



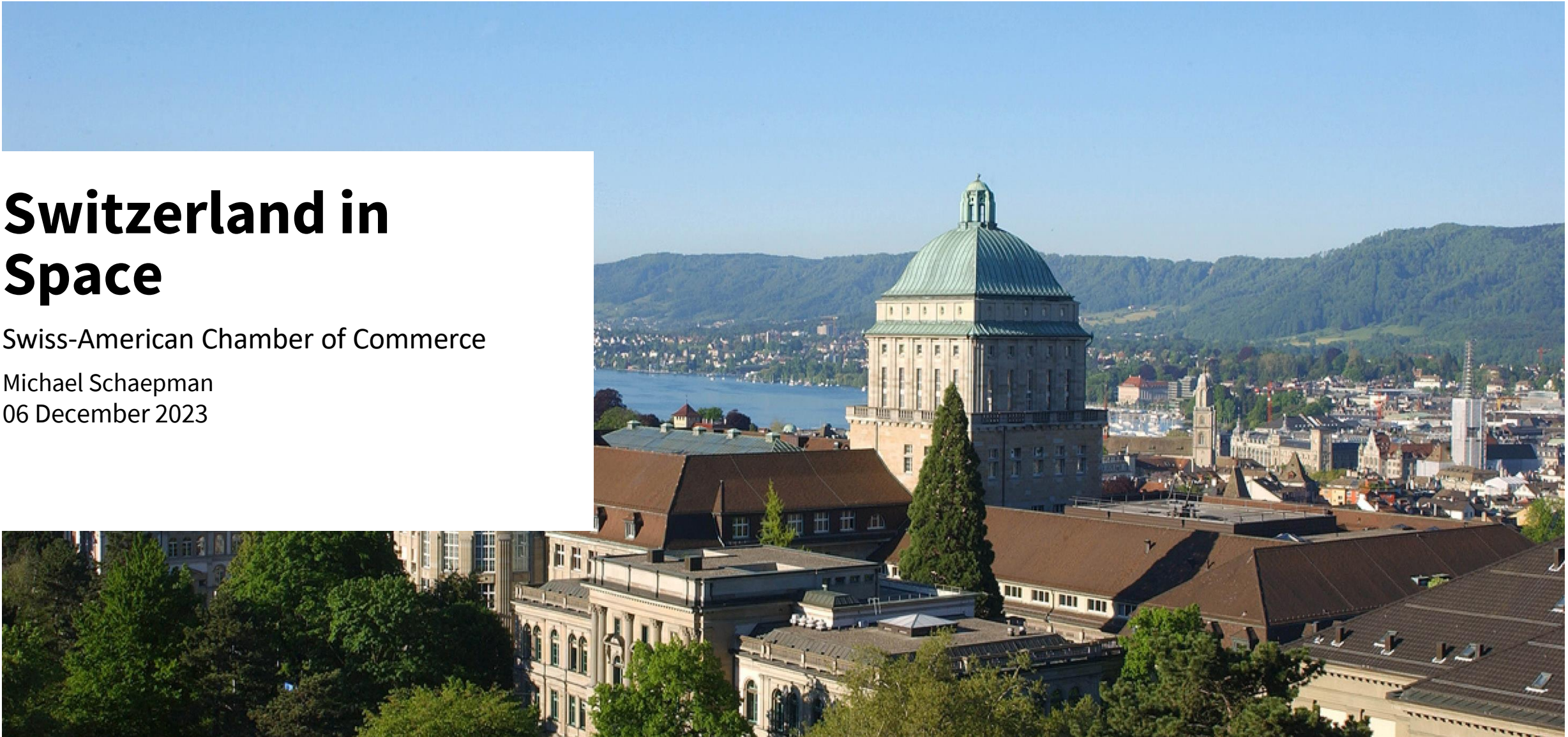
Universität
Zürich ^{UZH}

President

Switzerland in Space

Swiss-American Chamber of Commerce

Michael Schaepman
06 December 2023





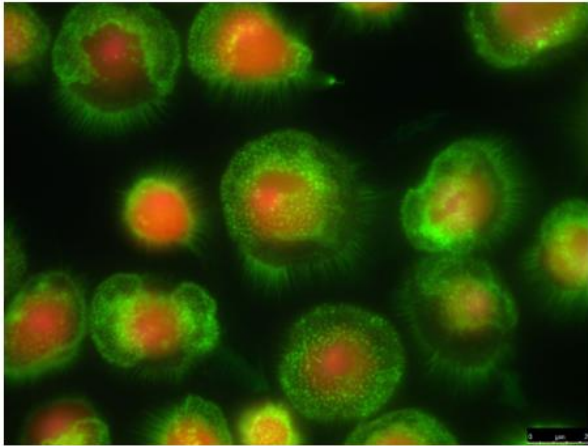
UZH Space Hub

The Innovation Cluster “Space and Aviation”

We promote space-related innovative UZH research, aiming for the creation of value for society & economy

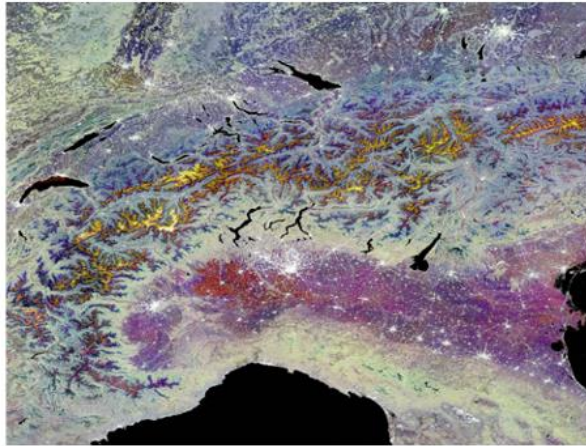
More than 30 research groups from four research areas

Space Life Science



Gravitational Biology
Fluid Physiology
Human Centrifuge
Hypoxia in Space
Spinal Health

Earth Observation



Biodiversity
Biodiversity Observation from Space
High Resolution Drone Observation
Imaging Spectroscopy

Astrophysics



Euclid and the Dark Universe
Juni Mission
LISA-SIGO
Planet Formation

Aviation and Drones



Swiss Parabolic Flights
Noise Reduction of airplanes
Drones
In-situ Instruments for Planetary exploration

Locations

- **Air Base Dübendorf**
 - Air Force Center / Hangar 9
 - Innovation Park Zurich, Hangar 4
 - *Multi-user facility with runway access*
 - *Workshops, offices, biolabs,*
 - *National Center of Biomedical*
 - *Research in Space*
 - *Civil Flight Research Facility*
 - *Scalable use*
- **Space Florida @ Kennedy Space Center**
- **Technopark Liechtenstein**
- **UZH Campus Irchel**



UZH SpaceHub Activities

More Liquid Water on Exoplanets?

Nature Astronomy 6, 819–827 (2022)

University of Zurich, University of Bern,
National Centre of Competence in
Research (NCCR) PlanetS

Liquid water could exist for billions of years
in the primordial atmospheres on planets
that are very different from Earth.

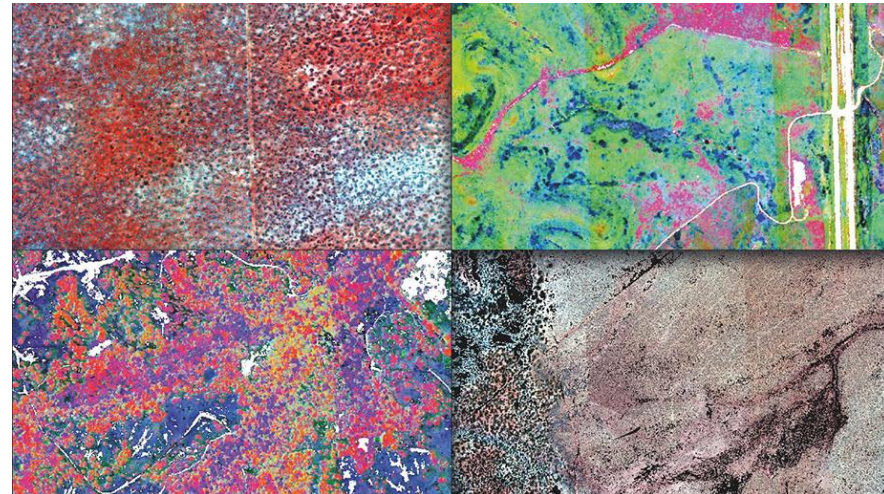


Satellite Monitoring of Biodiversity Within Reach

Nature Communications, 13:2767 (2022)

Plant communities can be reliably monitored
using imaging spectroscopy, which in the
future will be possible via satellite.

Paves the way for near real-time global
biodiversity monitoring.



UZH SpaceHub Activities

New Approaches to Enable Autonomous Flying in Unknown Environments

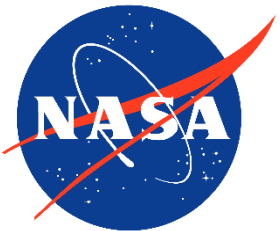
-A new technique to **autonomously** fly drones through unknown complex environments **at high speed using onboard sensing and computation.**

-Useful in an **emergency situation**, on **construction sites** or for **security applications.**



Genomic code of gravity in human cells

Gravitational force-induced 3D chromosomal conformational changes are associated with rapid transcriptional response in human cells. First evidence that the **specific cellular response to different gravity conditions is encoded in the spatial gene position** in the chromatin

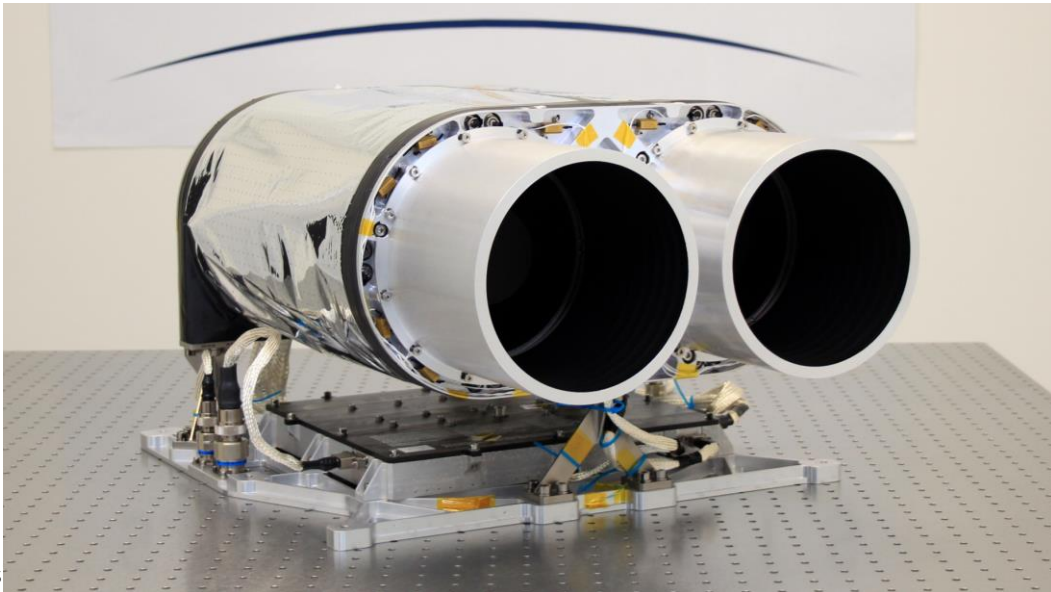


UZH SpaceHub Activities

ESA-Mission ARRAKIHS

Prof. Ben Moore is Swiss coordinator of the ARRAKIHS (Analysis of Resolved Remnants of Accreted galaxies as a Key Instrument for Halo Surveys)

Aim: Exploring the ultra-low surface brightness universe to unveil the nature of dark matter.



ESA-Mission EUCLID

8 UZH teams are working in ESA's Euclid Consortium

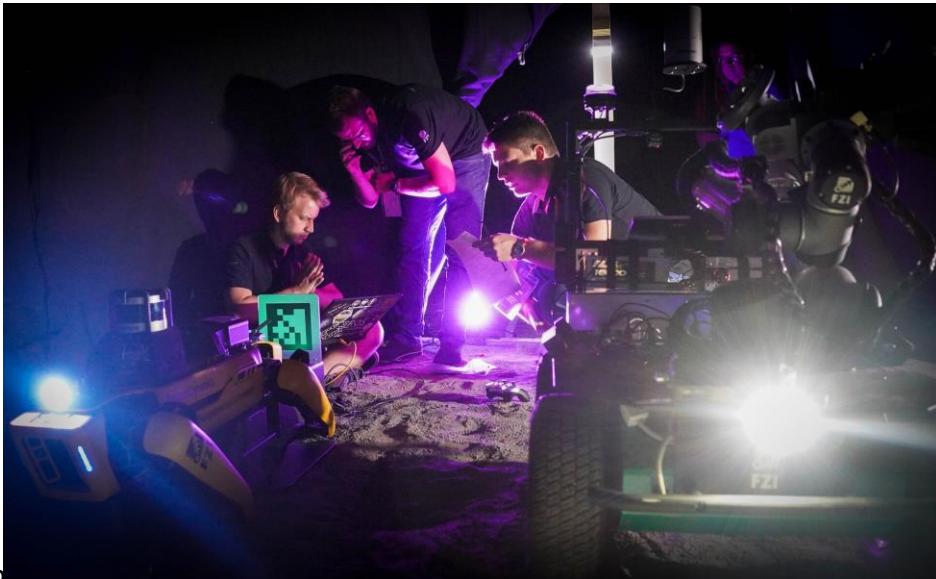
Euclid will record a 3D large-scale structure map of galaxies up to 10 billion light years away from Earth to study the nature of dark matter and dark energy as the laws of gravity.



UZH SpaceHub Activities

Lunar in-situ exploration

ARISE (Autonomous Robots for In-Situ Surface Exploration) team won the ESA-ESRIC Space Resources Challenge. Rovers managed finding the safest passages on simulated Moon surface and analysing the composition of the rocks as a potential resource.



Green Aviation: DYN-CAT / DYN-MARS

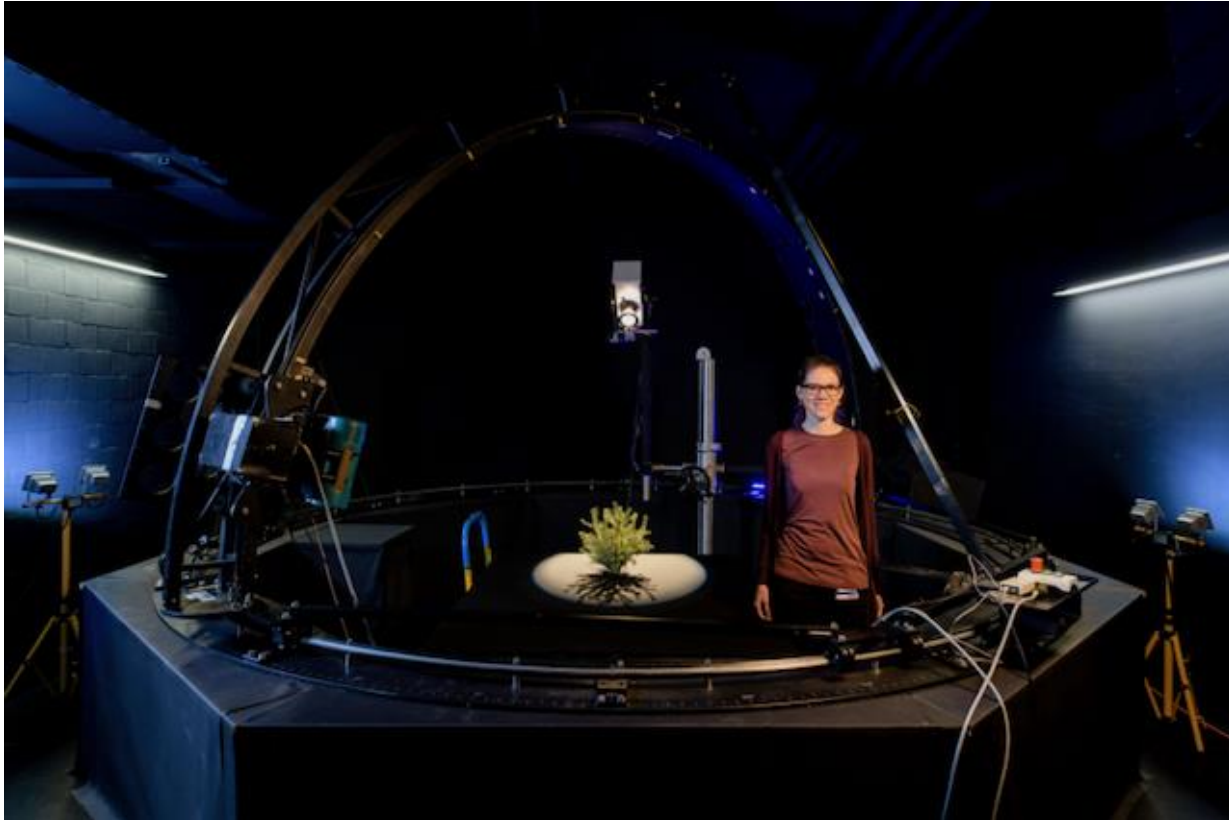
Funded by SESAR / EU Horizon / SERI

Aim: Reduce fuel consumption, noise and CO2 emissions in aircraft landing

Partners: German Aerospace Center (DLR), Swiss International Airlines, Thales AVS France and Empa.



Earth Observation



World-class infrastructure for geometric-optical modelling (left) and plant trait measurements (right).

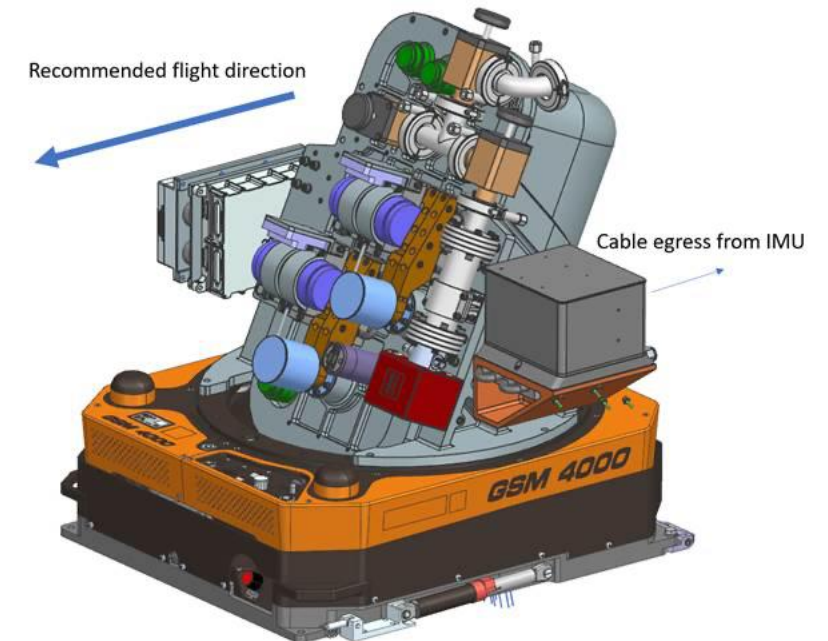
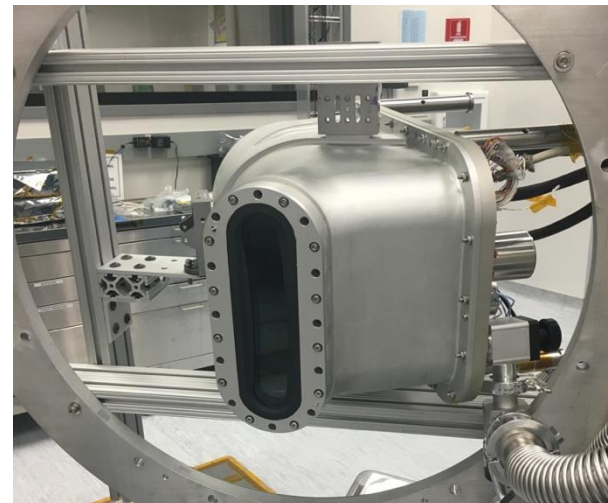
Collaboration with UCSB, UCLA, UCD, NASA JPL/Caltech, USRA, NEON, CU Boulder, etc.

ARES – Airborne Research Platform for the Earth System

- Up to four Earth observation instruments integrated on one airborne platform
- Project partners: Caltech / NASA JPL (Pasadena, USA), ESA ESTEC (Noordwijk, NL)
- Home: Switzerland Innovation Park Zurich (Dübendorf airbase)
- Swiss National Science Foundation Roadmap of Infrastructures of National Relevance ('A' ranking)
- Total cost of infrastructure: 30 Mio. CHF



Jet Propulsion Laboratory
California Institute of Technology



University of
Zurich ^{UZH}

ETH Zürich



eawag
aquatic research



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UNIVERSITÄT FREIBURG

Unil
UNIL | Université de Lausanne



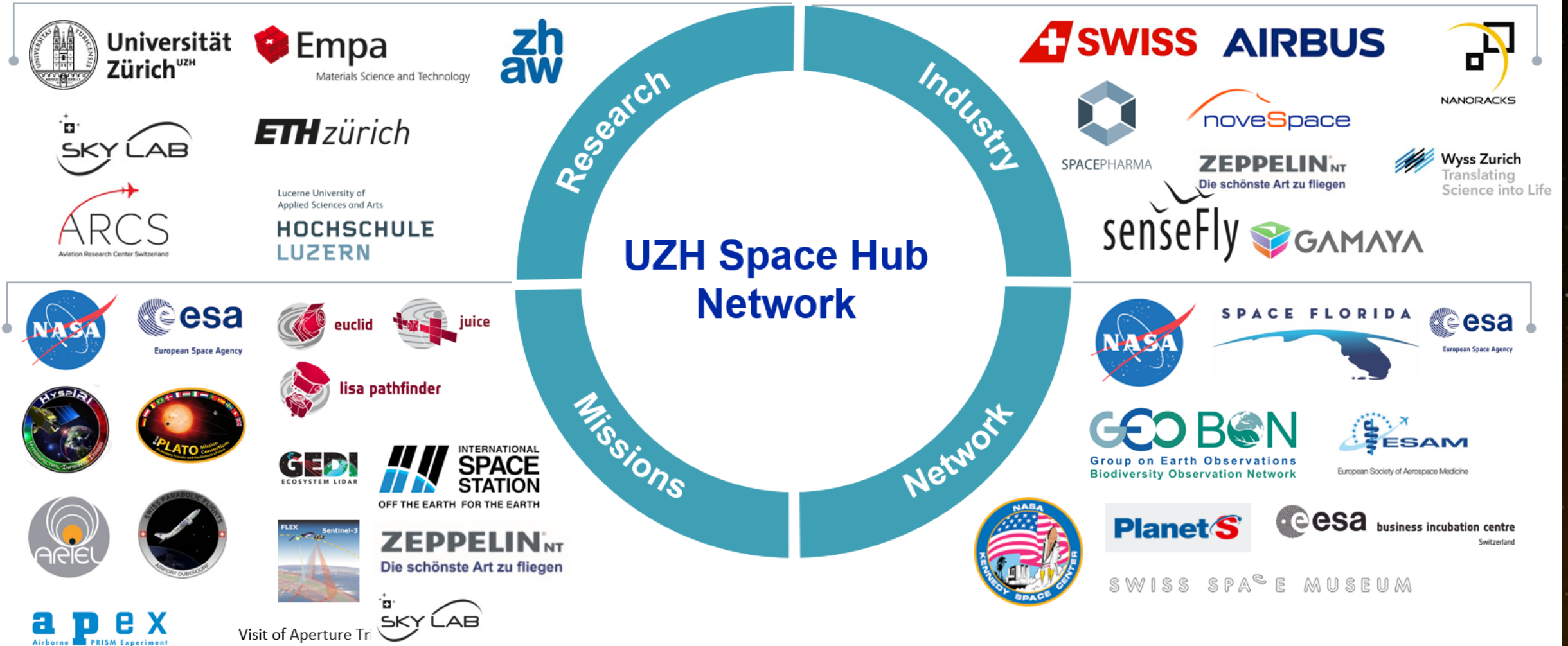


University of Zurich ^{UZH}

UZH Space Hub

The Innovation Cluster "Space and Aviation"

Our Partners: Research – Industry – Networks





Universität
Zürich ^{UZH}

President

**Thank you for your
attention!**

