ESA's Education Programme – *'satellites'* projects

NEREUS – Satellites&Schools Group
24 May 2021

Hugo Marée – Head, ESA Education Office

The strenghts of space in school education

- Space is a **modern myth** – a unique motivational context
- Space is a prominent part of **contemporary culture**
- Space is a large part of the **solution to global challenges**
- Space is a source of **cutting-edge multidisciplinary scientific knowledge**
- Space is a real-life model of **inquiry/problem based scientific methodology**
- **All STEM subjects, skills and competences** can be linked to a space example and to a space career
- Space is a cradle for **creativity** and an enabler of **innovation** and **transformational processes**
- Space is a powerful model of international **collaborative dimension** and **dialogue beyond frontiers** - a contemporary educational behavioral value
- ….

Education is about capacity building!

Education = a process aimed at the development of

- ✓ knowledge
- ✓ skills & competences
- ✓ core values & attitudes

through a structured path and methodologies (pedagogy/didactics) that take into account the abilities and development stadium of a learner

Communication/Outreach = a process aimed at the generation of inspiration and awareness

ESA Education – Programme structure

education esa

STEM

Primary

Secondary

esa academy

Tertiary

Teachers *& school pupils*

esero

Space is the context

University students

Space is the subject

STEM education

→ SPARKING INTEREST, NURTURING SKILLS

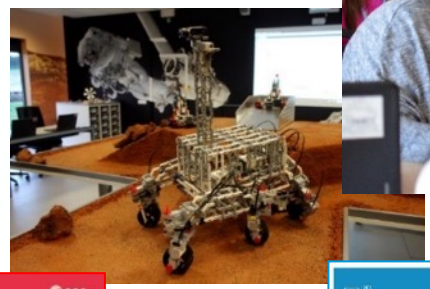

esa
ASTRO PI


ASTRO PI
esa
esa

ESA-led school level activities

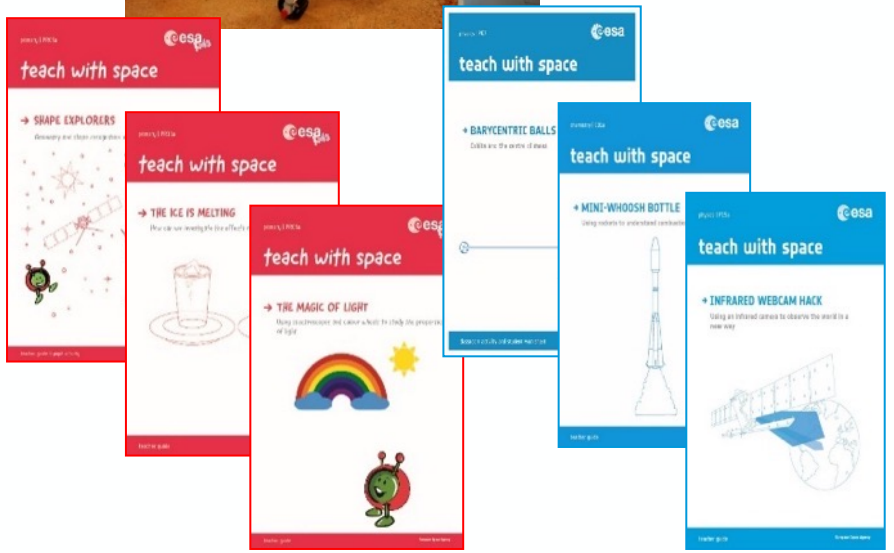
International teacher training

- ESA Summer and Autumn Teacher Workshops (in the NL), Jul and October every year
- e-technology lab teacher training, (in BE), ~ 2 workshops per month
- On-line teacher training



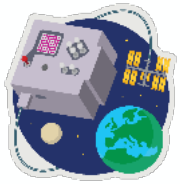
Classroom resources: Teach with Space collection

- http://www.esa.int/Education/Classroom_resources



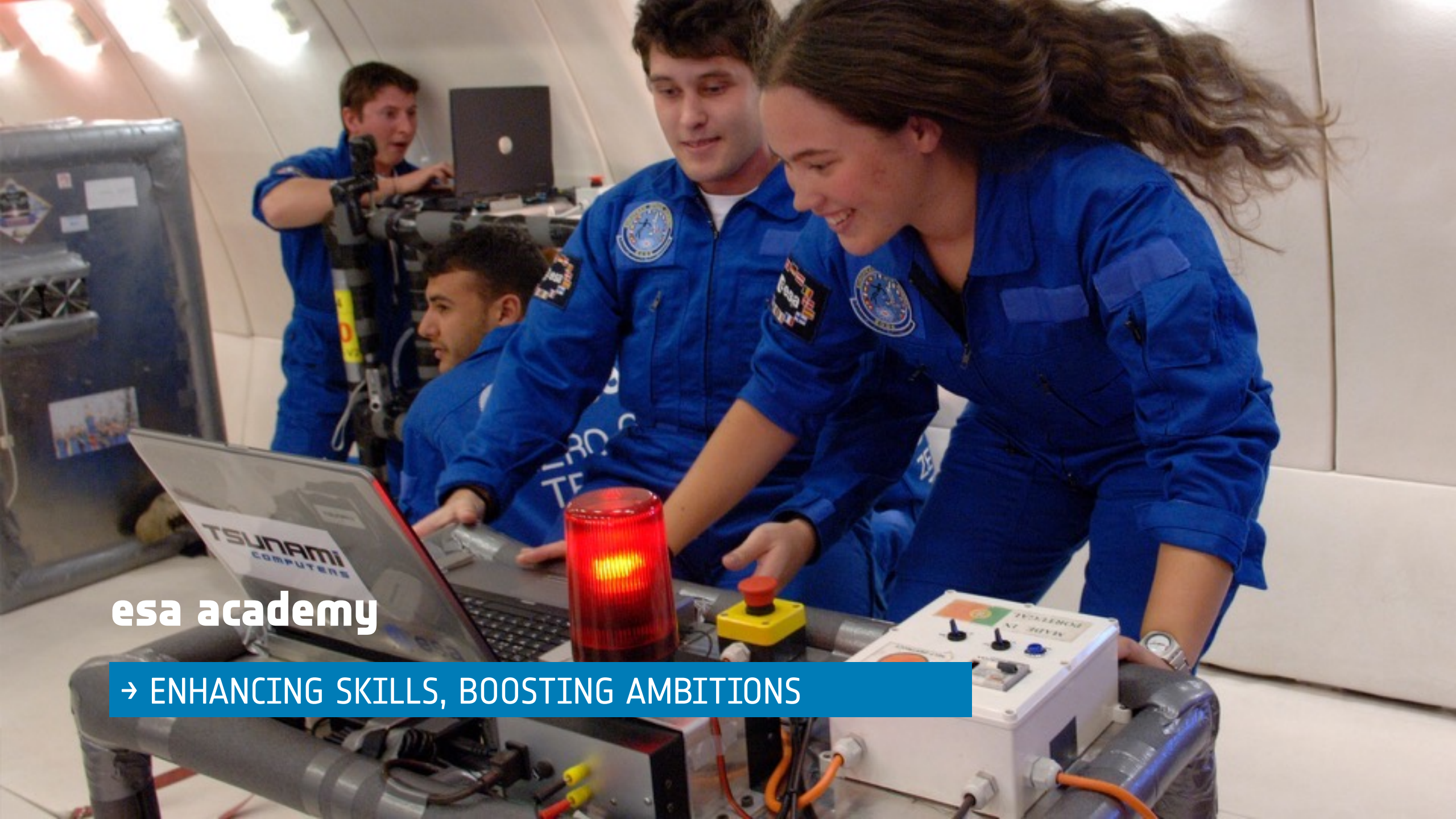
Europe-wide school projects (with ESERO' support)

- Interdisciplinary, recurring every school year



Informal education for the juniors

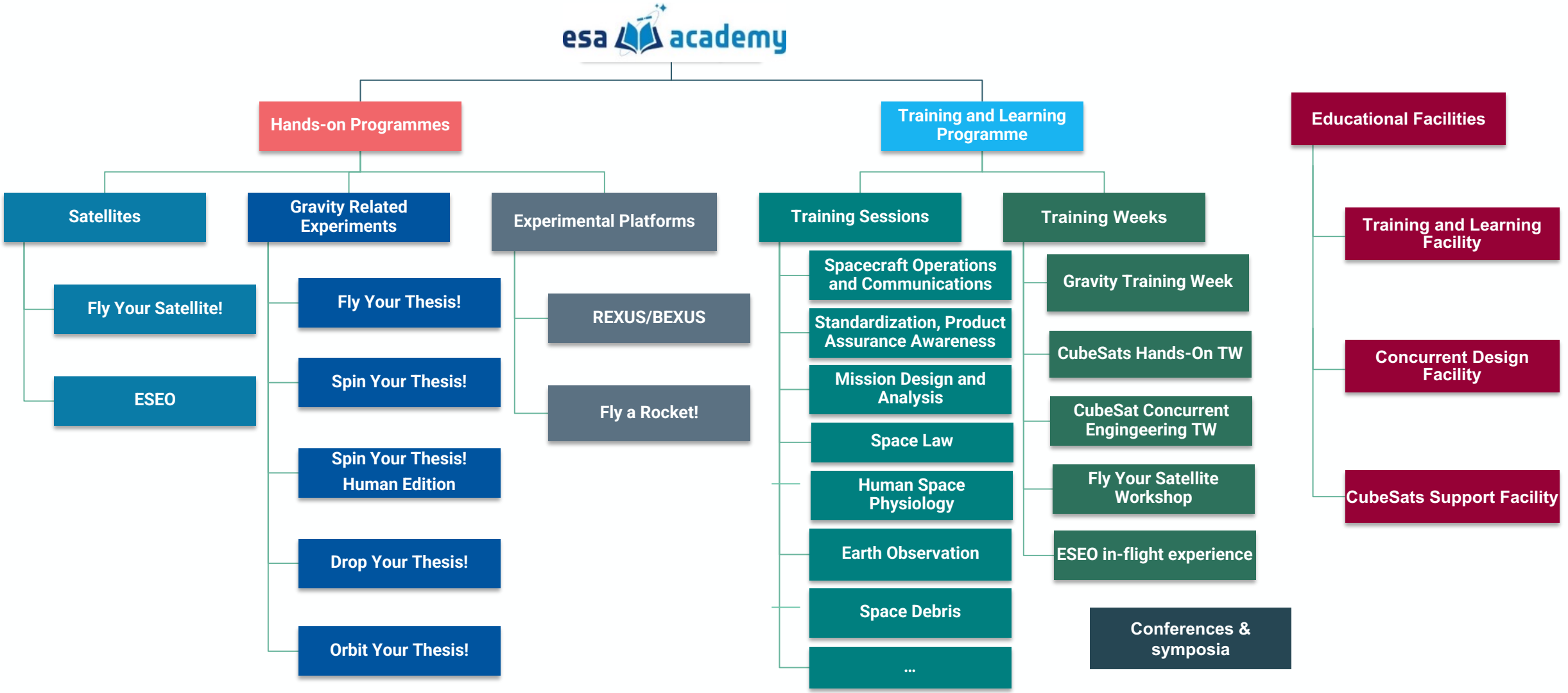
- Paxi the alien and ESAkids online platforms



esa academy

→ ENHANCING SKILLS, BOOSTING AMBITIONS

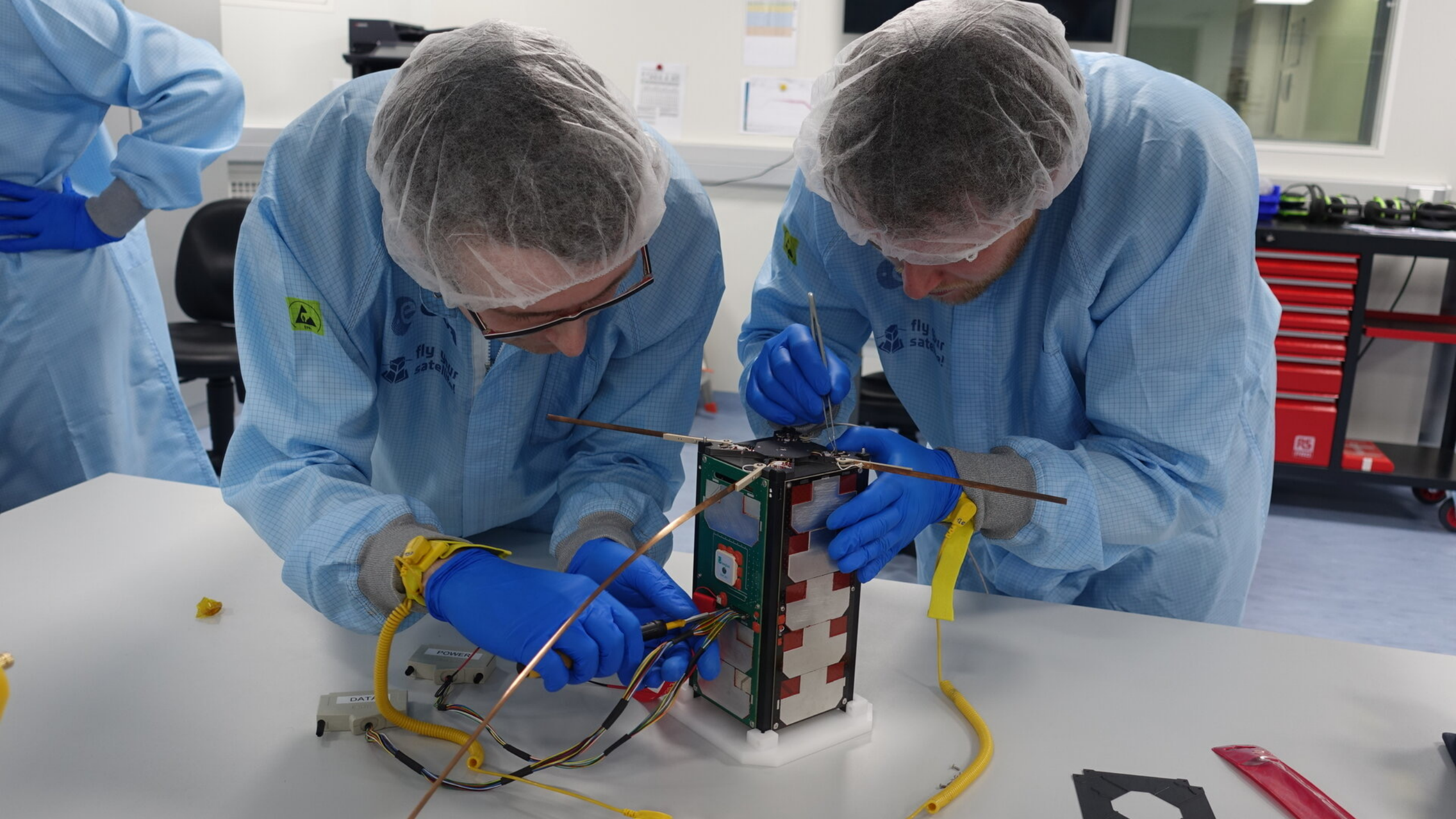
ESA Academy – Elements

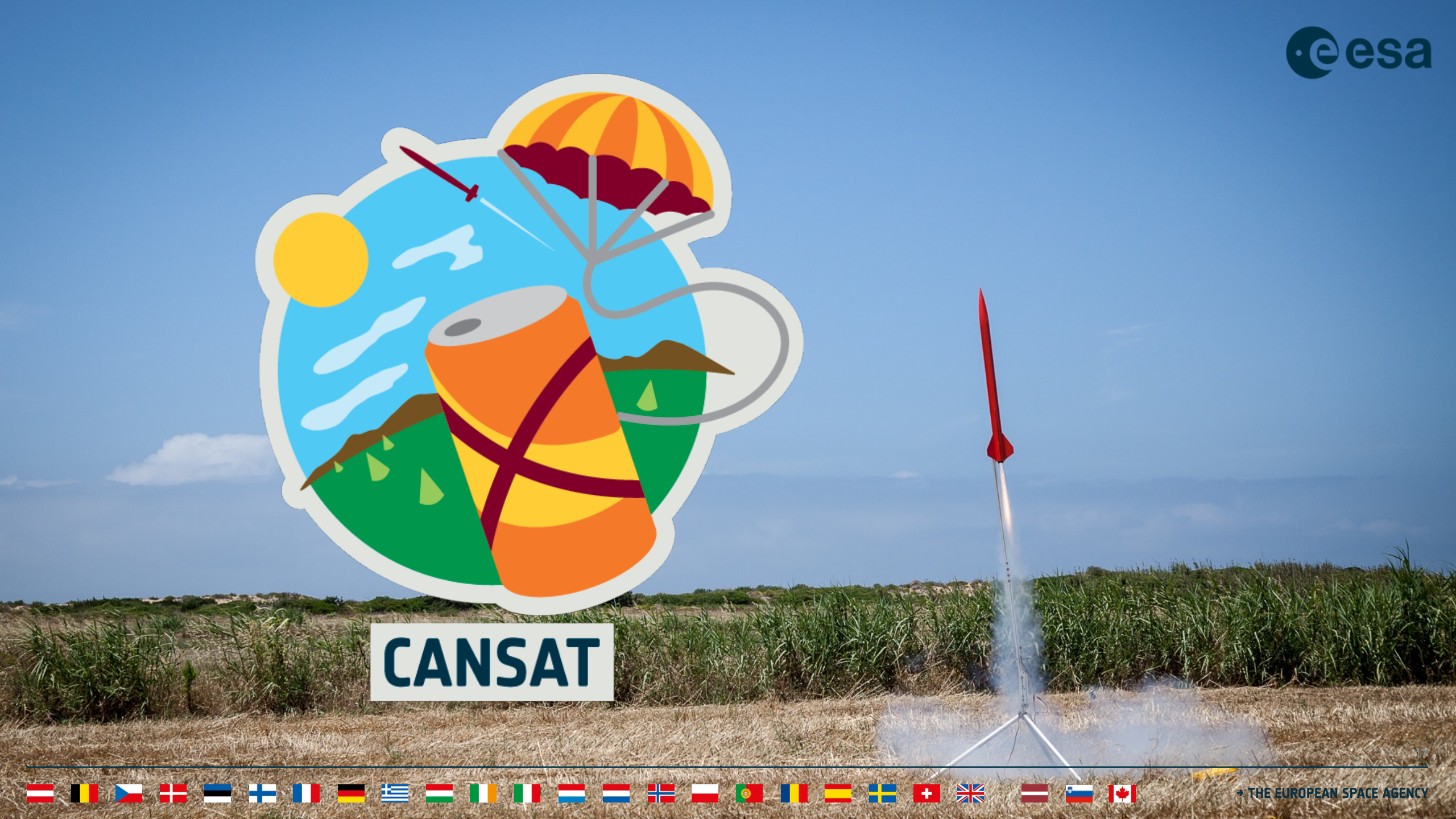



esa

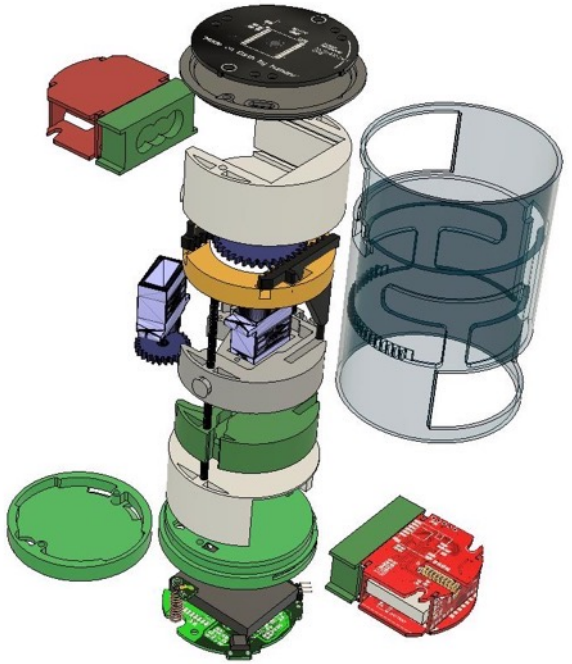

esa


esa academy
training and learning facility
ESA Academy's Training and Learning Facility


POWER

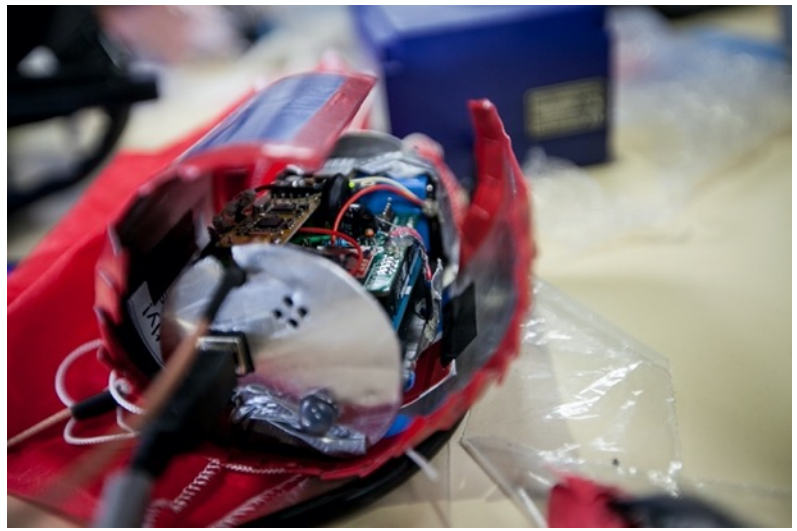

CANSAT

CanSat



Students to **create a mini satellite that fits the size of a soda can**

- Open **to ESA Member States, Canada, Slovenia, Latvia and Malta**
- Two challenges: **CADSat** and **the European CanSat Competition**



The European CanSat Competition

Complexity level: Intermediate/advanced

Objective: Imagine, design, test and launch your mini satellite the size of a soda can

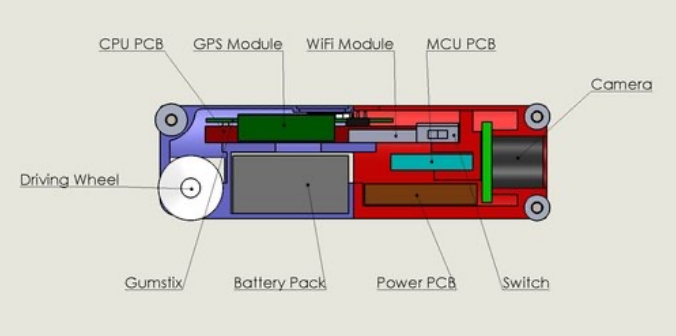
Tool: Microcontroller or mini computer of choice (e.g Arduino and Raspberry Pi) + sensors, radio module, antenna, parachute

Age range: 14-19 years old

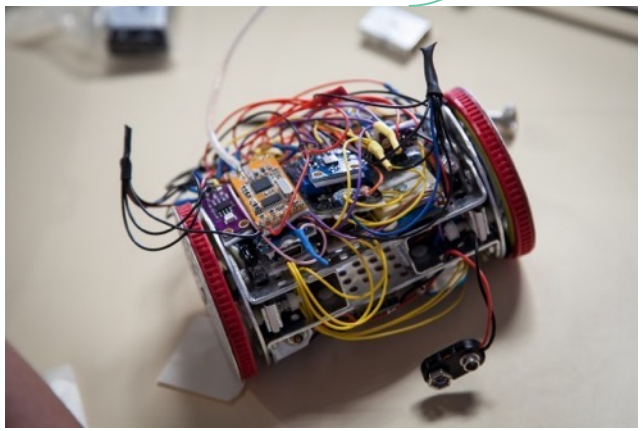
Registrations: open on 16 September 2021

The European CanSat Competition

Phase 1: Imagine your CanSat

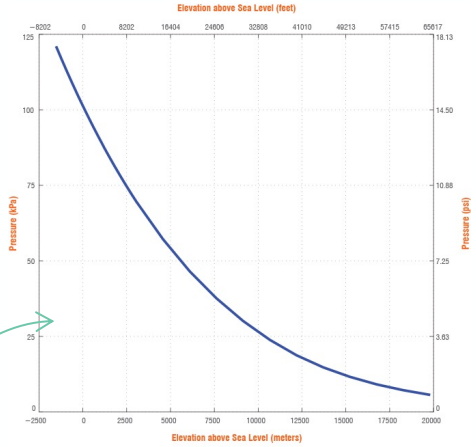


Phase 2: Build your CanSat



Phase 3: National Competitions

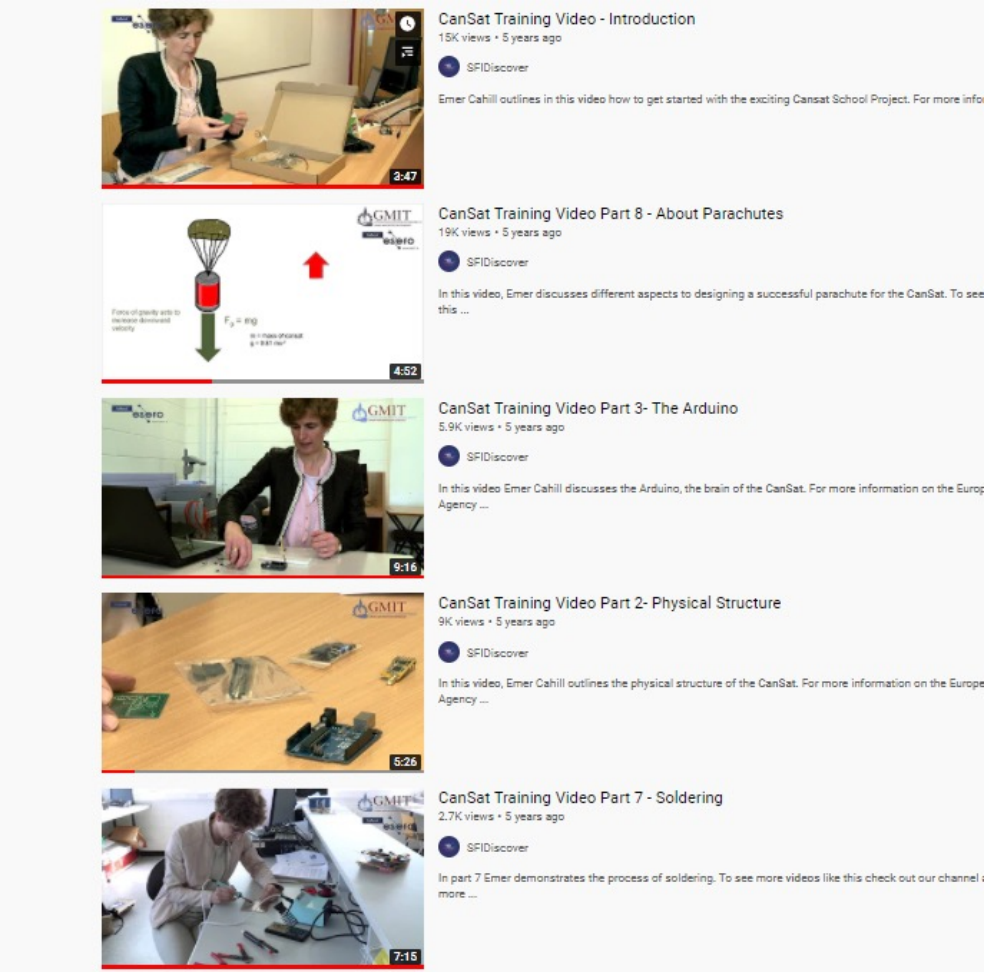
Phase 4: European Launch Campaign



Phase 5: Final report

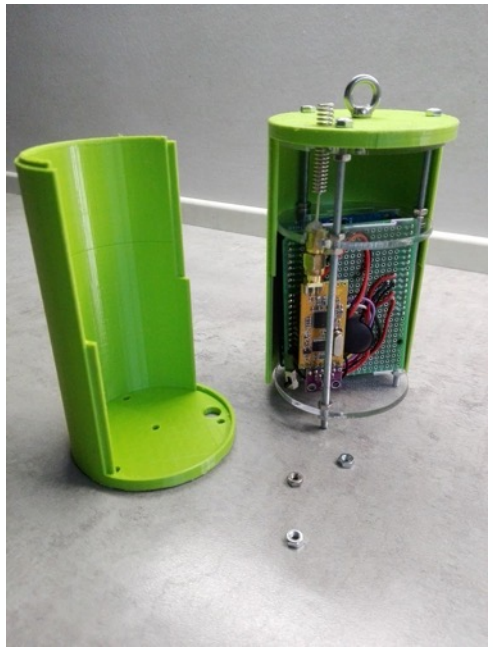
Supporting Resources

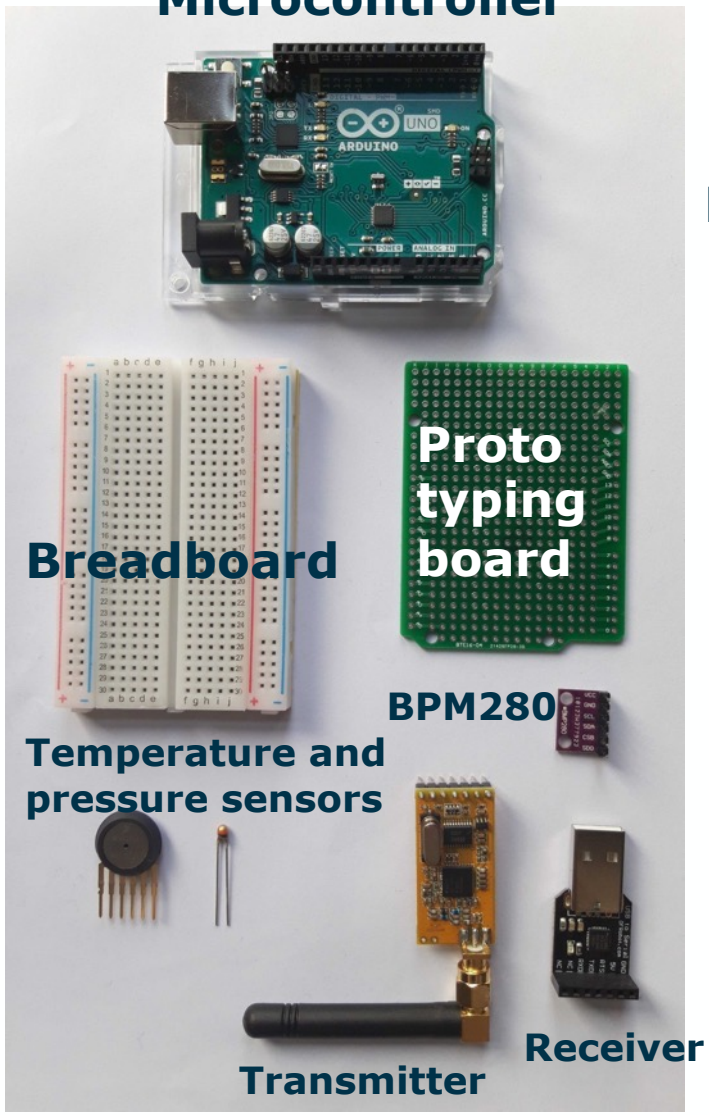
Video tutorials

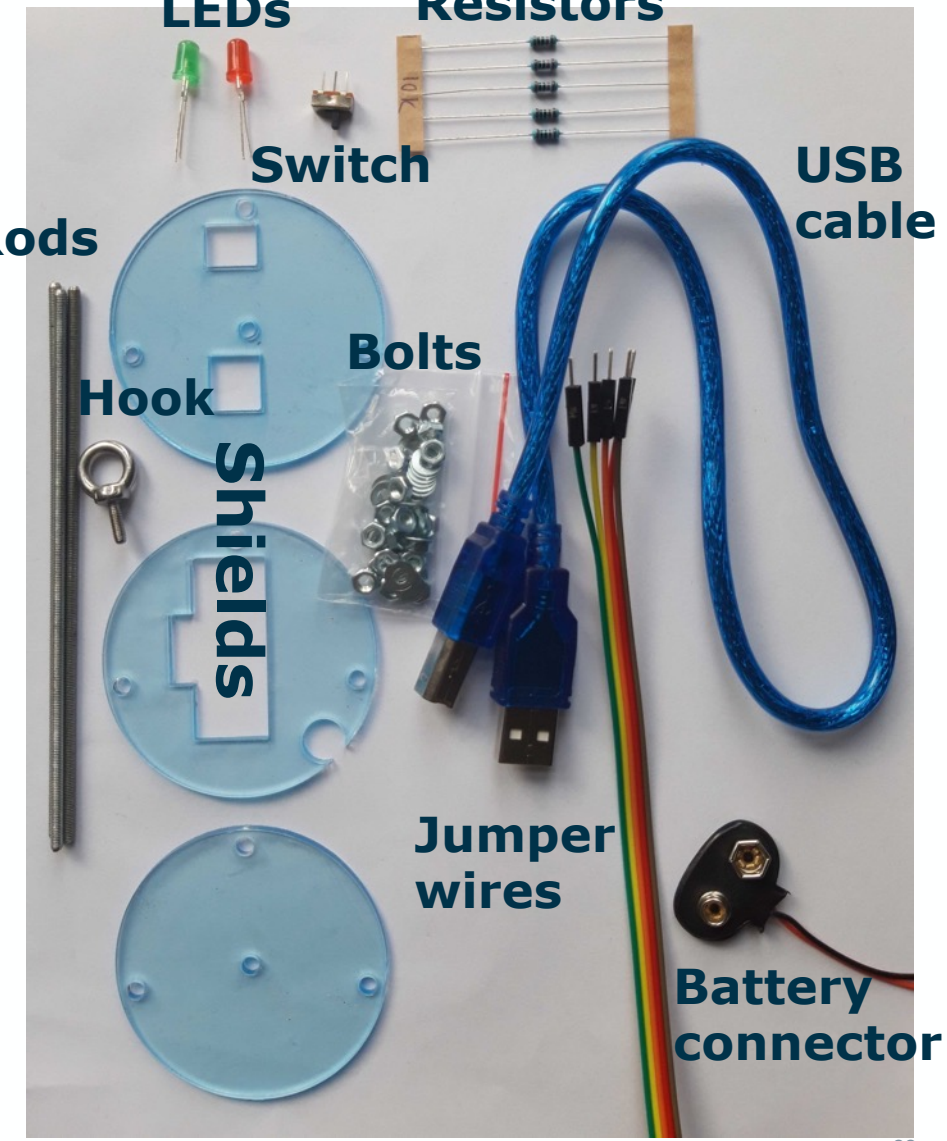


Classroom resources

CanSat Kit contents







2022 European CanSat Competition: Timeline

Phase 1: Kick-off of the European CanSat Competition	
Activity	Date
Competition announcement and ESA call for proposals for countries with no national competition	16 September 2021
Deadline for submission of proposals from countries with no national competition	3 December 2021
ESA announcement to the teams selected from countries with no national competition	16 December 2021
Student teams submit their Critical Design Review Report to ESA (only by teams from countries with no national competition)	1 April 2022
ESA sends feedback of Critical Design Review to teams from countries with no national competition	25 April 2022

Phase 2: National competitions	
Activity	Date
National competitions take place	February – 8 May 2022
Deadline for national competition organisers to communicate name of winning teams to ESA	9 May 2022

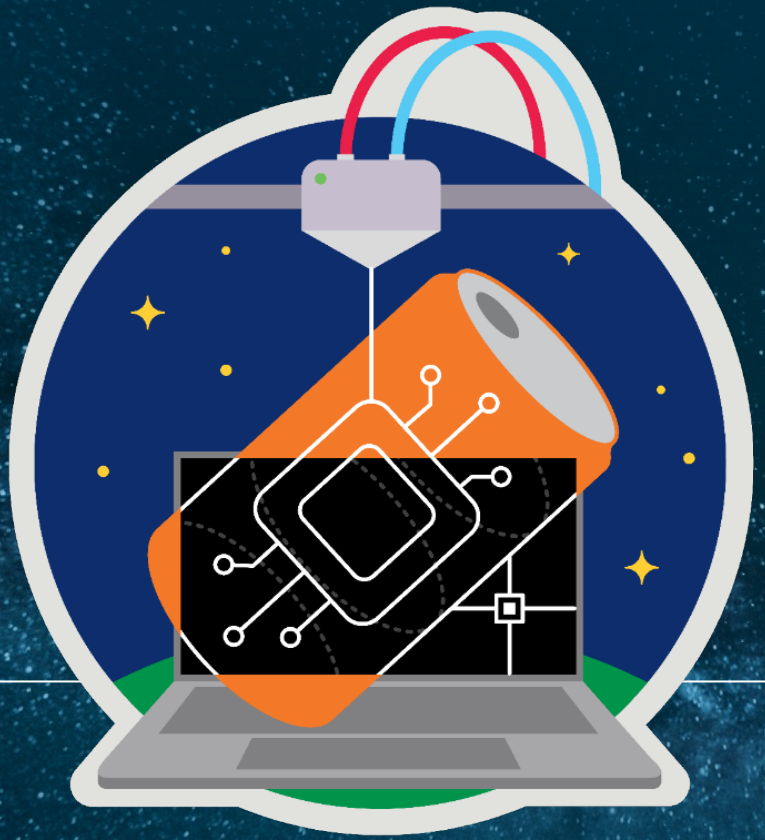
Phase 3: Preparation of the European Launch campaign	
Activity	Date
Student teams submit their Pre-launch Report to ESA	10 June 2022

Phase 4: European launch campaign	
Activity	Date
European launch campaign	20-25 June 2022

Phase 5: Post-flight activities	
Activity	Date
Student teams submit their CanSat Final Report to ESA ESA mails the participation certificates to the teams	29 July 2022

New structure European Launch Campaign

Day 1 (20 June)	Teams arrive Ice breaker activity Opening ceremony
Day 2(21 June)	Presentation of projects to the Jury at the working site First technical inspection of CanSats Drop tests of CanSats
Day 3 (22 June)	Launch of CanSats
Day 4 (23 June)	Preparation of final presentation by CanSat teams Presentation of results by CanSat teams
Day 5(24 June)	Presentation of results by CanSat teams Closing ceremony Social Programme
Day 6 (25 June)	Teams depart



CADSAT

CADSat– new concept 2021/22

Complexity level: Beginners

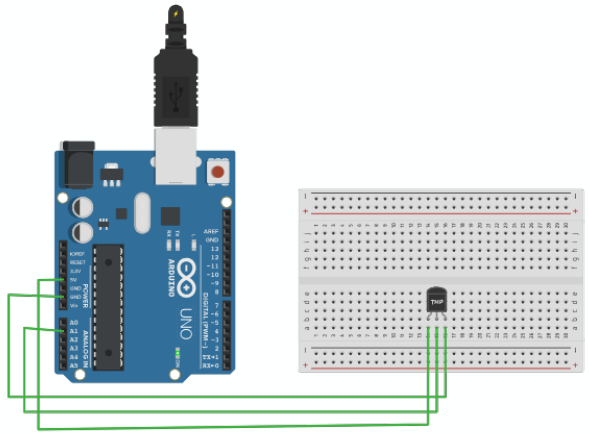
Objective: Measuring temperature and displaying it every second, optional: 3D design your ‘virtual’ CanSat

Tool: Tinkercad Circuits + Tinkercad 3D (Optional)

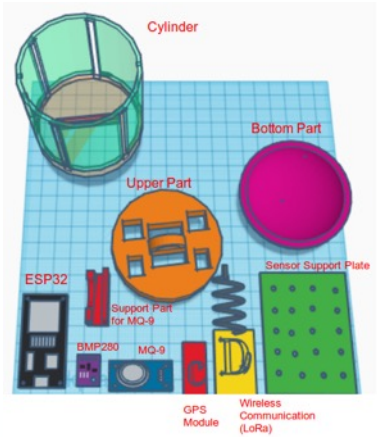
Age range: 11-15 years old

Registrations: open on 16 September 2021

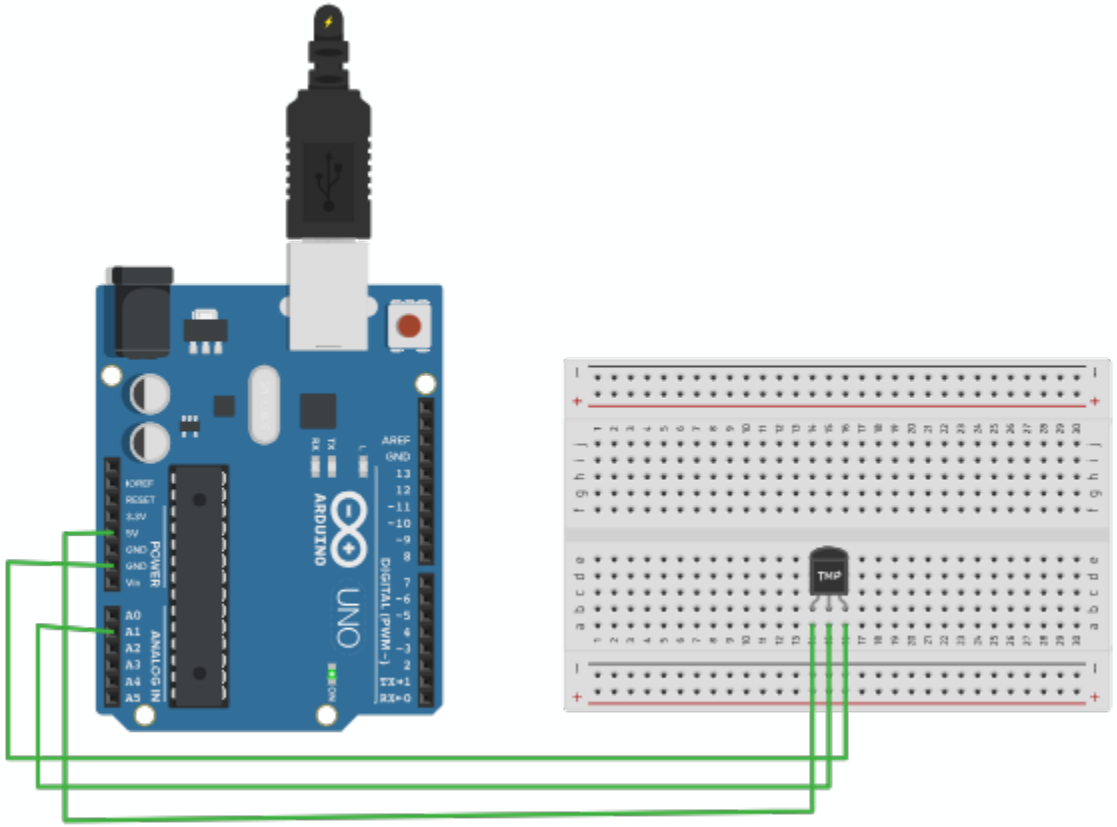
Basic mission

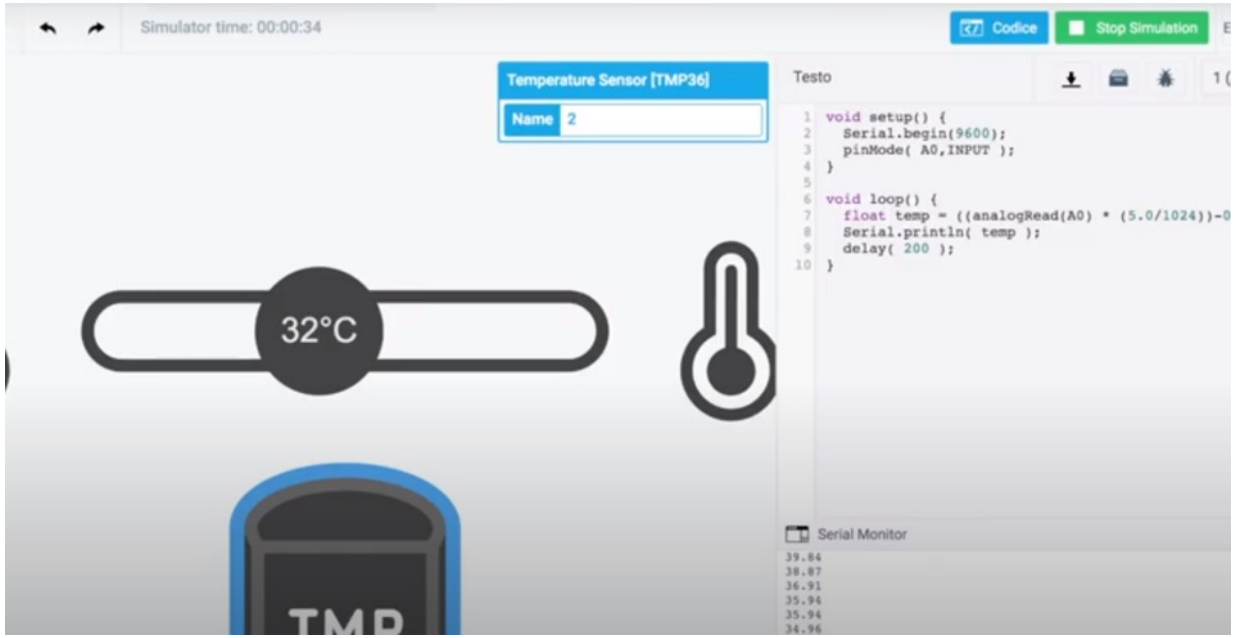


Optional mission



Basic mission – Measuring temperature with Tinkercad circuits



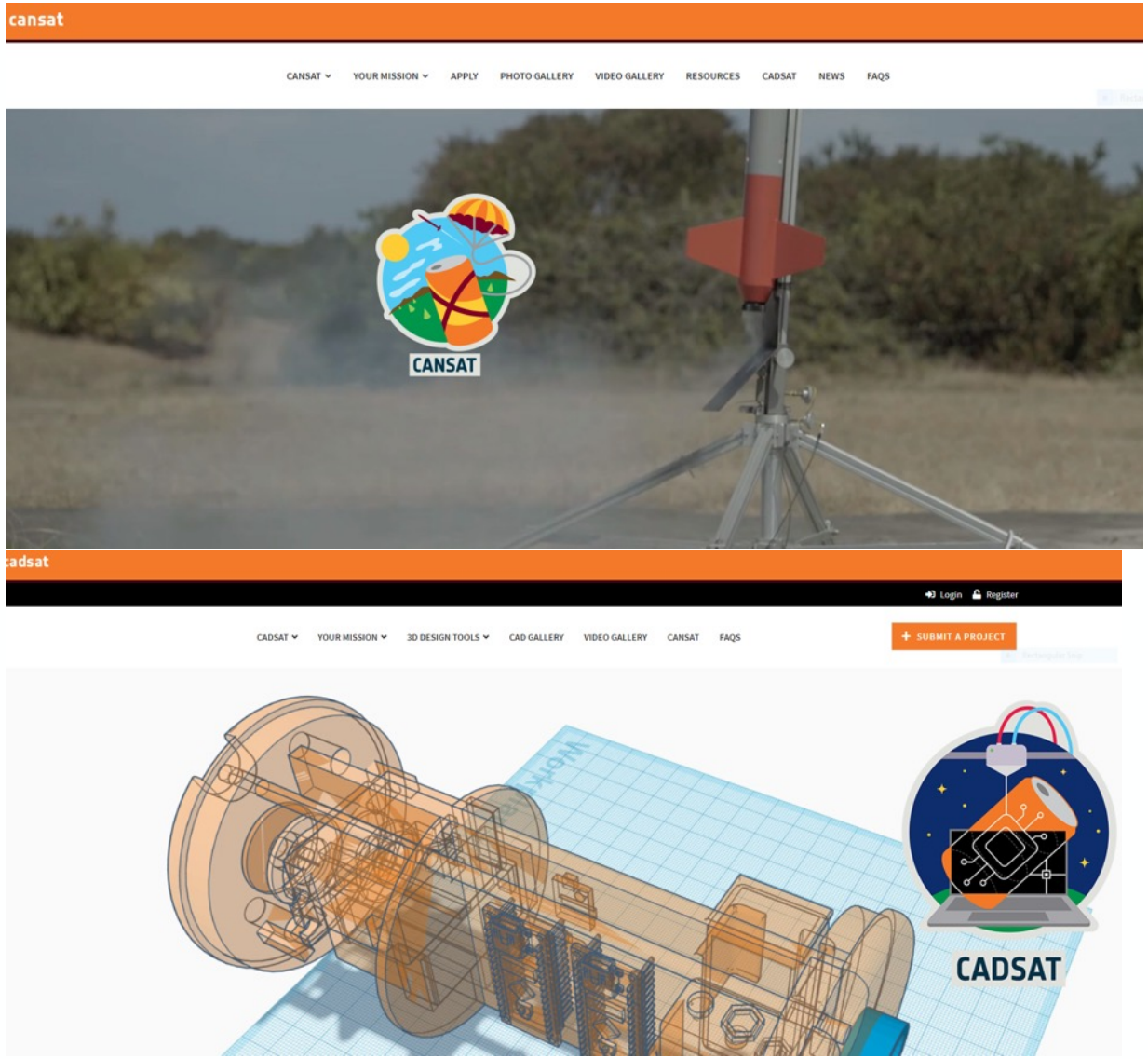


More information

Cansat.esa.int

Cadsat.esa.int

e-mail: cansat@esa.int



ESA Education's future - *Space for Education 2030*

Design, by 2022, a long-term Education Programme, considering

- ✓ the evolution of the space sector
- ✓ the evolution of the education sector
- ✓ Global and societal challenges

3 axis:

- ✓ Build on Programme **heritage**
- ✓ Invest in **innovation**: subject knowledge; skills and competences; core values and attitudes; delivering methodologies
- ✓ Pursue **collaboration**: academia, industry; national, European and international institutions

"...prepare for jobs
that have not yet been created,
for technologies that have not yet been invented,
to solve problems that have not yet been anticipated"

The future of education and skills, Education 2030, OECD 2018

Thank you!

- **Education web portal:** www.esa.int/education
- **Education on facebook:** facebook.com/ESAEducation
- **Education on twitter:** @ESA_Education
- **Education on flickr:** ESA_events
- **ESAKids web portal:** www.esa.int/kids
- **ESAkids facebook and twitter pages:** PaxiESAKids, #Paxi_ESAKids

Supporting Formal Education

European Space Education Resource Office

- ***Teacher training***
- ***Classroom resources***
- ***School projects***

- Recognition of the **diversity of ESA Member States** in Education: 15+ different languages and even more education systems
- **An approach to support education focusing on the needs and national priorities**
- Largest project of ESA Primary & Secondary activities
- In **partnership** with **national space agencies and institutional education stakeholders**
- Started in 2006 with pilot in the Netherlands (NEMO)

The ESERO approach

- **Targeting teachers** to reach students
- **Accredited teacher training** through institutional partnership
- **Large scale reach in the country**:
  - for everybody, not targeting the 'elite' (not for the 'richest,' 'most intelligent…')
  - promoting collaboration rather than competition for higher geographical coverage and expertise offer
- **Innovative didactics** (e.g inquiry, project-based learning, etc), contributing to change teaching practices