

Swedish Space Programmes – Balloons, rockets, satellites

Kristine Dannenberg

Head of Space Exploration and Access to Space



- SNSA established in 1972

Government Agency under
Ministry of Education and Science

- 25 employees

- Annual budget ~120 M€

~75 % contributions to ESA programmes

~25 % allocations to national activities

New Space Law under preparation (2023, tbc)



Main tasks of SNSA

- Responsible for space and Earth Observation activities in Sweden
- Provides grants for space research, technology development and EO
- Promotes Swedish space research and space industry
- Ensures that Sweden contributes to and benefits from international cooperation
- No “operational” activities – to be procured





Esrange: Sweden's spaceport

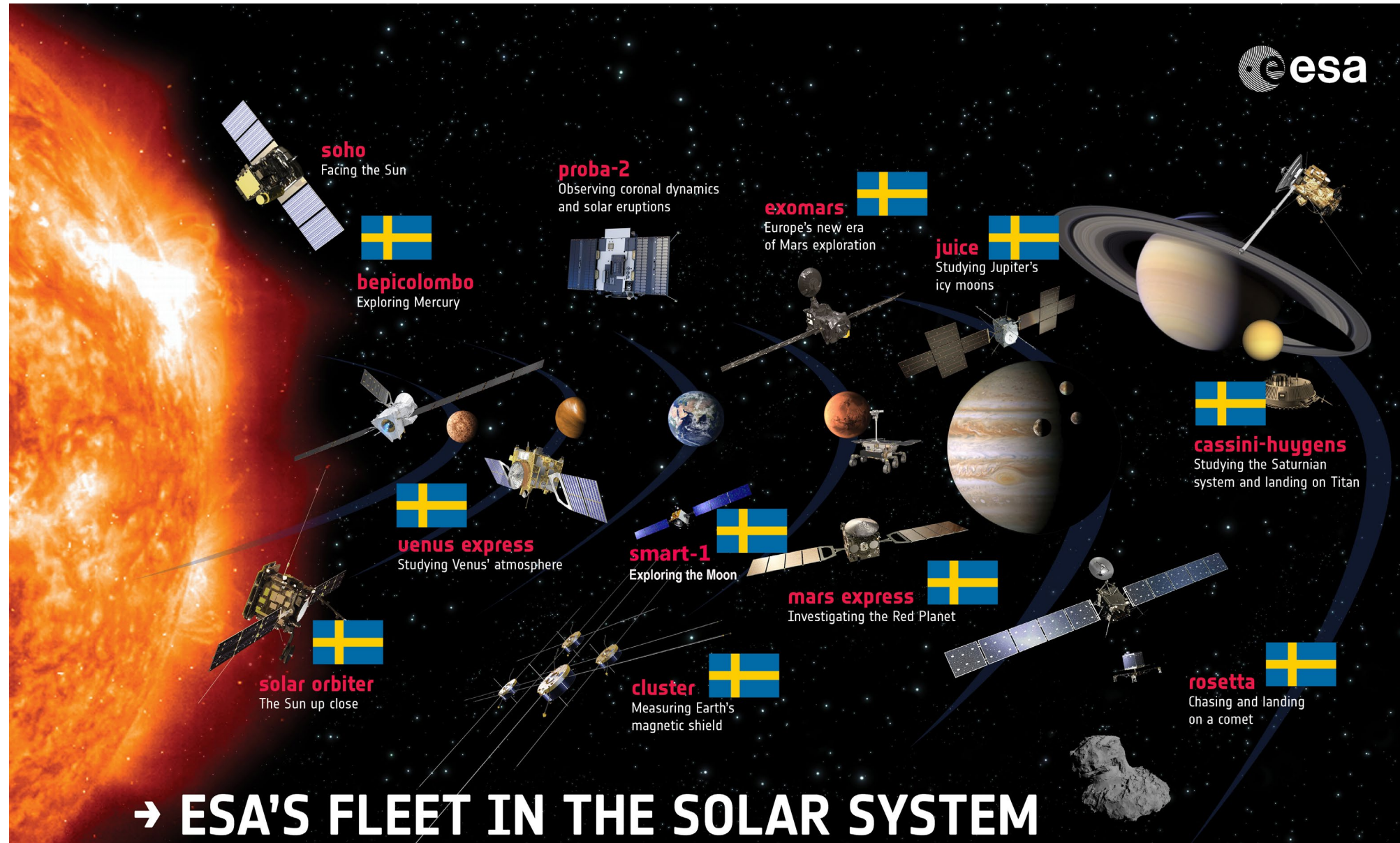
>1000 rocket and balloon launches since 1966 with
science and technology experiments

Special role of SNSA in Swedish research funding

- Long-term support – to comply with the long-term nature of space projects
- Annual call for space and EO research projects
- Most projects are related to ESA, NASA or other international missions
- National balloon and rocket programme, bilateral and multilateral projects (Odin satellite), national small innovative satellite initiative (MATS)

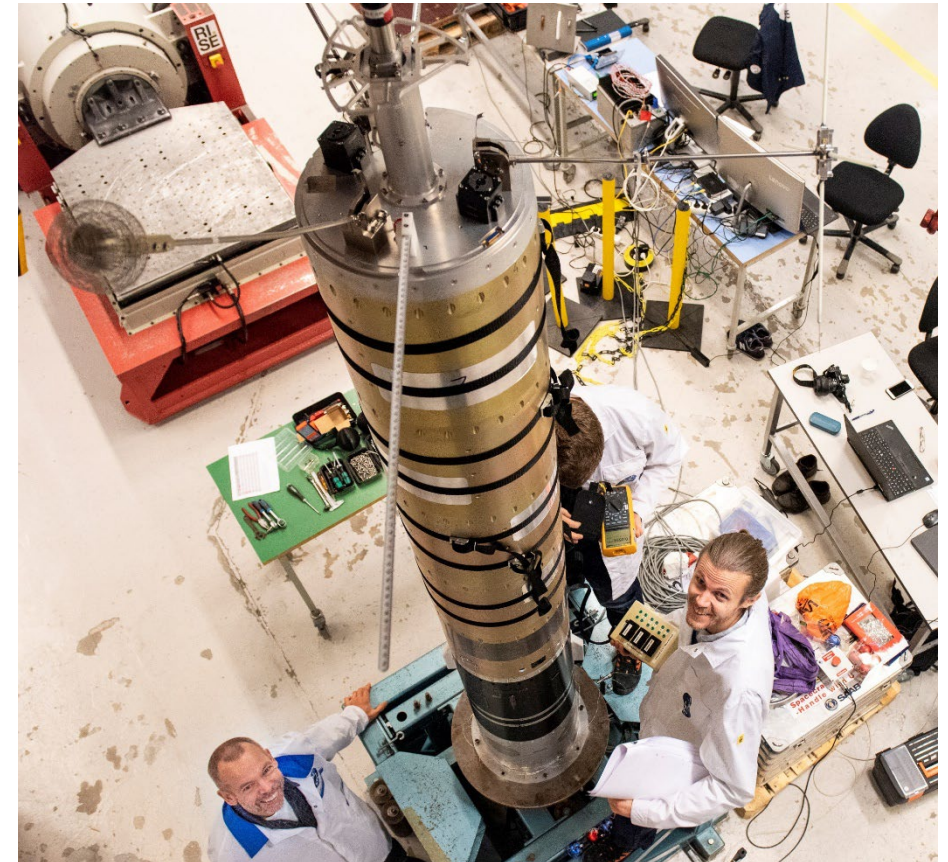


Swedish contributions to ESA space science missions



Swedish national balloon and rocket programme

- Established in 2012 with a specific budget allocation (currently 20 MSEK/year)
- Objective: offer scientists balloon and rocket flights from Esrange for high quality research
- Calls for proposals issued on regular basis
- Last call in 2020, next in 2023/2024 (tbc)

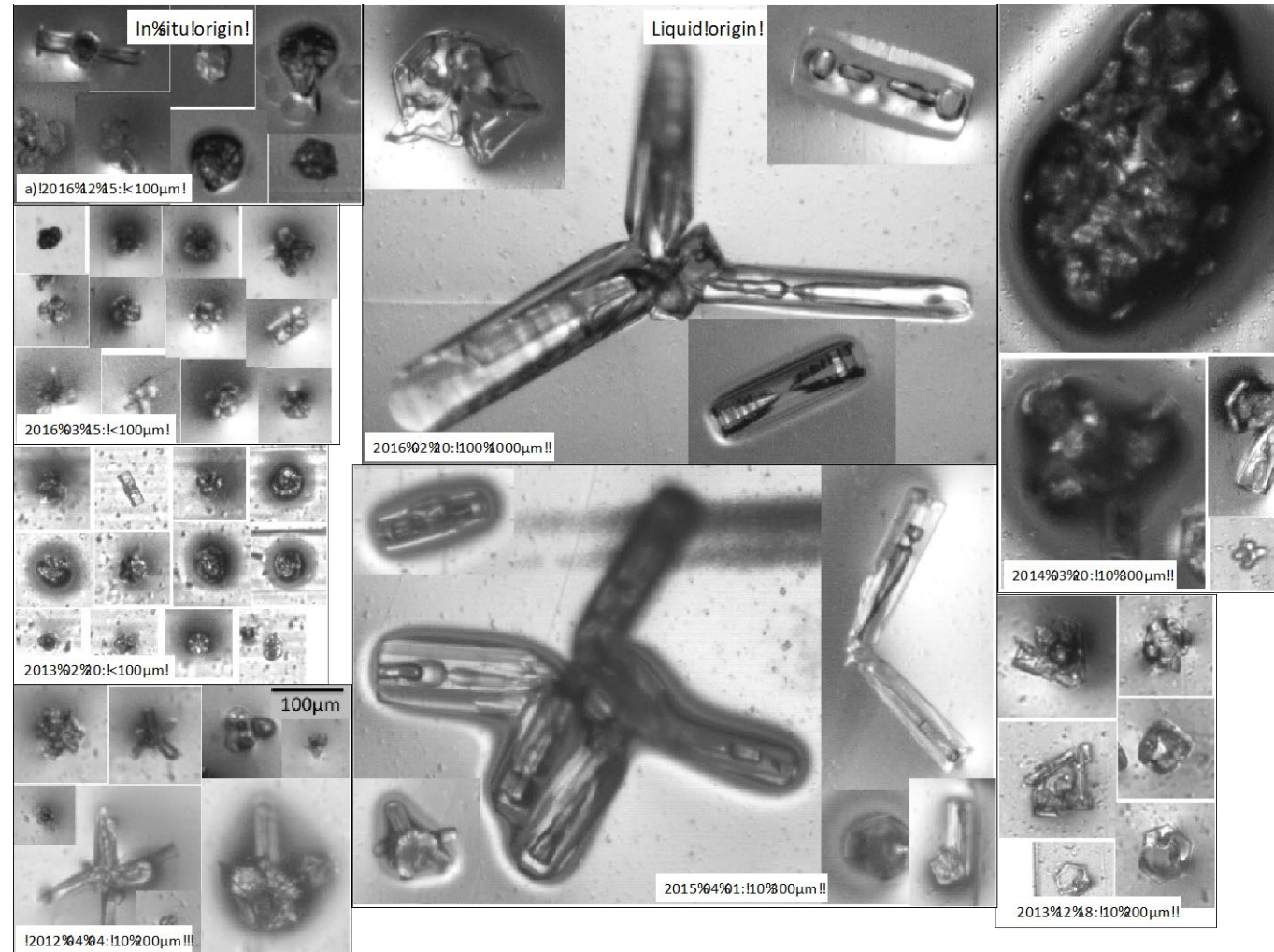


Swedish national balloon and rocket programme

- Open to international collaboration if beneficial for science objectives
- Many Swedish PIs already collaborate with scientists in other countries
- Flight costs normally covered by SNSA but any non-SE instruments to be provided by collaborators
- SNSA is not in position to cover travel or staff costs for scientists from other countries



In-situ Ice Particle studies in Arctic Cirrus, by Luleå Technical University



BROR, by Institute of Space Physics

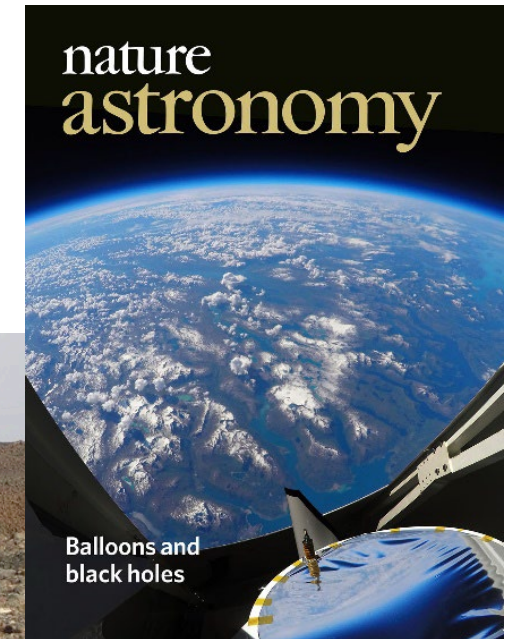
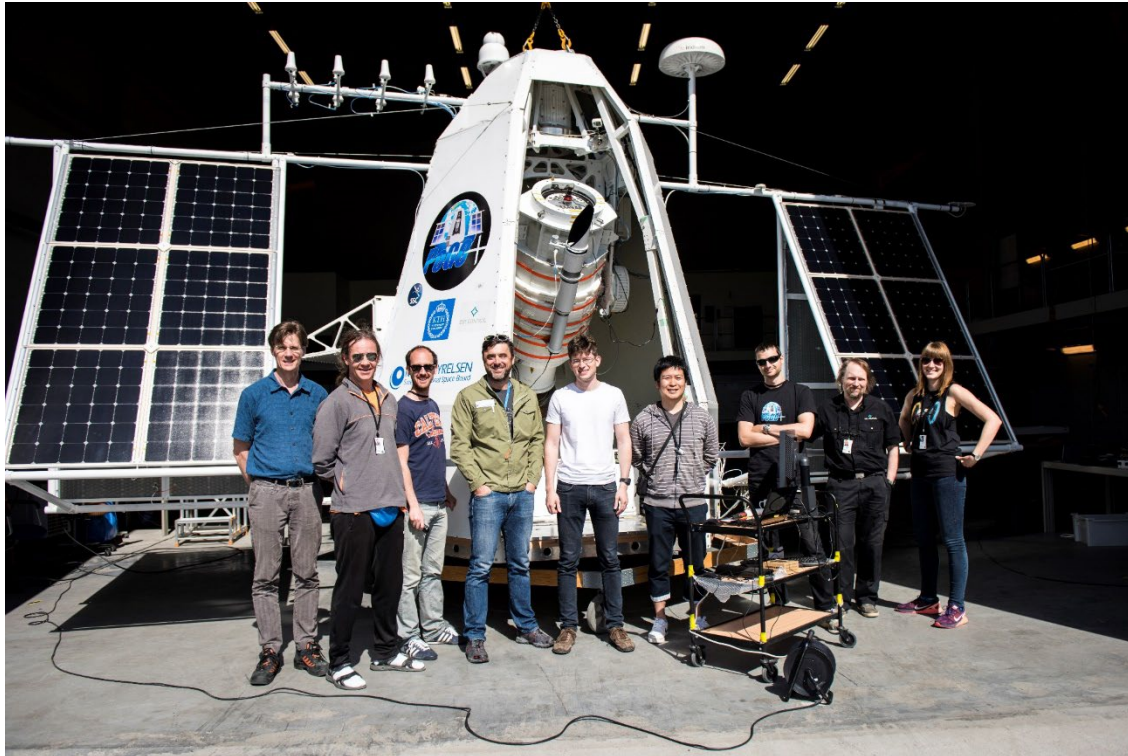
- Barium Release Optical and Radio (BROR) rocket experiment – will study small-scale processes and structures in the auroral ionosphere using multiple releases of barium
- Launch from Esrange in 2023



Balloon mission PoGO+



- Studies of polarisation of gamma rays from Crab Nebula
- Flight from Esrange to Canada 12–18 July 2016



XL-Calibur (NASA) – launch from Esrange in July



X-ray mirror



Polarimeter



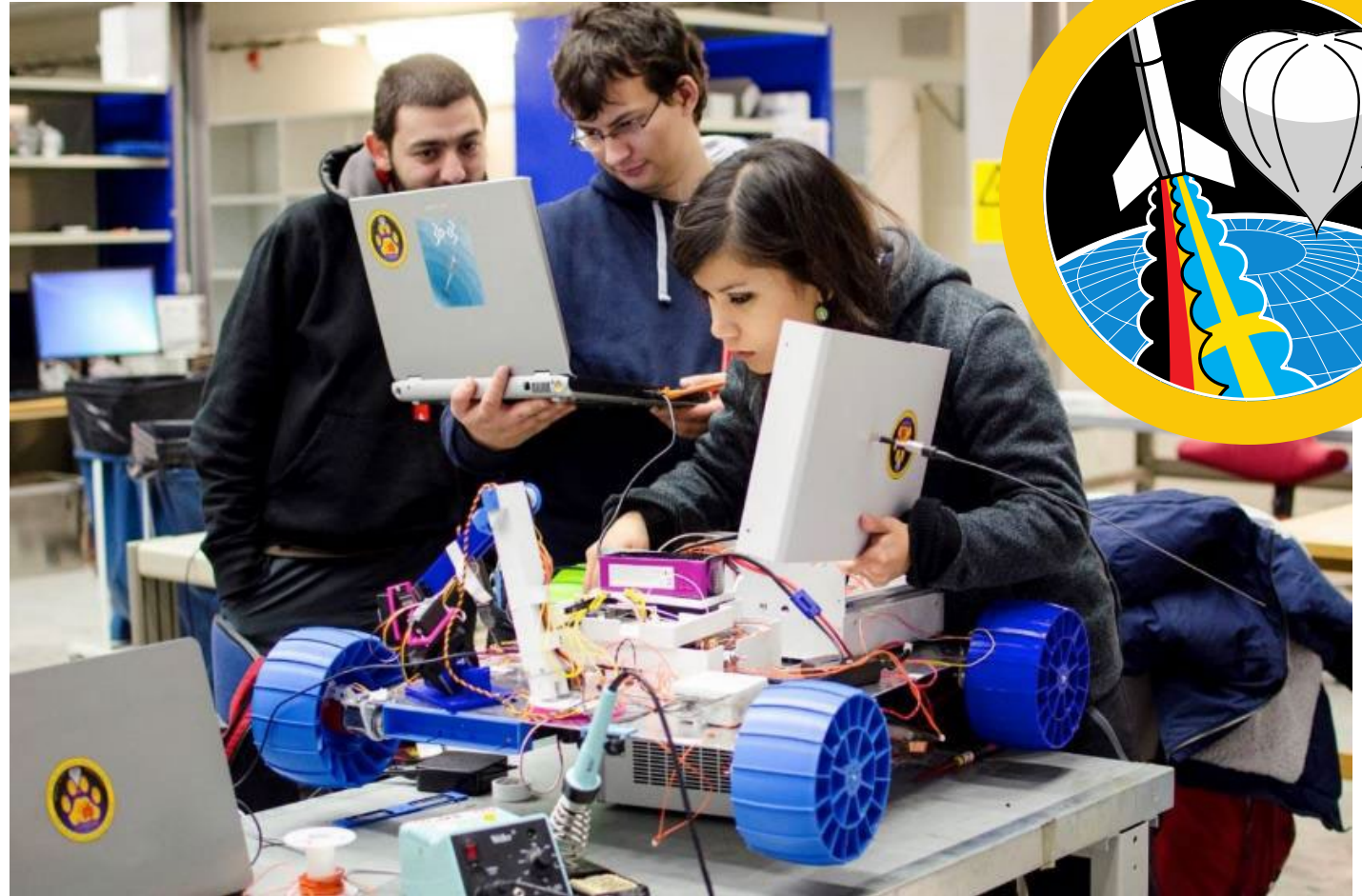
Shield

Drop tests from balloons for space exploration

Rosalind Franklin – *A Robot Astro-biologist*



Educational activities - DE-SE programme REXUS/BEXUS in collaboration with ESA - open to European students



- New call opens in 2023, deadline in mid-October 2023 (tbc)

REXUS/BEXUS

- Funded and (programmatically) managed by SNSA/ESA and DLR
- Industrial partners SSC, ZARM and MORABA/DLR
- Swedish share open to all ESA members states and associated countries
- Annual call for proposals
- Students develop own experiments to be flown on balloons and rockets from Esrange 12-18 months after the selection
- Flights, technical support, travel covered by SNSA, DLR and ESA

