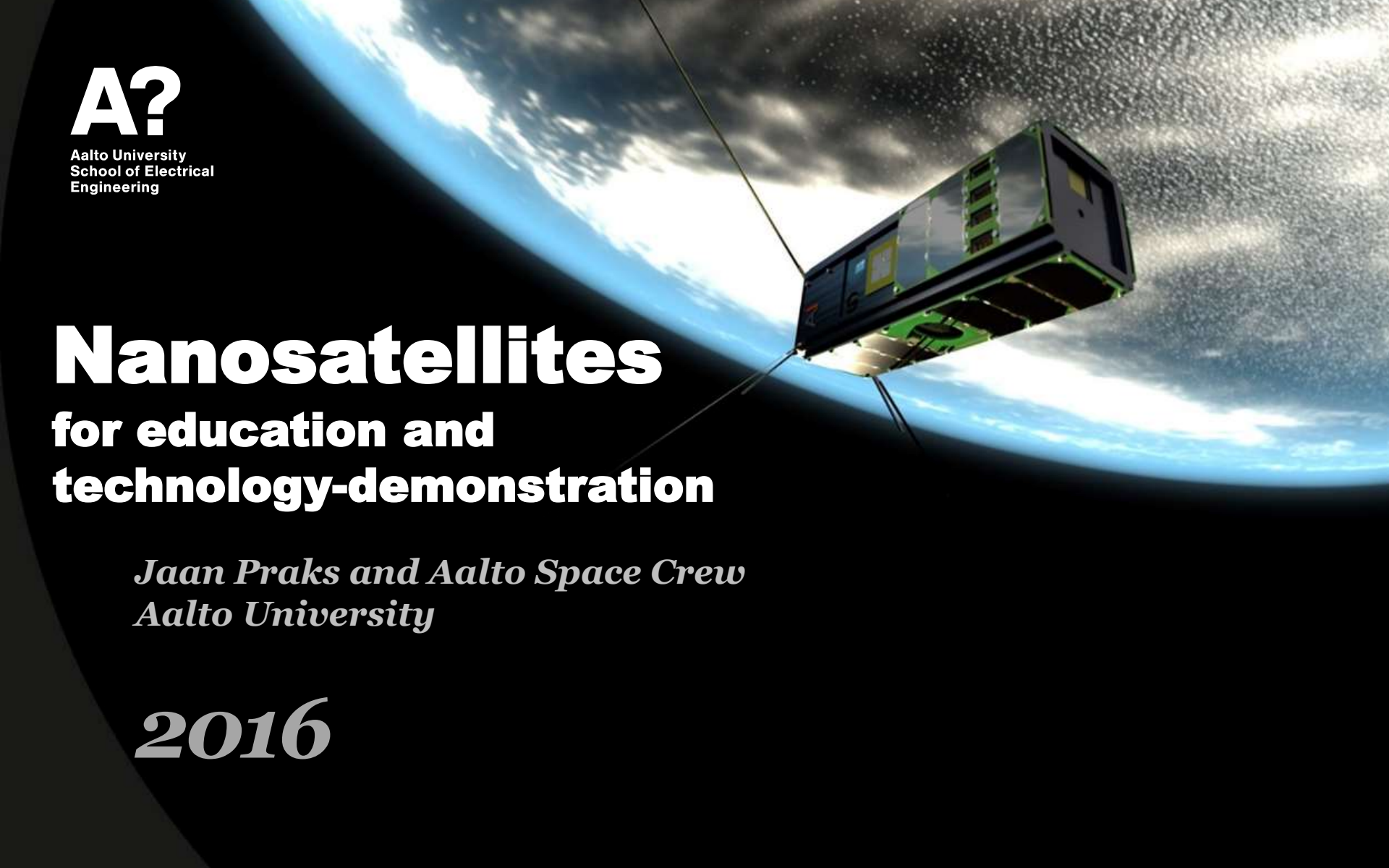

A!
Aalto University

Global world...

... needs global tools..

.. and people with new ideas!



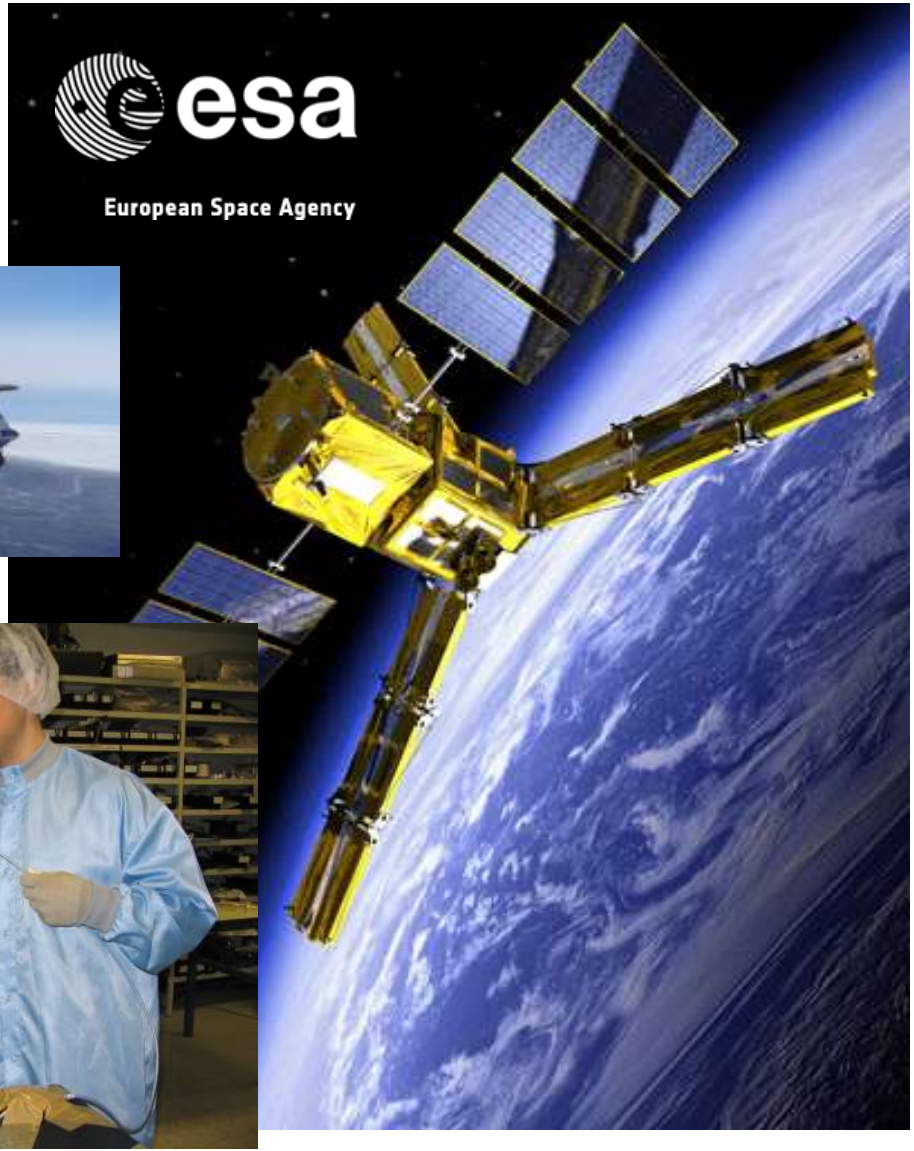
Aalto University
School of Electrical
Engineering

Nanosatellites
for education and technology-demonstration

Jaan Praks and Aalto Space Crew
Aalto University

2016

TKK heritage: SMOS mission and HUT2D

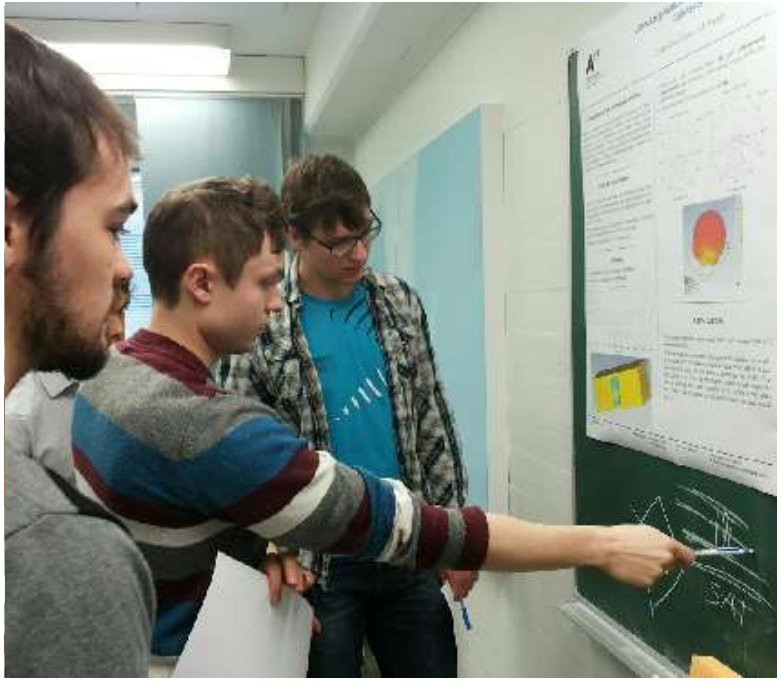


Aalto University
School of Electrical
Engineering

Planning our own satellite 2010

Satellite project integration to curriculum

- **The satellite project was integrated with Master thesis projects and special assignments**
- **The project worked together with many teachers in many disciplines**
- **The satellite project provided topics in:**
  - remote sensing, space technology, radio engineering, electronics, mechanical engineering, software engineering and others

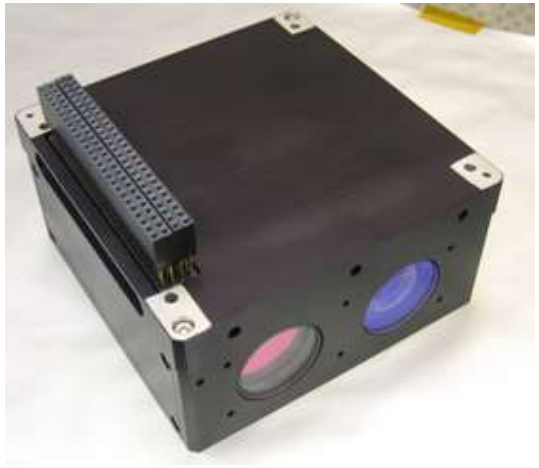


Aalto University
School of Electrical
Engineering

Working together

Collaboration platform


Payloads



AaSI (VTT)

Mass: 592 g

Power: max 2.5 W

Plasma Brake (FMI)

Mass: 259 g

Power consumption: 1-1.6 W

1000 V high voltage generation

RADMON (Univ. Of Turku, Univ of Helsinki)

Particle detector measuring the flux of >700 keV electrons and >10 MeV proton

Mass: 354 g

Power consumption: 1 W

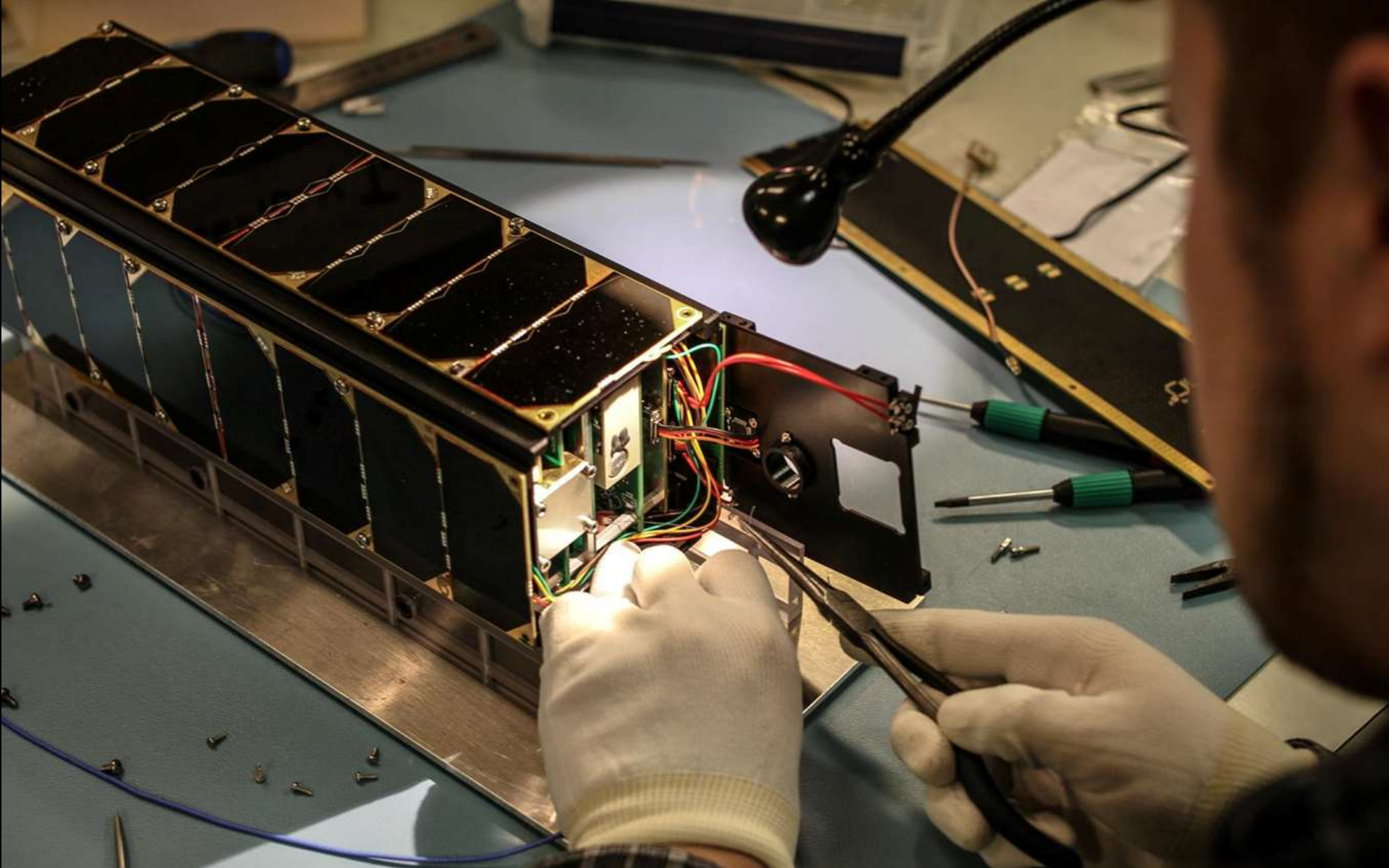
Aalto University
School of Electrical
Engineering

HELSINGIN YLIOPISTO
HELSINGFORS UNIVERSITET
UNIVERSITY OF HELSINKI

VTT

Aalto-1
The Finnish Student Satellite

Aalto University

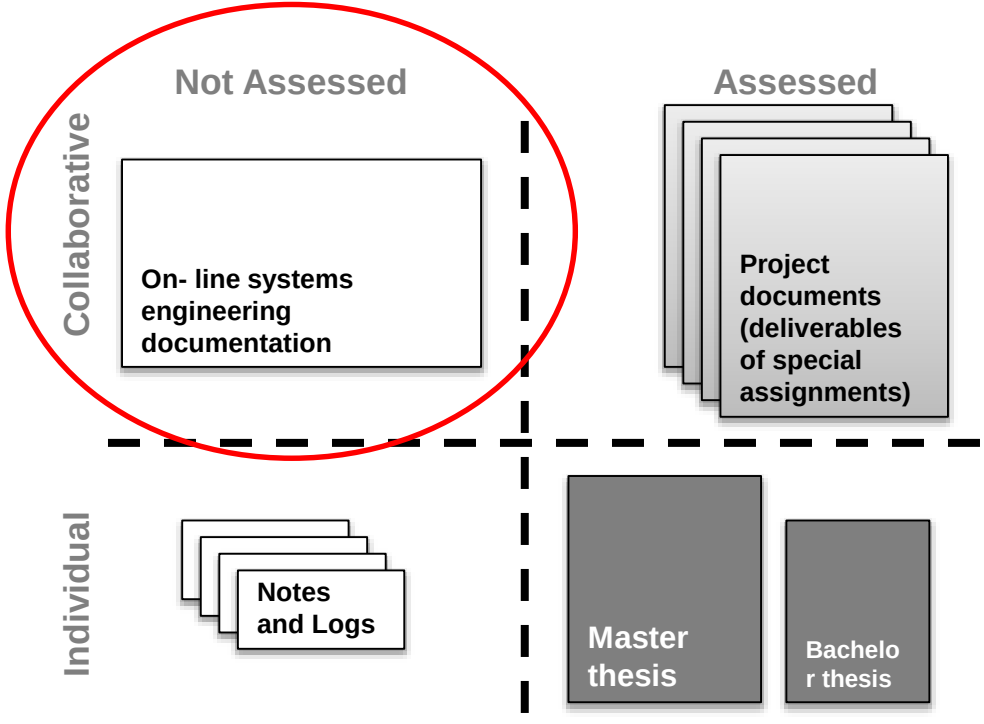


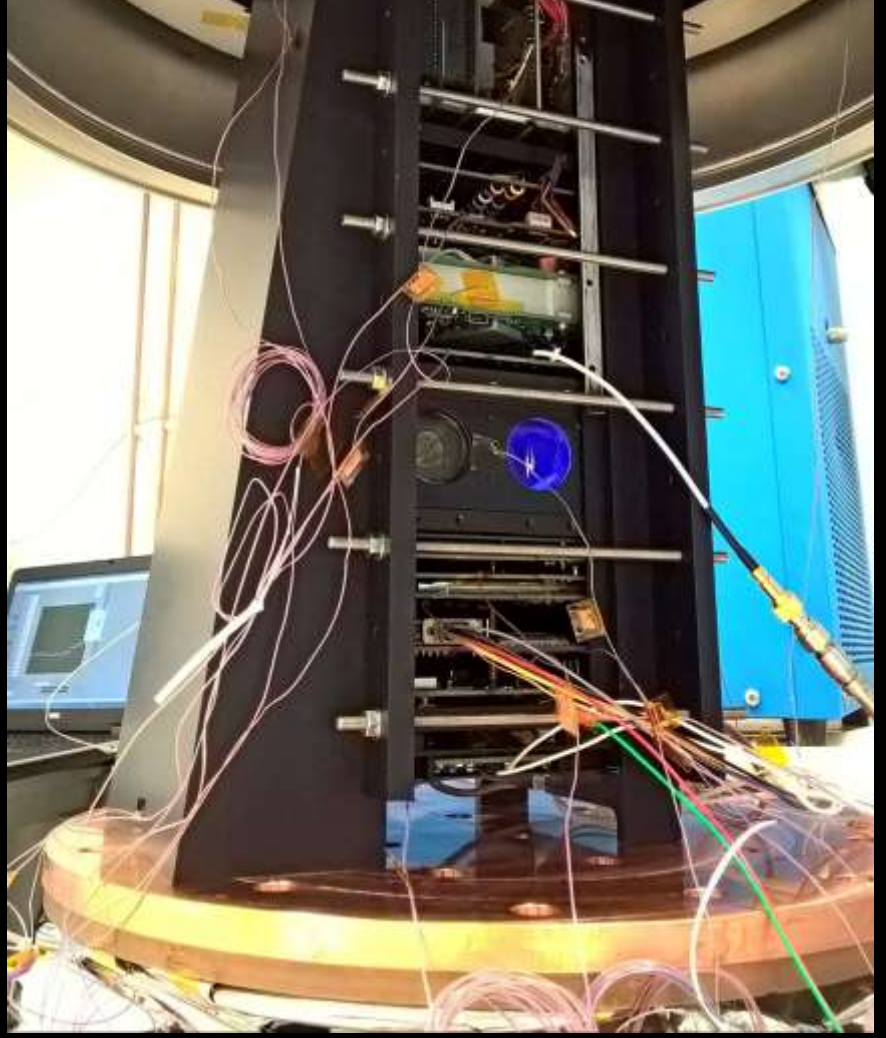
Aalto University
School of Electrical
Engineering

Solving systems engineering challenges in a student project

Tailored documentation approach for student projects

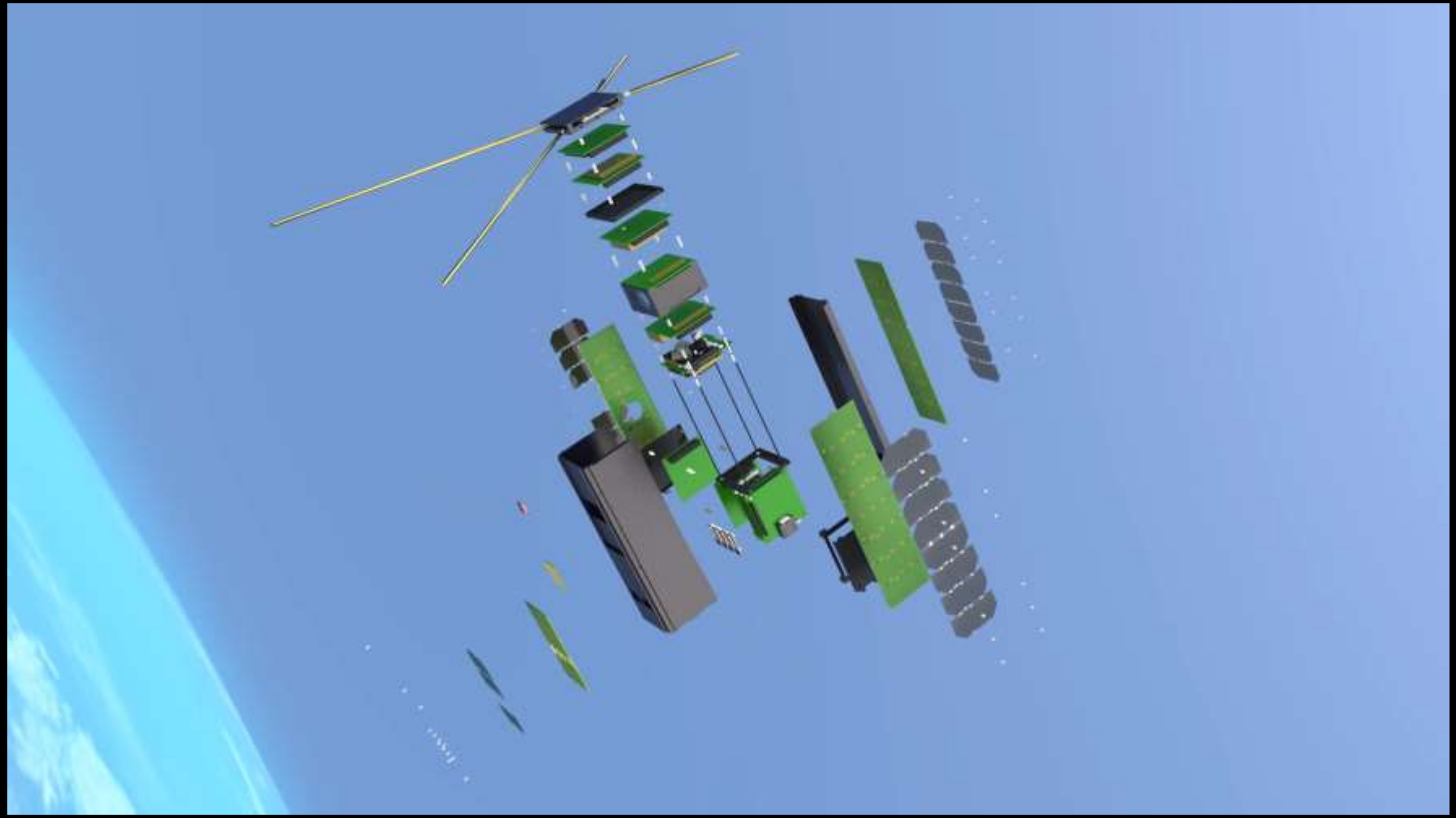
A documentation approach was developed which includes systems engineering, supervising and assessment.





Aalto-1

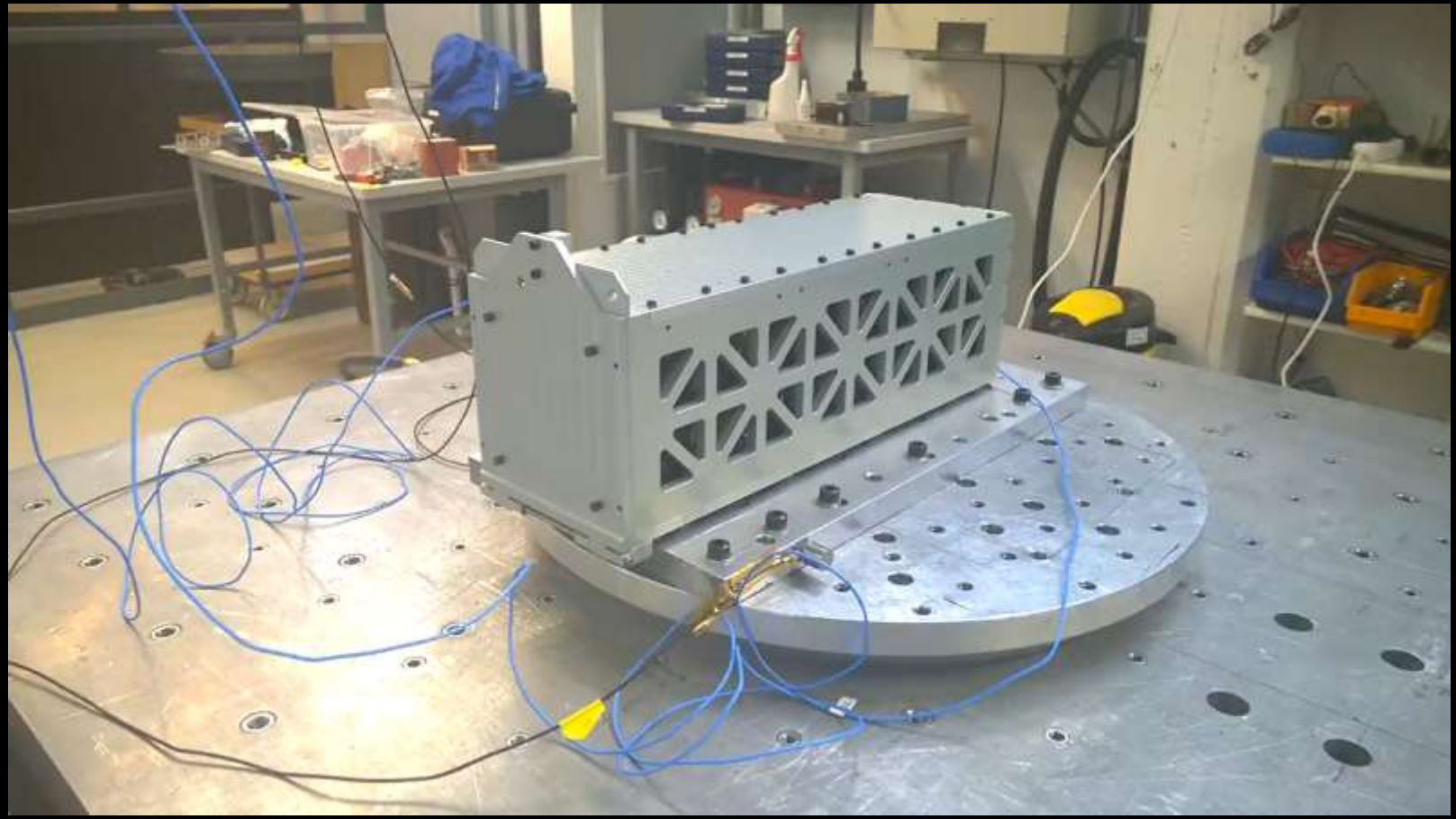
The Finnish Student Satellite



Aalto University

Aalto-1

The Finnish Student Satellite



Aalto University

Aalto-1

The Finnish Student Satellite

Aalto-1 team in spring 2011

Aalto-1

The Finnish Student Satellite

Multi Payload, technology demonstration, Mass: 4 kg, COM: 437 kHz and 2405 kHz

Helping the students reach the skies:

NOKIA

Space Systems
Finland

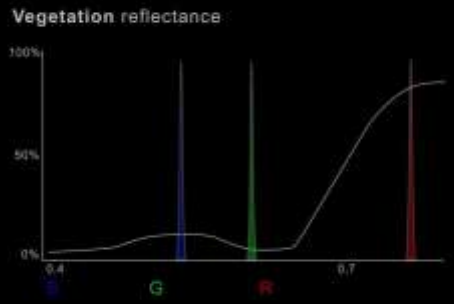
Turun yliopisto
University of Turku

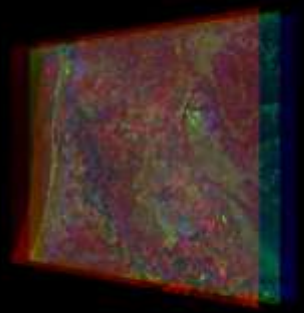
RUAG

A?
Aalto University

Aalto-1

Spectral imager





VTT

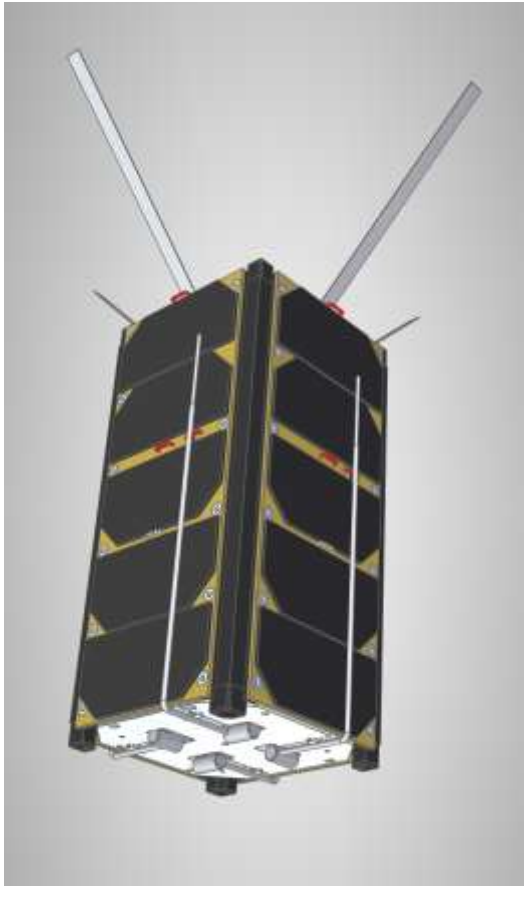
Aalto-1

The Finnish Student Satellite

Aalto University

Aalto-1

The Finnish Student Satellite



Mission
- QB50 mNLP payload platform

Science mission
- Multi Needle Langmuir Probe operation during QB50 mission

Platform
- Mass 2 kg (with payload)
- Average power: 3 W
- Attitude keeping 5°
- Downlink: 1.2 W RF power, 9,6 kbit/s
- GPS
- Scinence data 2Mbits/day

Aalto-2

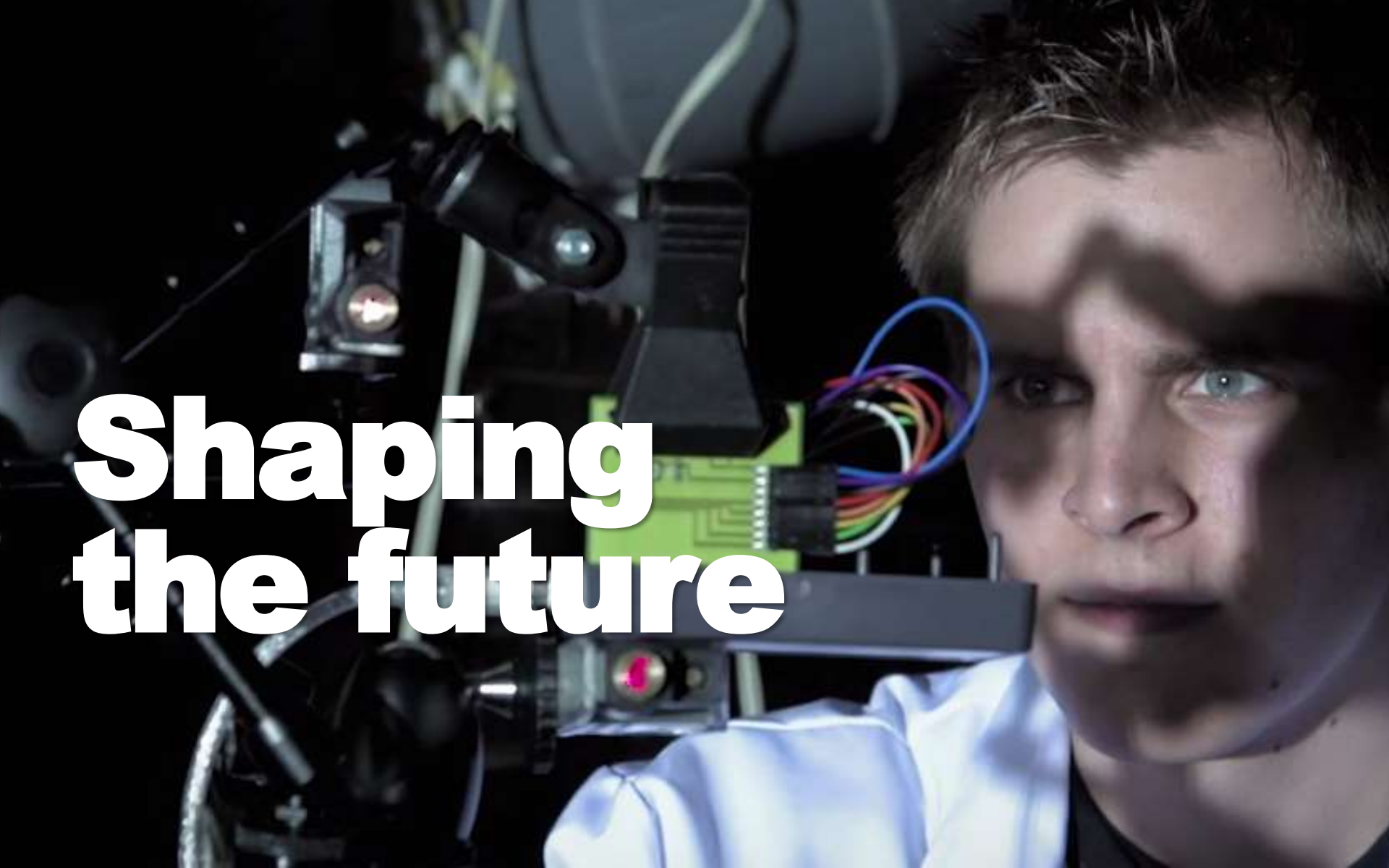
Aalto University
School of Electrical
Engineering

COOPERATION

QB50

VKI

Tekes

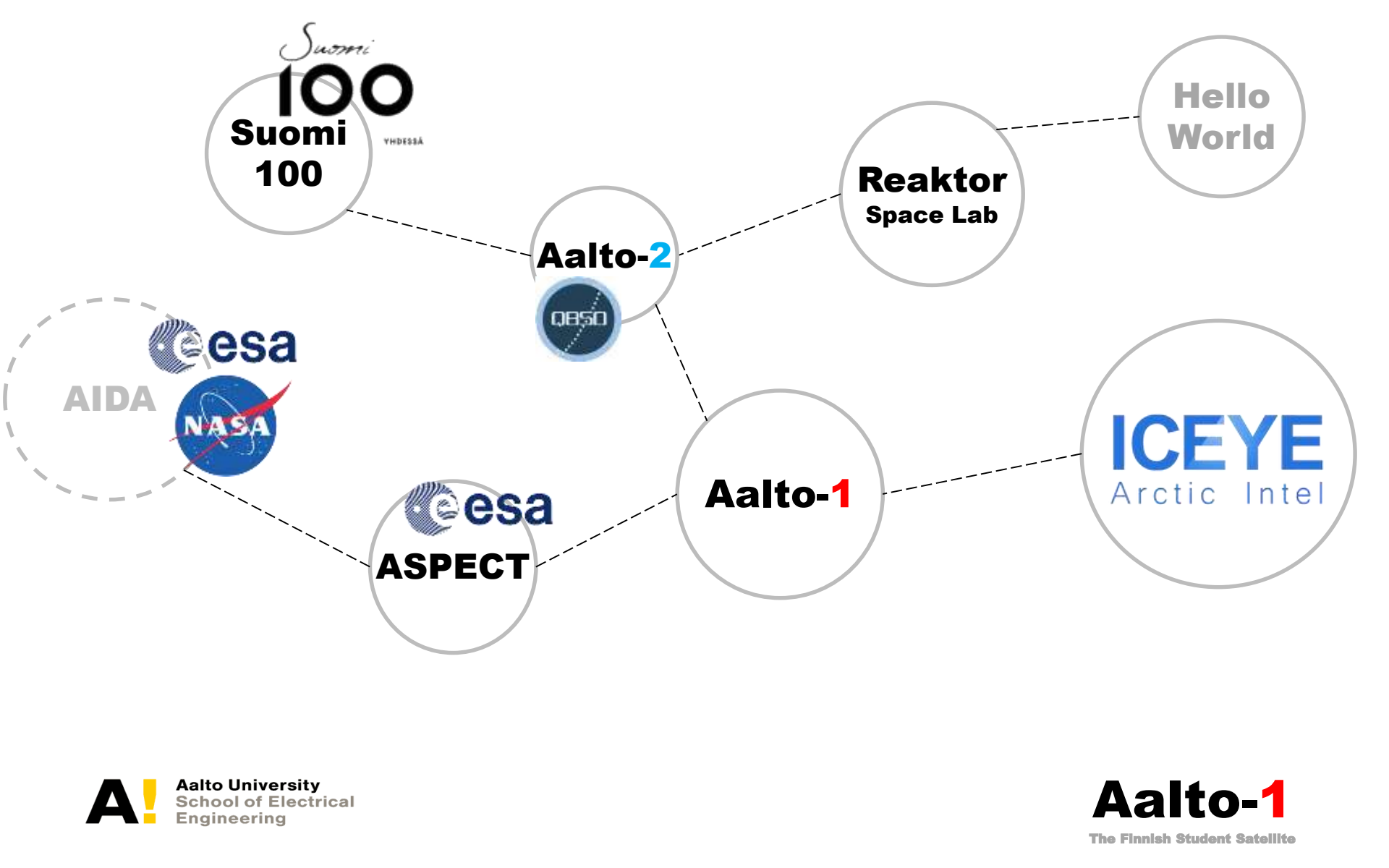

Shaping
the future

Educational results

During 6 years of the project

- ~ **100 students** participated
- ~70 students made special assignments in satellite project
- **28 Bachelor** theses were written on satellite related topics
- **12 Master** theses on Aalto-1 satellite
- **10 Master** theses on related topics
- (additional 10 Master theses on RADMON instrument in Univ. of Turku and Univ. of Helsinki)
- 12 students proceeded to doctoral studies

- ~20 conference papers by students
- 3 published journal papers, many on the way



Aalto University
School of Electrical Engineering

Aalto-1
The Finnish Student Satellite


Sharing the
Inspiration

A?

Aalto University
School of Electrical
Engineering

Aalto University

LUMA program for gymnasiums

Aalto-1

The Finnish Student Satellite

A!
Aalto University

Aalto-1

The Finnish Student Satellite

Our students are making the news!

Contact us

Reaktor Space

Juha-Matti Liukkonen
Director, Space and Robotics

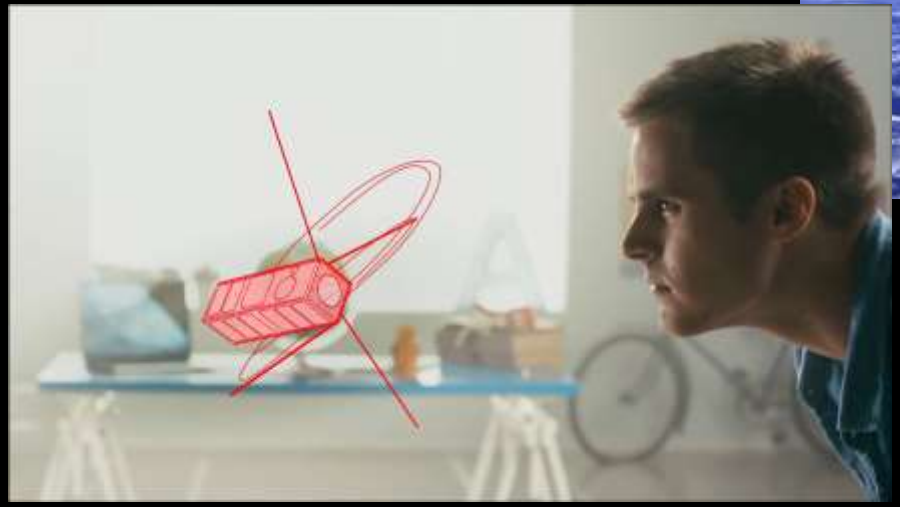
Reaktor Space Lab Oy

Tuomas Tikka
CEO, Reaktor Space Lab Oy

Reaktor Press contact

Jani Hellström
Communications Specialist

ICEYE

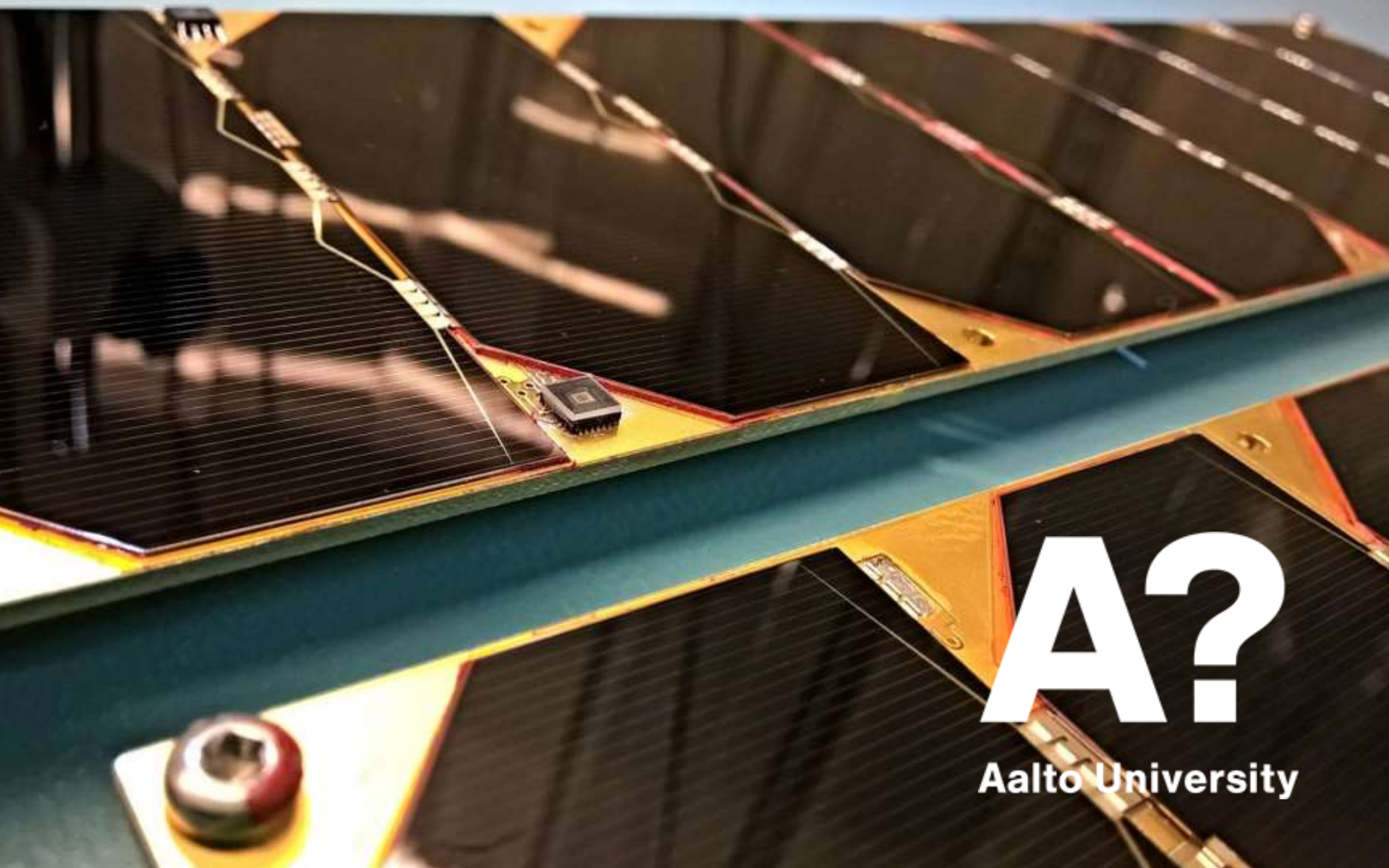


Free to dom succeed

Aalto University

Aalto-1

The Finnish Student Satellite


A?
Aalto University