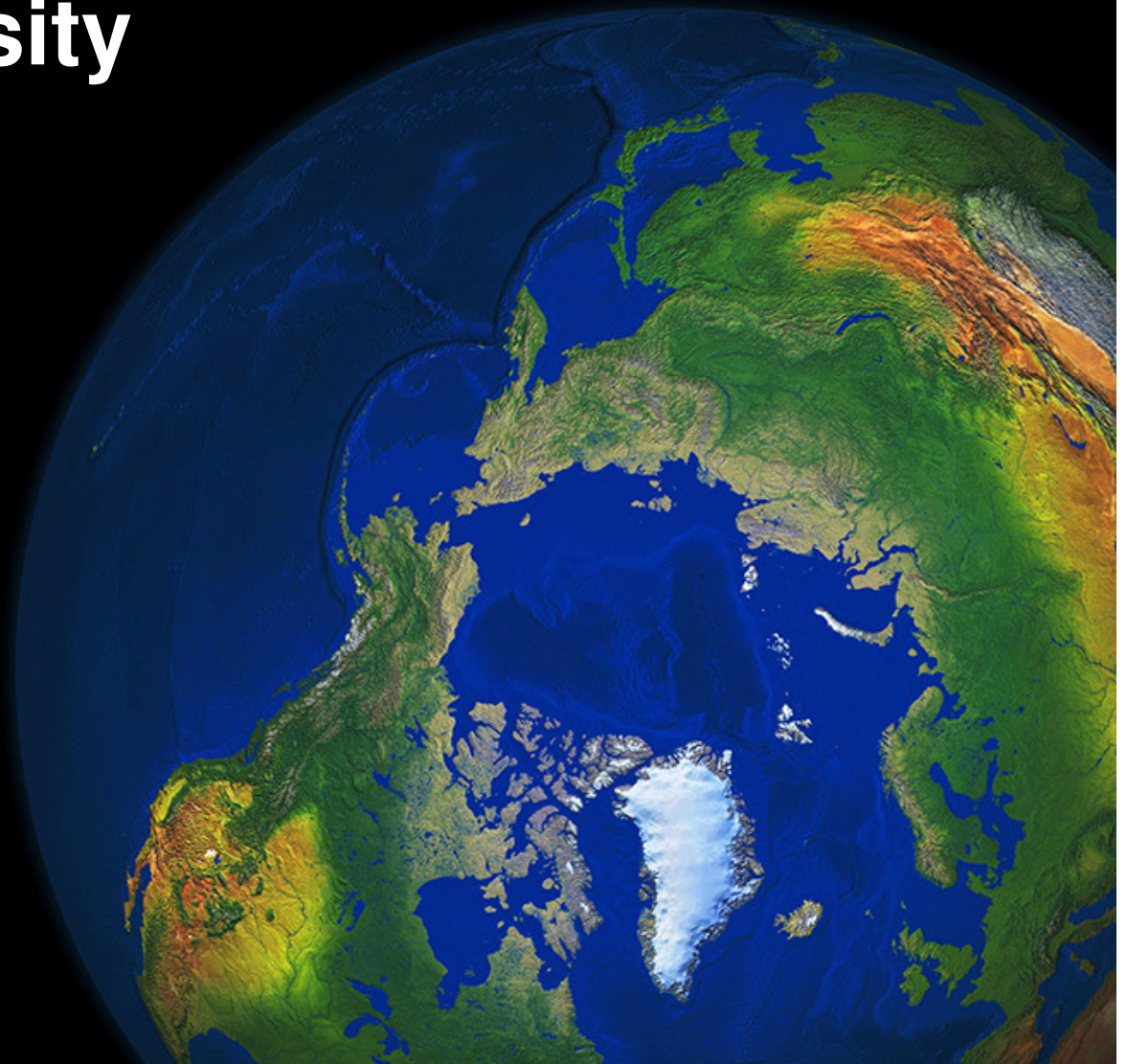


# Microwave remote sensing at Aalto University

Jaan Praks, Dr.Sc.  
Assistant Professor



Aalto University



# Organization

# Department of Radio Science and Engineering

~**100** workers

- **11** professors
  - (including one dean and one vice president)
- **20** senior researchers
- **40** post graduate students



# Strategy:

## Develop locally, apply globally

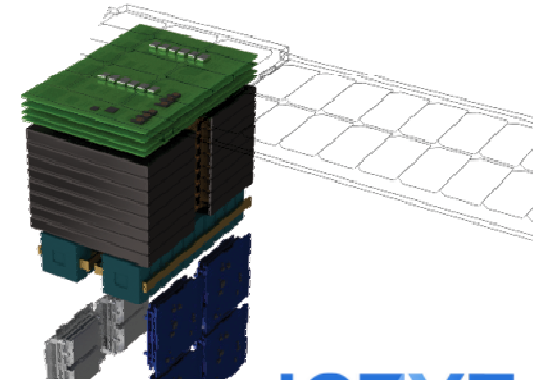
- Concentration on local and small scale studies
- Instrument development , concept level, technology demonstrations
- Active spin-off activities
- Global projects with partners



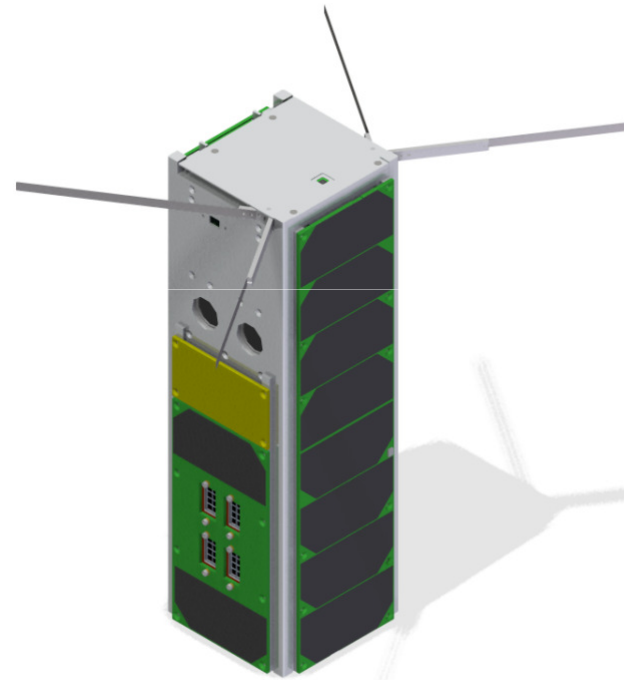


# Current projects

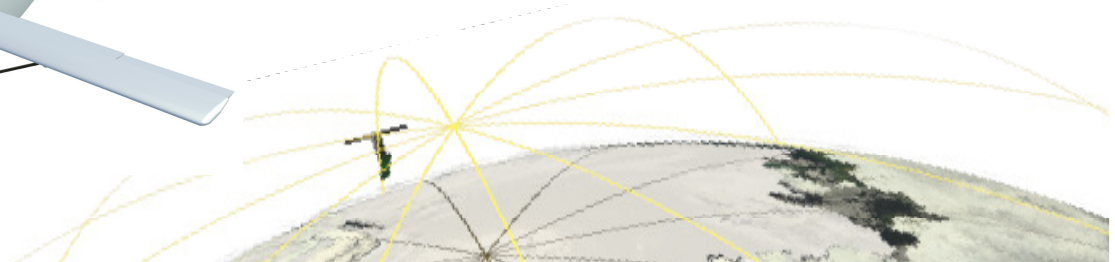
- Aalto-**1** student satellite
- Aalto-**2** satellite
- MMEA
- Infra Investment
- Skyvan Flying Lab
- **ICEYE** spin-off project
- Novel concepts
- Urban mapping
- SAR PolInSAR



**ICEYE**  
Arctic Intel



**Aalto-1**  
The Finnish Student Satellite



UUTISET: Joka kymmenes lapsi tekee tona

# Kauppalehti

INTONUMERO 2,60€, YHÄTTUNÄ 1,30€/VV  
WWW.KAUPPALEHTI.FI / MOBIILE: M.K.L.FI / APP: KAUPPALEHTI.FI  
PERUSTETTU VUONNA 1998

TIISTAINA  
13. TOUKOKUUTA 2014



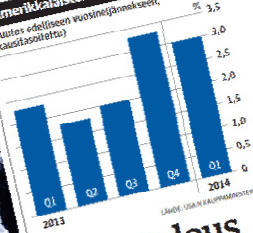
## Matkalla avaruuteen

Antti Kestilän, Pekka Laurilan ja Rafael Modrzewskin yritys on ensimmäisenä suomalaisena lähdössä kaupallisille satelliittimarkkinoille. Arktista jääinformaatiota tarjoava yritys tähtää satojen miljoonien eurojen liikevaihtoon.

OMA YRITYS » 16-17

### A UUTISET

Amerikkalaisten kulutuskysyntä  
muutos edelliseen vuosi(jänne)keen,  
(kausi)tasotietoa



USA:n talous  
voi yllättää  
iloisesti

» 6-7

### B REPORTAASI



Japani  
käynnistää  
varovasti  
ydin-  
voimaloitaan

» 12-15

### C PÖRSSI

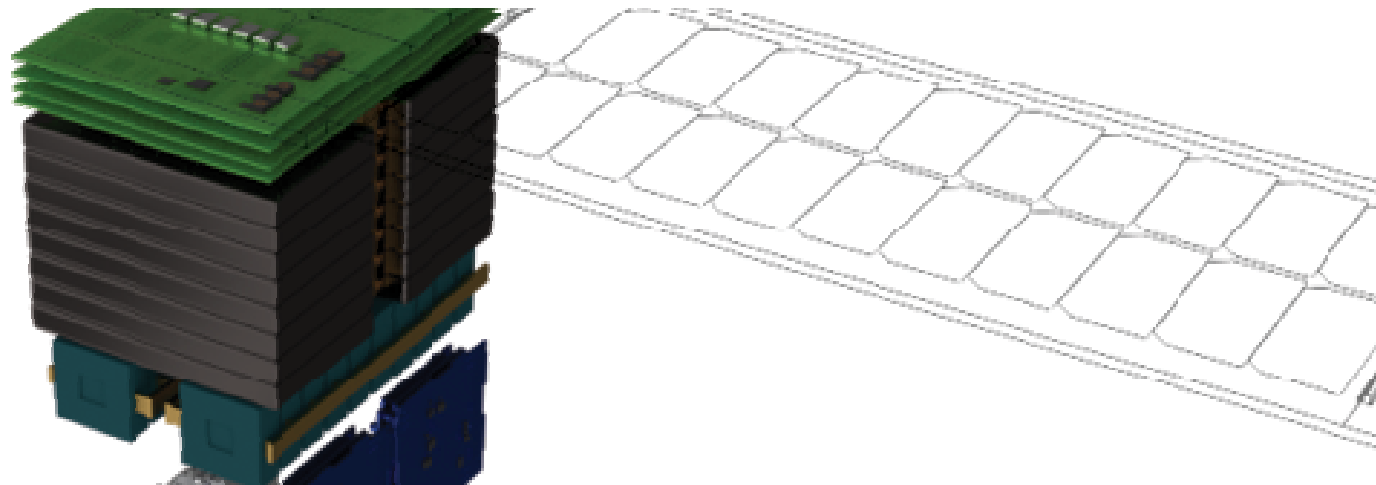
Netflixiä  
naitetaan  
Applelle

» 19

OMXH +0,72%

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puh. 010 665 2100 sähköposti: k.asiakaspalvelu@kauppalehti.fi

ICEYE  
Arctic Intel



**ICEYE**  
Arctic Intel

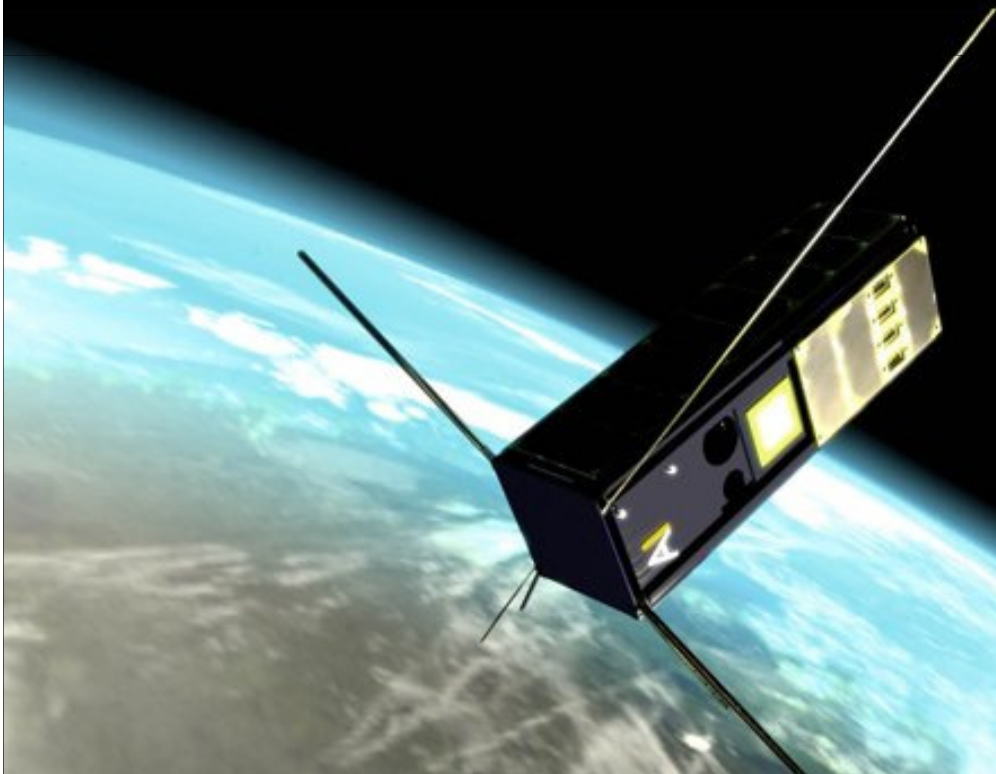






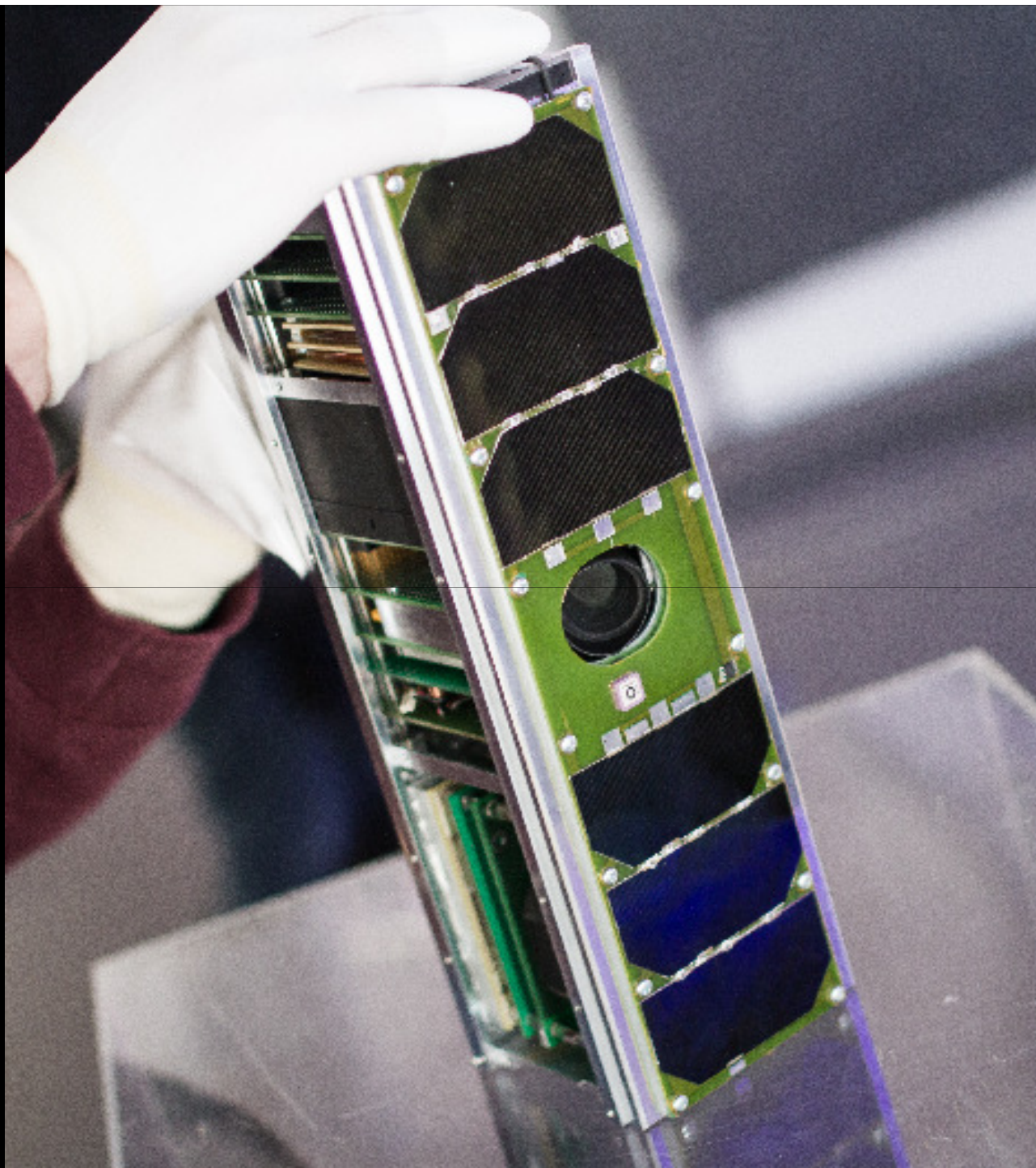


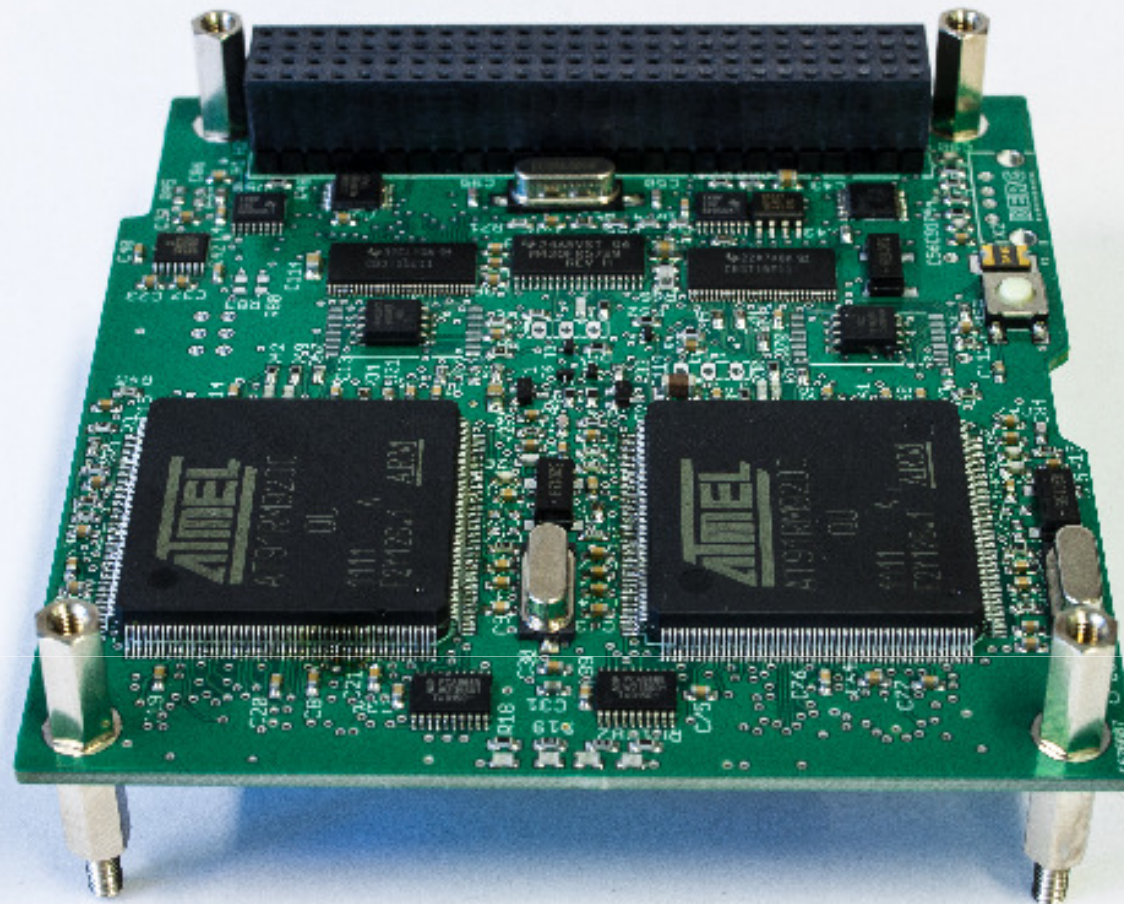
# Aalto-1





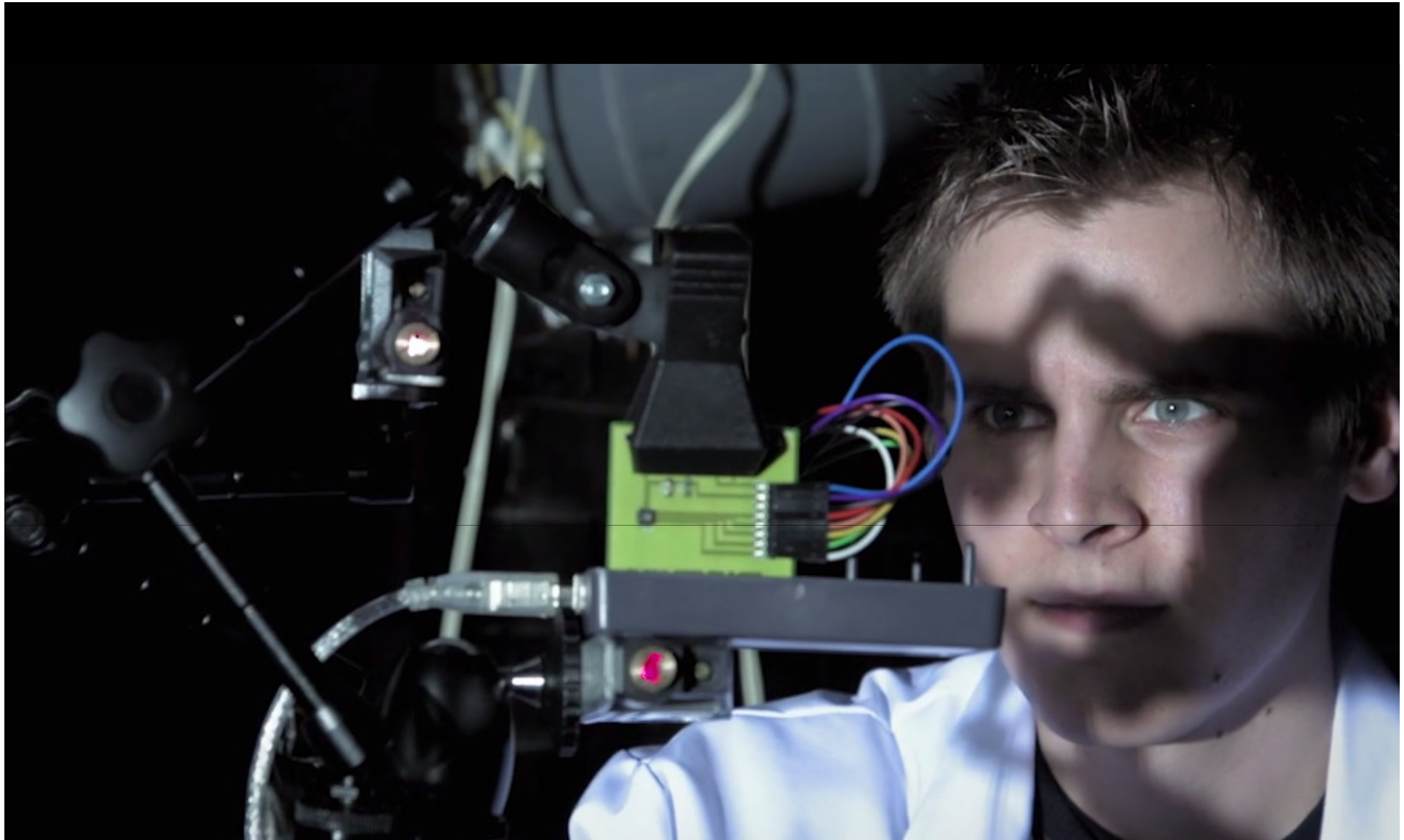






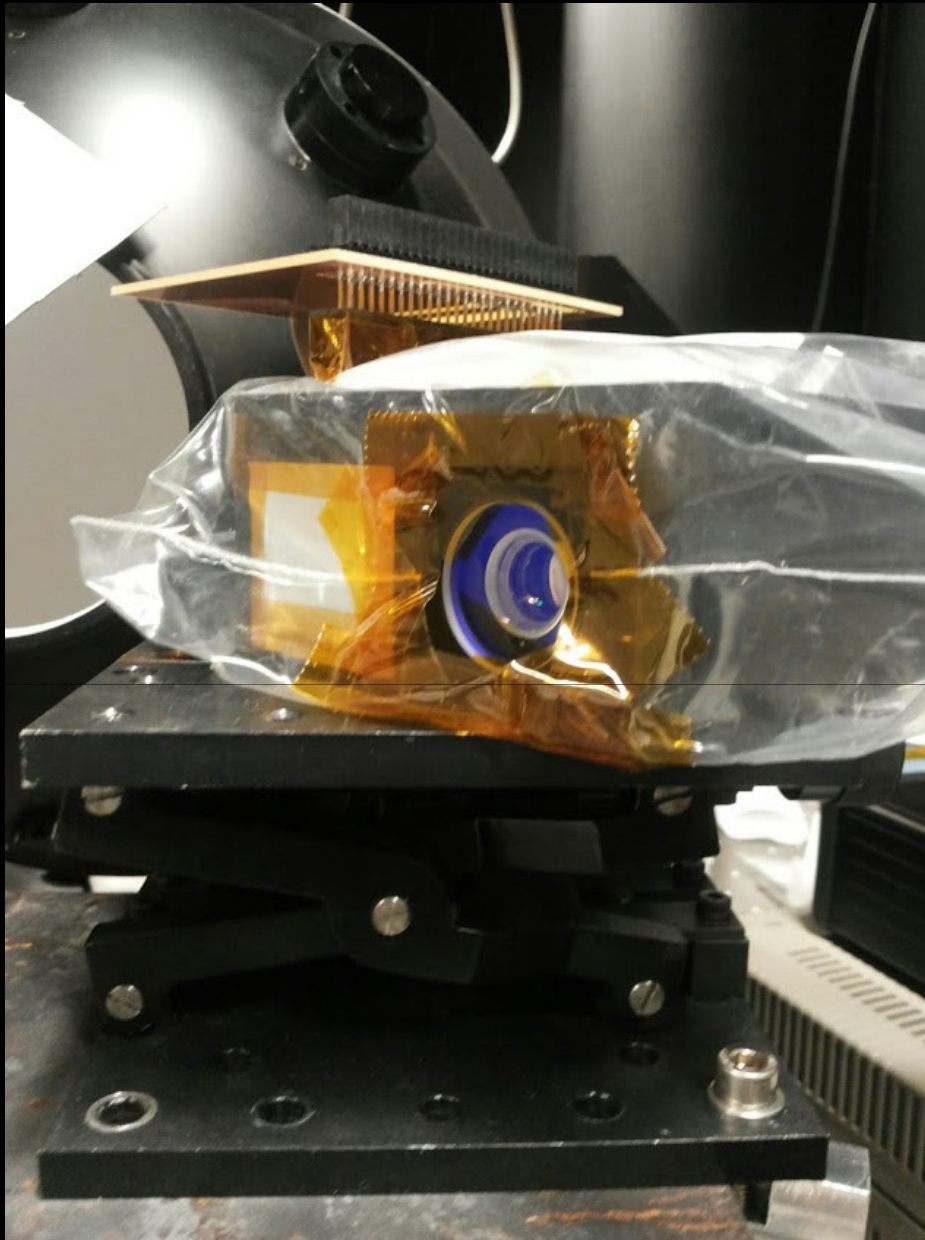
Aalto OBC EM







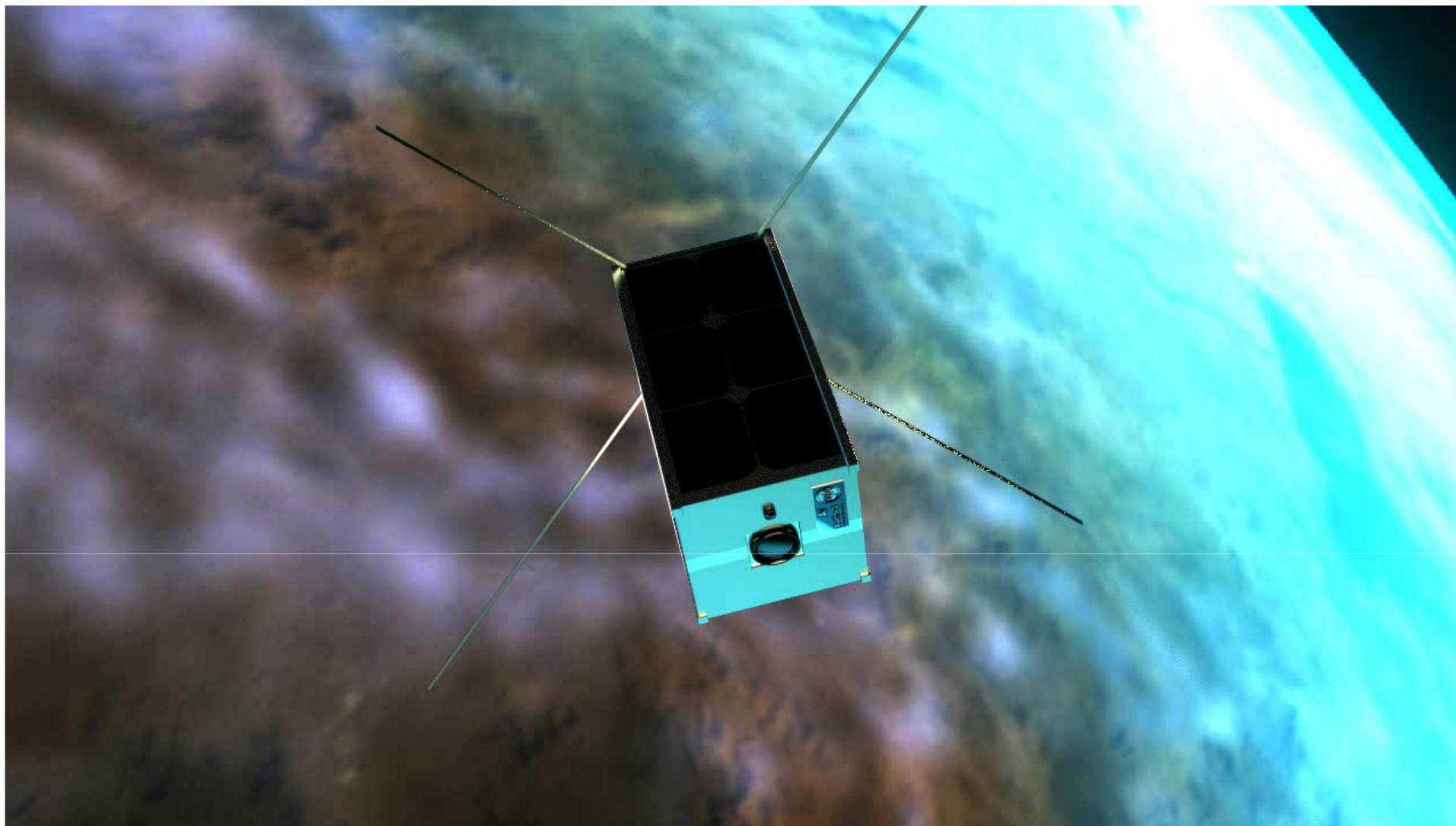




# AaSI Spectral Imager EM







**Aalto-2**





# Directions

- Combining microwave remote sensing and small space platforms (RFI CubeSat study)
- Direction towards active systems and coherent data analysis methods (SAR, scatterometers)
- Following the trend in available spaceborne data in near future (Biomass, Saocom, Smap)
- Assimilation of passive and active multiband microwave data

## Topics

- SMOS, RFI
- Boreal Forest, PolInSAR, tomography
- Grasslands
- Ice
- Urban mapping
- Instrument development

# Education

# Education





# Aalto starts new Master programmes in 2015



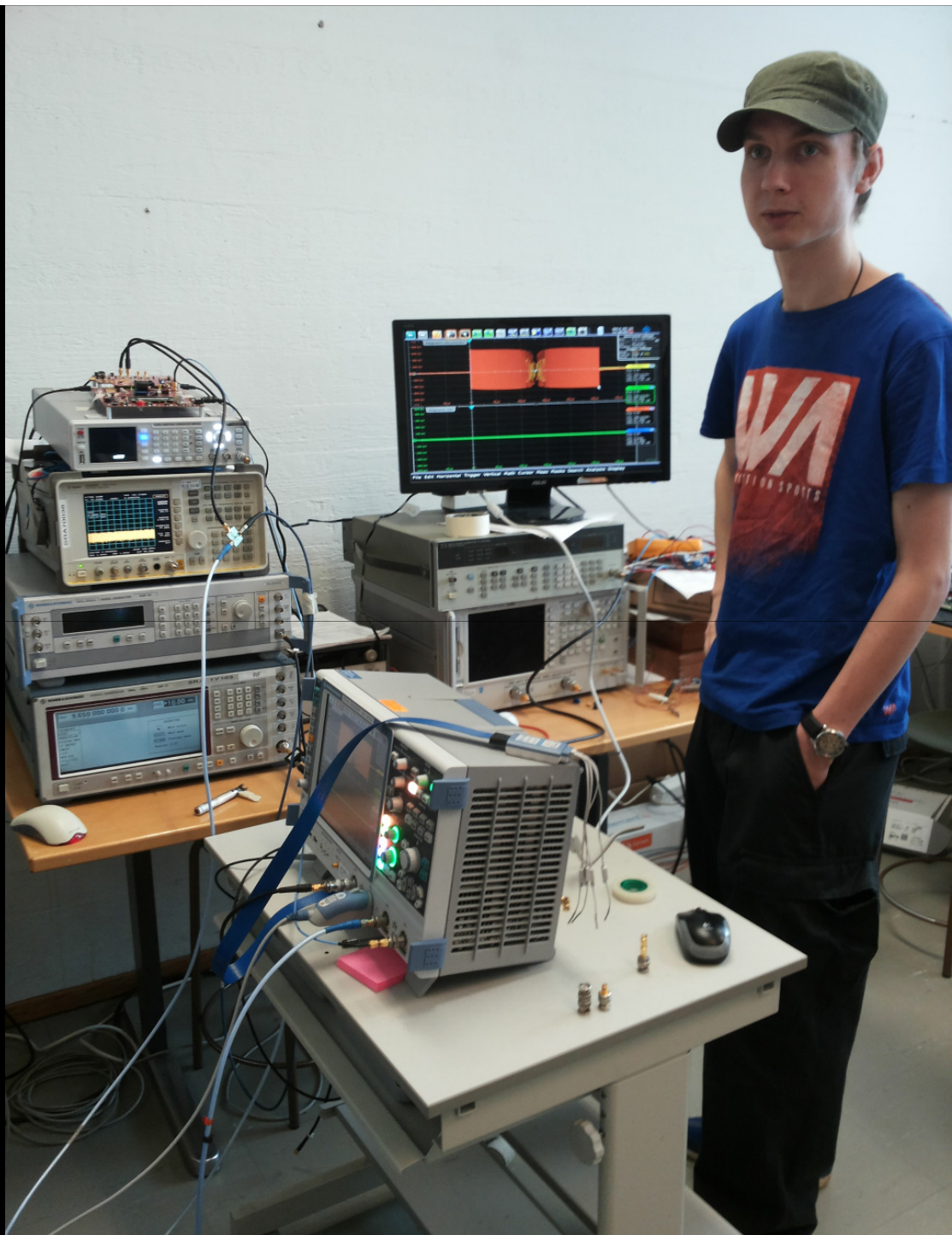
A new Master programme on **Nano and Radio Sciences** starts in autumn **2015**.

- New **Space Sciences and Technology** Major.
- Tight integration with radio- and nanosciences.
- Collaboration with Joint European ERASMUS MUNDUS Space Master programme.
- Collaboration with Nordic Five Tech.

mobile communications  
student satellite  
space weather  
Aalto-1  
photronics  
radio science  
solar panels  
cubesat  
nanotechnology  
antennas  
integrated circuits  
wireless microfabrication  
radio astronomy  
electromagnetic

# Infrastructure

# Upgrading Microwave LAB equipment







Aalto University

# Building Small Sat Test lab

Cleanroom  
Thermal  
Vacuum  
Hardware In Loop





# Short Skyvan aircraft



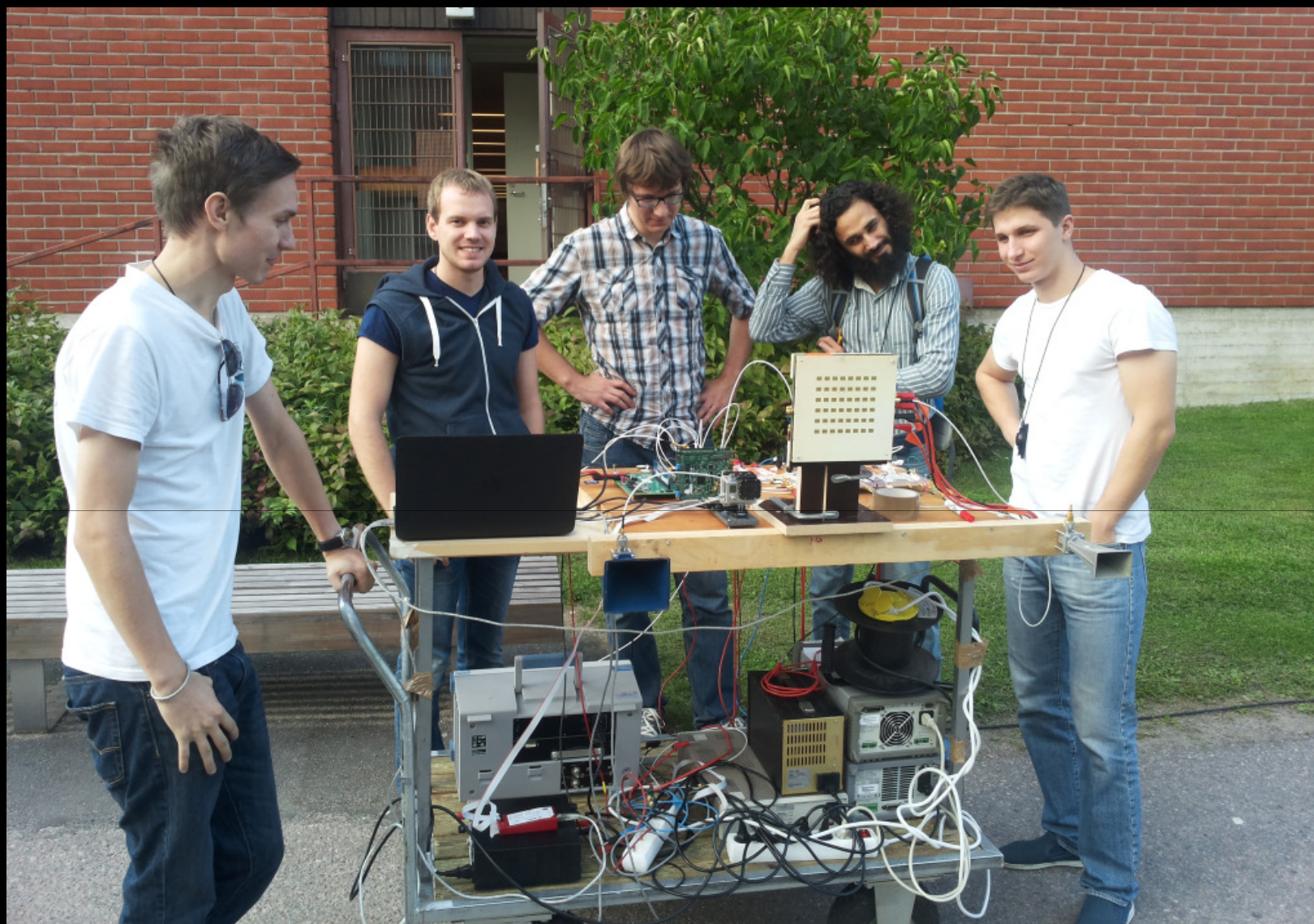
**Open for collaboration in scientific domain!  
Developing new instrumentation.**



Aalto University



# Novel Concepts



# Novel concepts



Airborne  
L-band scatterometer  
C-band scatterometer



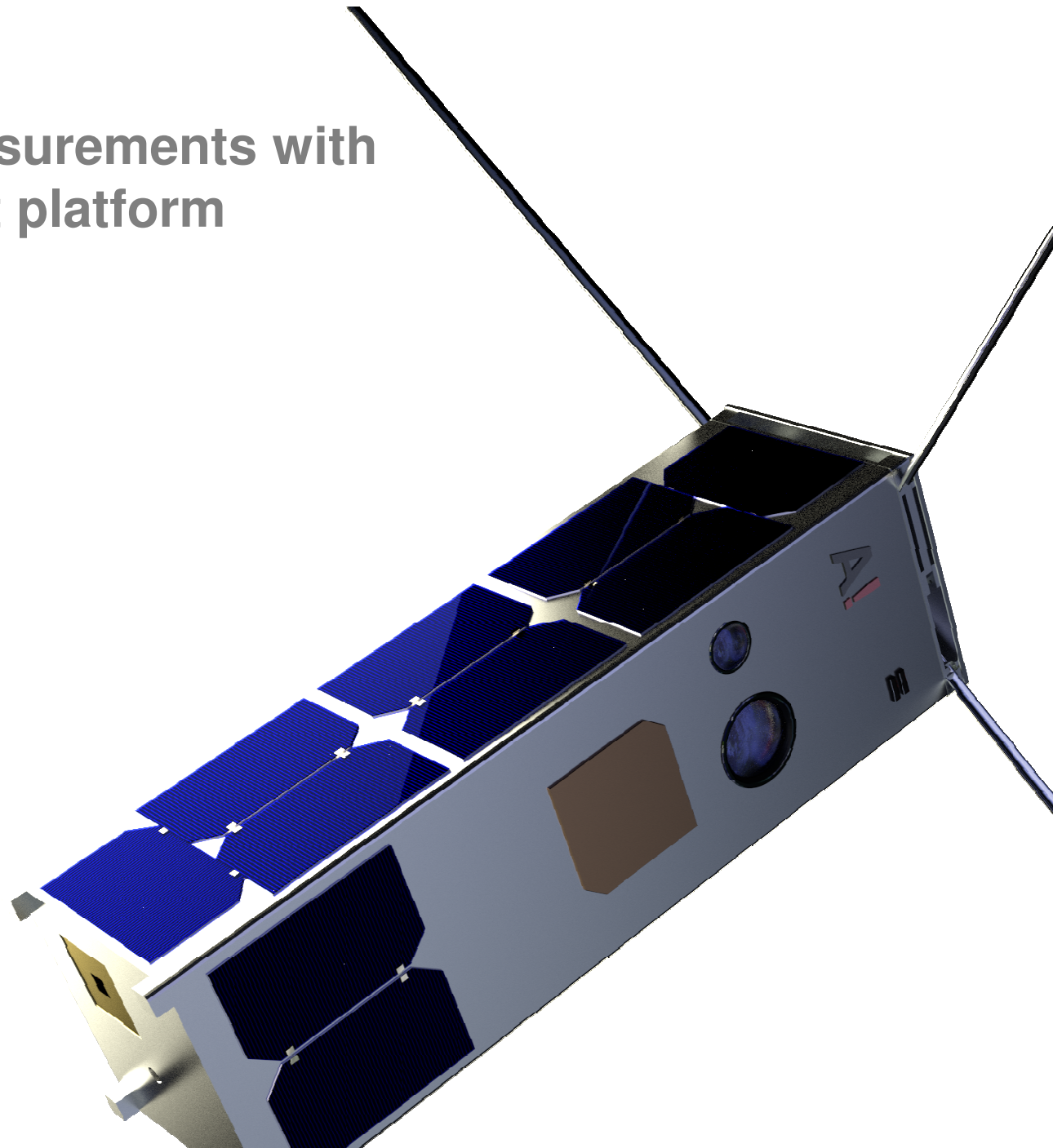
# Novel concepts

New satellite communication and radio astronomy antennas to Metsähovi



# Novel concepts

RFI measurements with  
CubeSat platform



# Co-operation



# Looking for partners

## Assets

- Steady stream of young talented scientists and engineers!
- SkyVan Airborne Lab
- Heritage Instrumentation HUT2D, HUTRAD, HUTSCAT, AISA
- Flexibility for various airborne instrument accommodation
- Modern Microwave Laboratory
- Cleanroom and test facilities
- CubeSat platform

