responsible for safe use of equipment and PPE.

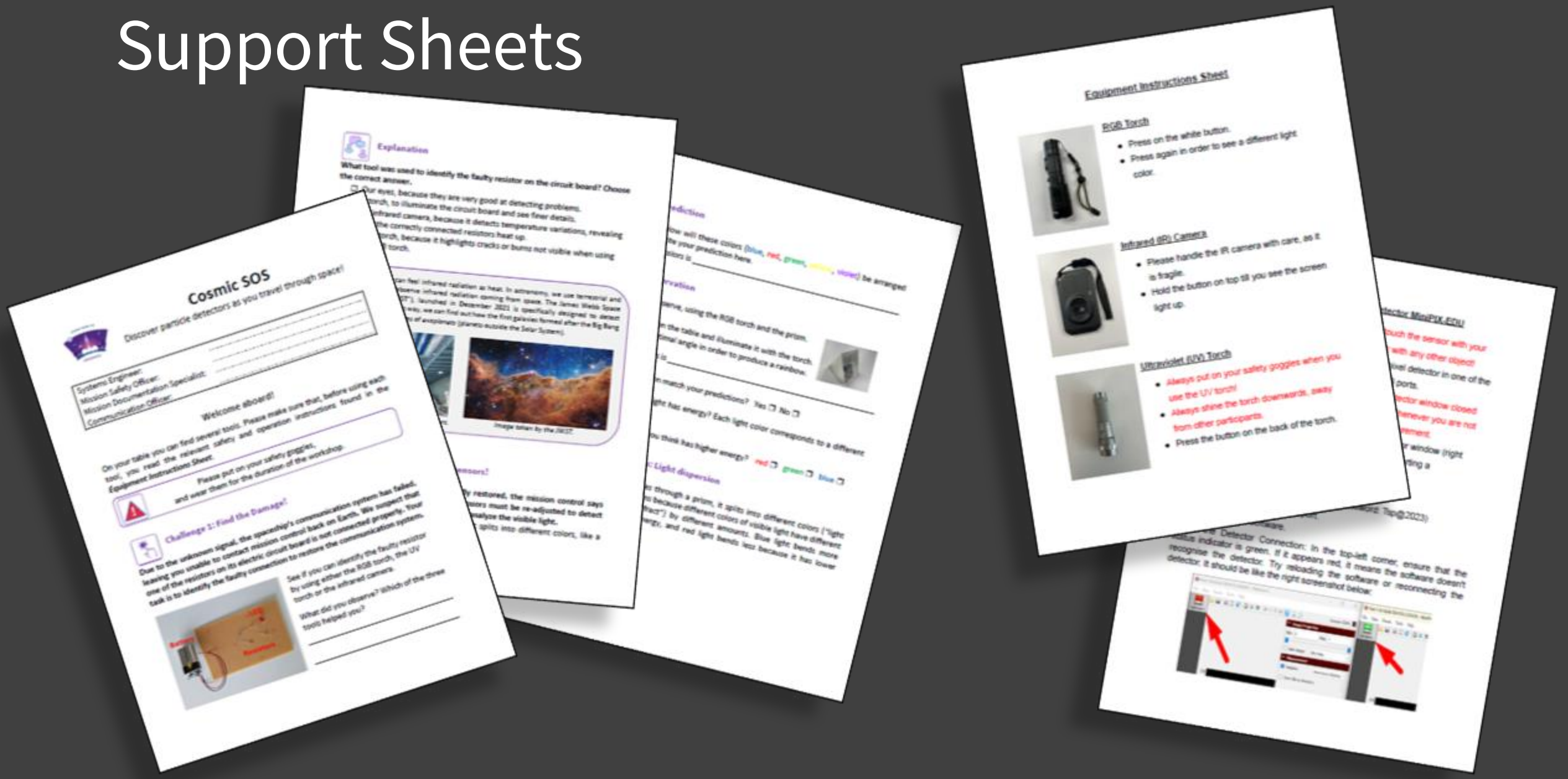
Mission Documentation Specialist

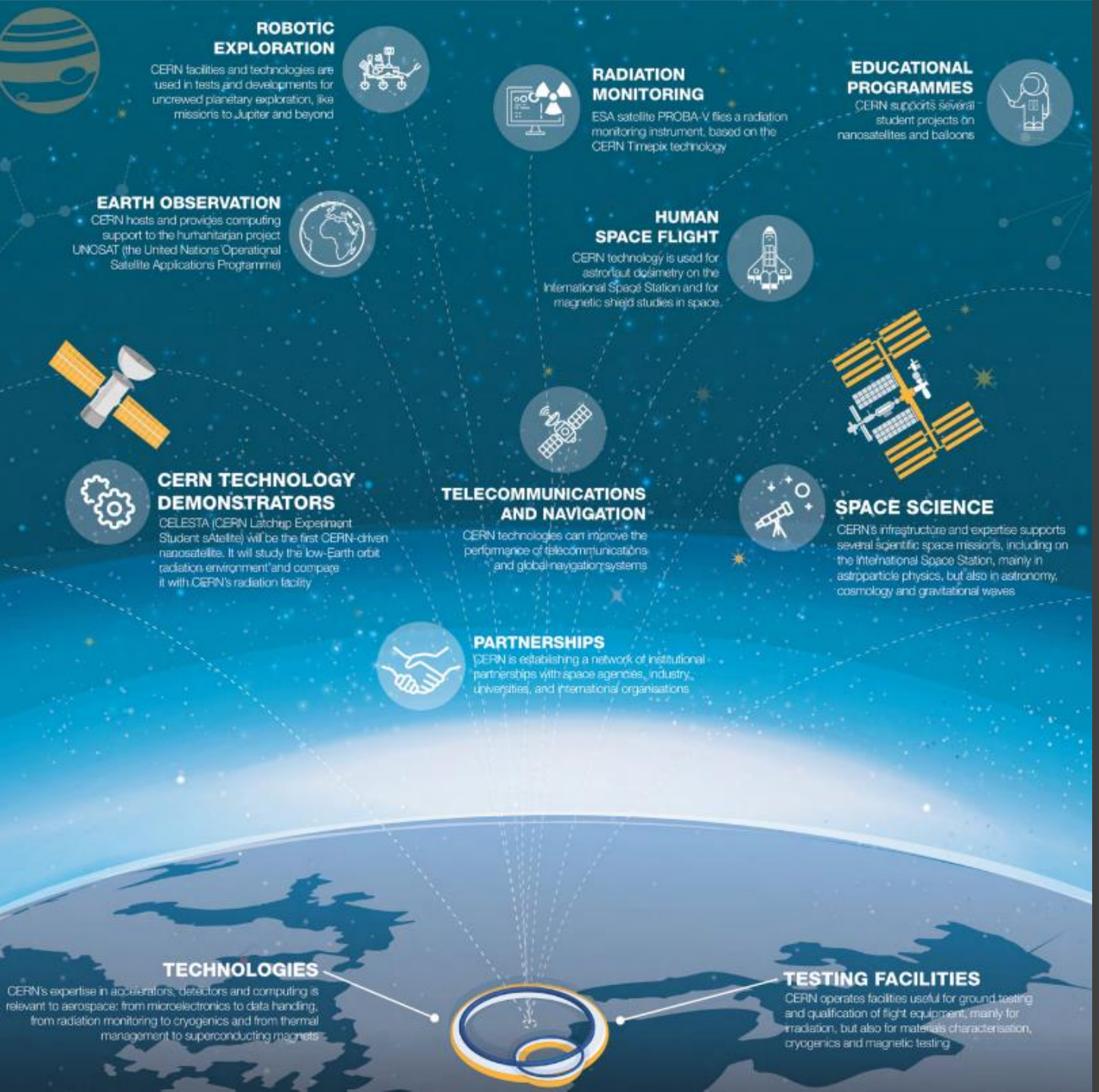
Keeping notes and writing down results.

Communication Officer

Liaise with other peers and tutors.

Support Sheets





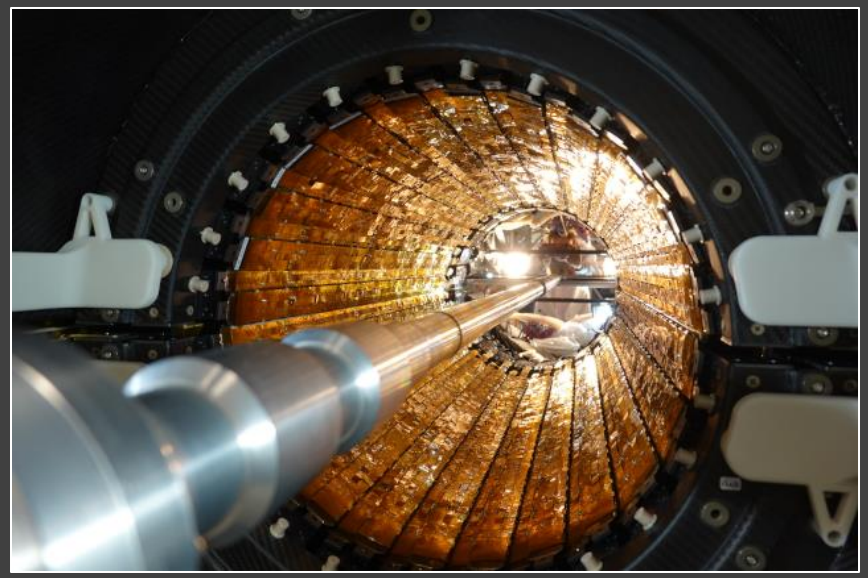
CERN & Aerospace

Aerospace and particle physics share technical similarities, for example:

- Both need electronics that can function in high radiation environments, extreme temperatures and high vacuum conditions.
- Both need to handle large amounts of data quickly and autonomously.

Pixel detectors at CERN and aerospace

Timepix on the International Space Station



The ALICE Inner Tracking system, consisting of about 12 billion pixels

Timepix on NASA’s Orion Rocket

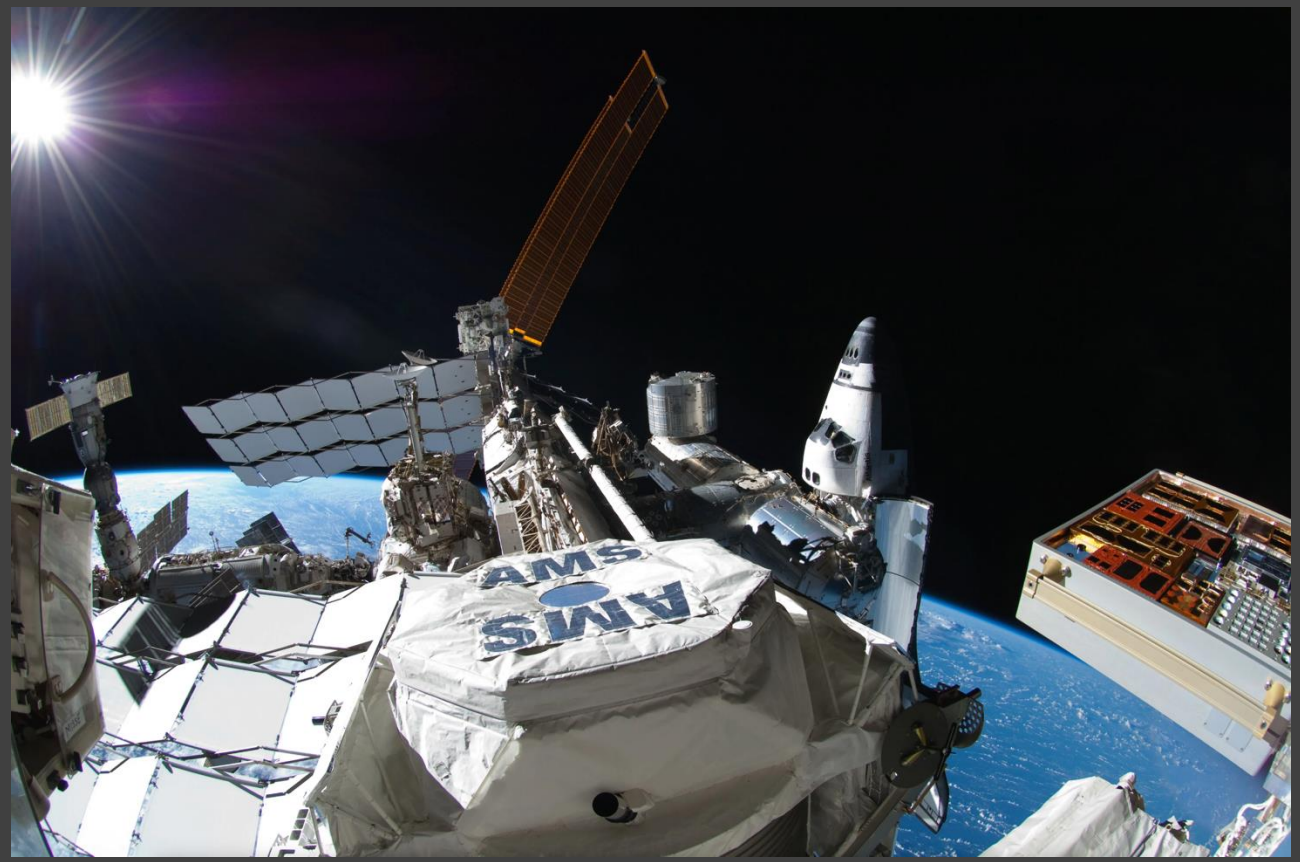
The Alpha Magnetic Spectrometer (AMS)

It's a detector mounted on the International Space Station, orbiting about 400 km above Earth.

AMS uses the unique environment of space to study the universe and its origin by looking for antimatter and dark matter.

It also measures the composition and flux of cosmic radiation. In this way, scientists can better understand the challenges of sending humans to Mars.

AMS is monitored and operated from CERN, where the data analysis also takes place.



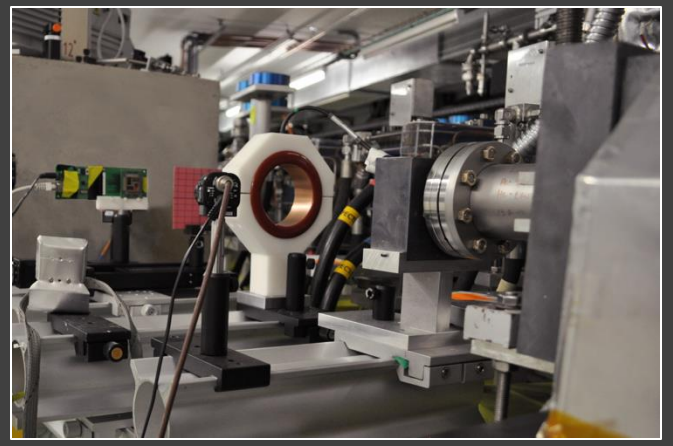
CERN aerospace facility examples

CHARM

Irradiation facility to test how electronics and materials respond to radiation in environments similar to those found in space.

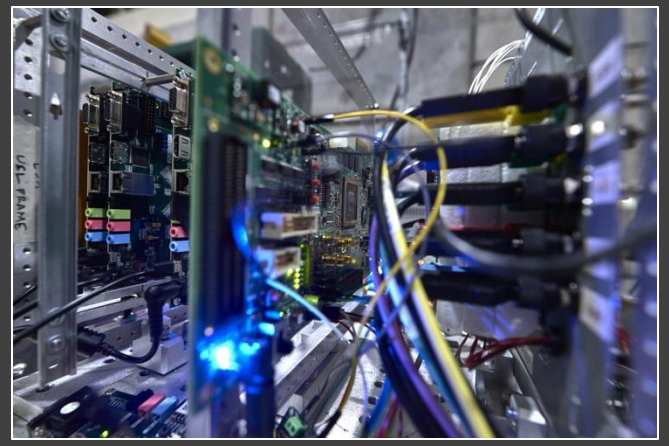
VESPER

High-energy electron beamline replicating Jupiter's harsh radiation environment. Electronic components for **JUICE,** an 8-year mission to Jupiter to explore its icy moons, are tested there.



SPS North Area

Replicates the actual galactic cosmic radiation spectrum, including heavy ions.
Also used to calibrate instruments for space like the AMS.



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Thank you for exploring with us !

Link to the worksheet