

ESA Programmes, Prodex

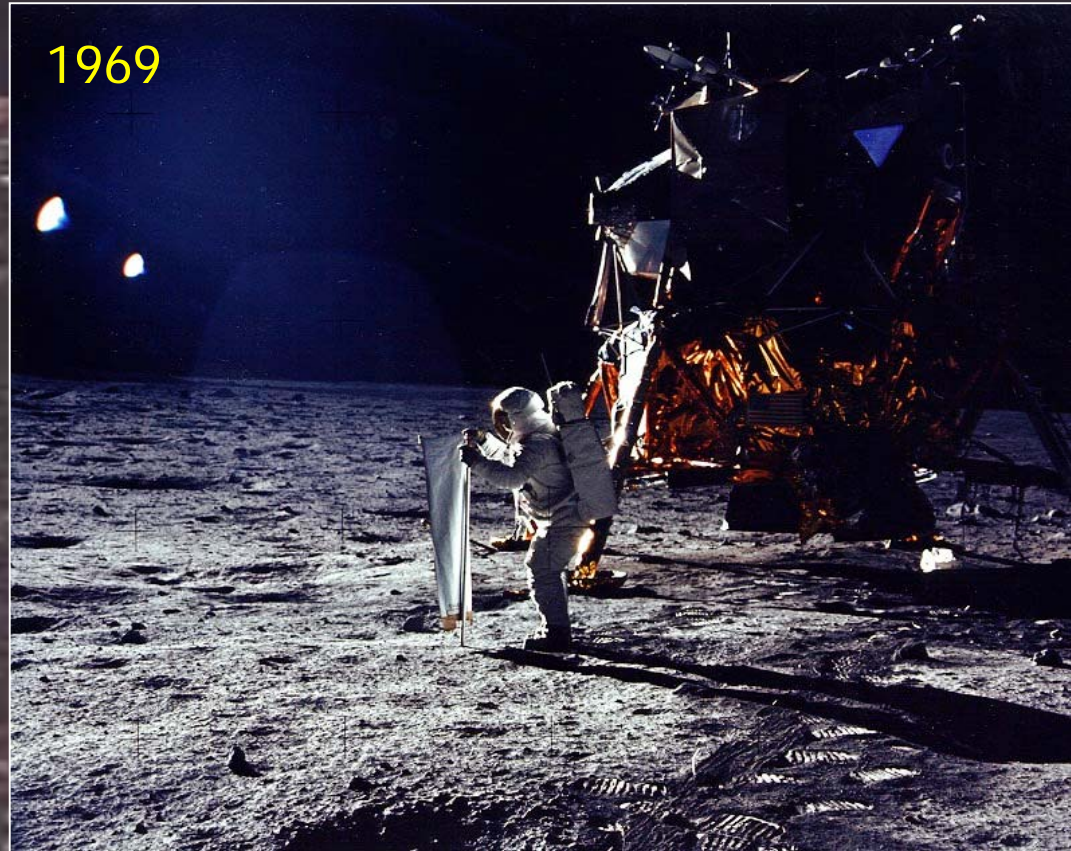
Photonics in Space

12th SSOM Lectures on Optics

Engelberg 5–7 March 2007

Jakob Frauchiger

Scientific Programmes Manager
Swiss Space Office



"That's one small step
for a man, one giant leap
for mankind,"
15 Minutes later and
before the US flag:

*"Aldrin deploys
instrument to collect
particles of "solar wind."*

Prof. J. Geiss, Apollo 11, University of Bern



Space Agencies

- USA



- Russia



- Japan



- Europe



- Canada



- Switzerland





Swiss Space Policy ...

... is approved by Swiss Federal Council;

... and is proposed and implemented
by the Space Division of SER
(*Swiss Space Office - SSO*).



ESA* Membership

- Serves the implementation of Swiss Space Policy
- Contributions to mandatory and optional programmes allows Swiss space users an active participation in a wide range of space projects
 - Universities and Research Institutions
 - Industry
 - Government

* **E**uropean **S**pace **A**gency, founded in 1975, first conference in CH in 1960



CH ESA Contributions

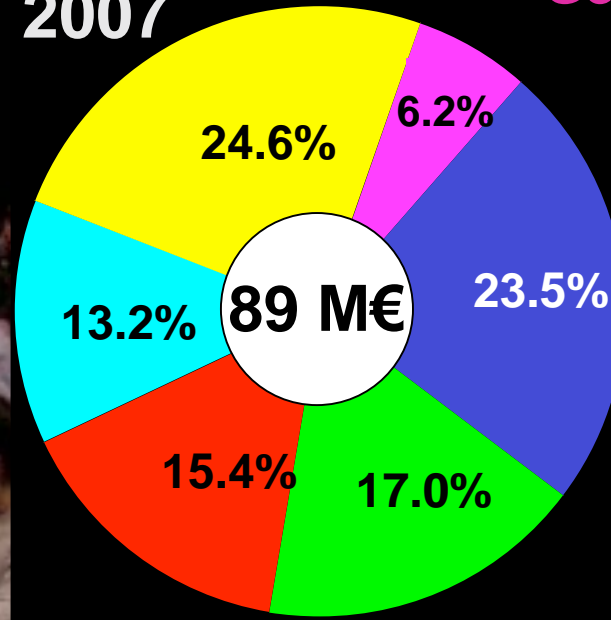


Human Space Flight, ISS

2007

General Budget

Launchers
Kourou site



Scientific Programmes
(ESA 12%)

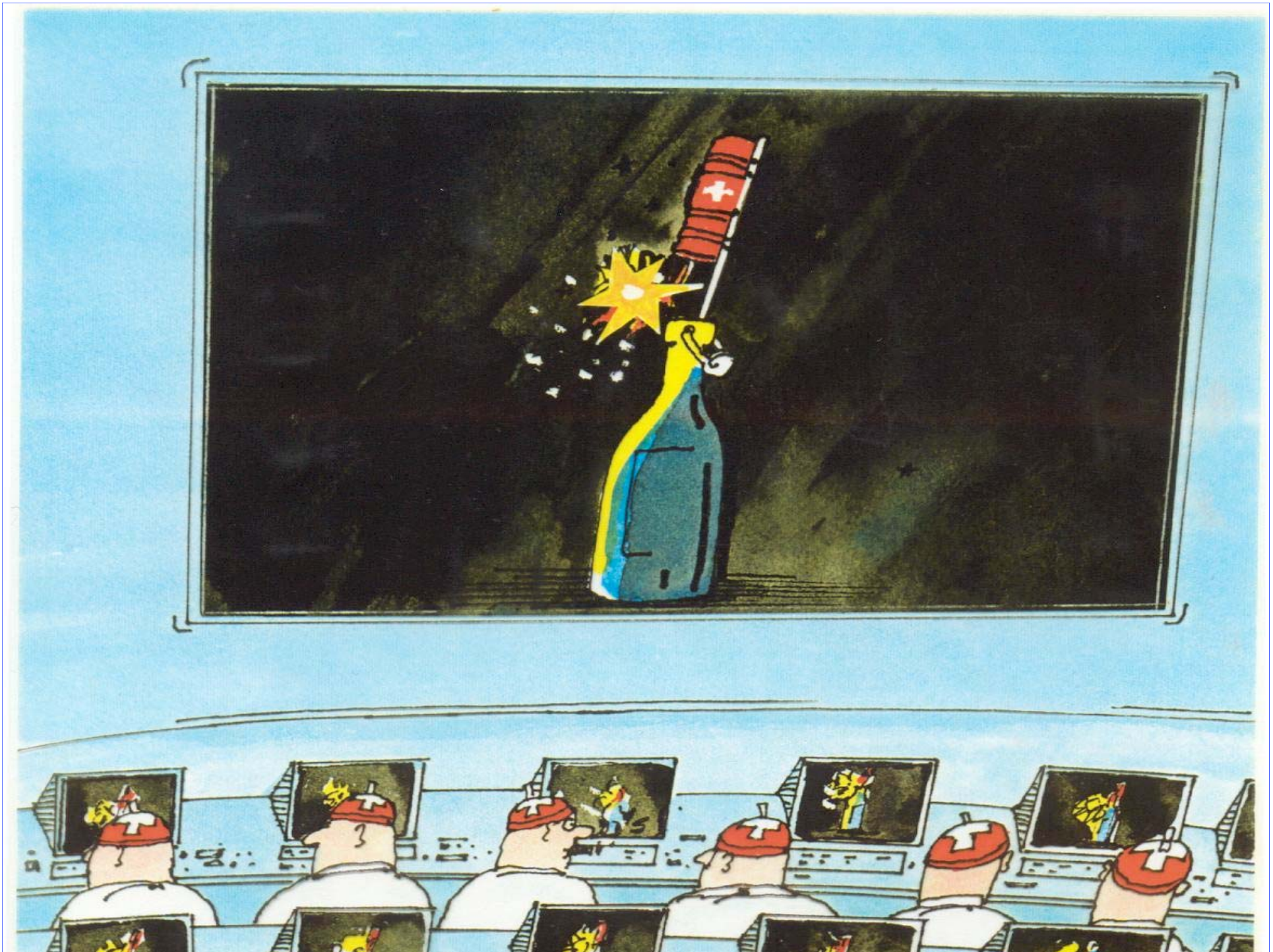
Technology / Telecom / NAV

Earth Observation



... Dimensions of Space ...

- **strategic**
 - > foreign policy
- **relevant for research**
 - > basic- and applied research
- **relevant for education**
 - > new generations of scientists and engineers
- **technology**
 - > key technologies
- **economy**
 - > return of ESA contracts
 - > space applications and technologies







Payload provision

- Payload developments for ESA missions traditionally must be funded nationally
- The optional programme **Prodex*** was introduced in 1986 for member states without a national agency
- Prodex offers funding and managerial support for the development of space research experiments of all disciplines

* *PRO*gramme de *DÉ*veloppement d'*EX*périences scientifiques



Rosetta





The Swiss Instruments on Rosetta

University of Bern

9 Institutes (intl.) and **18** Swiss companies

32 Scientist

14 Engineers

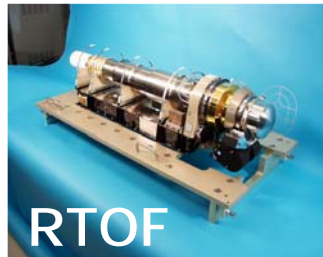
3 Instruments



** Rosetta Orbiter Spectrometer for Ion and Neutral Analysis*



18 Swiss companies were involved in the development of the three Rosina instruments of the University of Bern



Contraves Space AG	Struktur, Ionenoptik, Thermaldesign für DFMS
	Verschlussmechanismus für RTOF und DFMS
APCO Technologies SA	Struktur, Ionenoptik, Thermaldesign für RTOF
montena emc sa	Elektronik für COPS, Herstellung der Data Processing Unit
BVE EMPA	Ionen Optik für DFMS, Ionenquellen
Schutzgastechnik	Laserschweissen
Styner + Bienz FormTech Ltd.	Präzisionsteile für DFMS
Collini-Flühmann AG	Oberflächenbehandlungen
EROWA, Rheinfelden	Funkenerosion von Gittern (COPS)
Mecanex	Ionenquelle DFMS
PhiTec	Abschlussventil DFMS
Prophysik	Flugventil RTOF
Meili Cryotechnik	Vakuum-Durchführungen COPS
Buffat Engineering	COPS, Ingenieurleistungen
Romabau	Isolationsmaterial
helbing Technik	COPS Konzipierung
INTEC (Spin-Off FH Bern)	Thermalanalyse
AIP-Wild	Hochspannungskomponenten
Metalux	COPS Keramik-Leiterplatten

COPS: Comet Pressure Sensor

RTOF: Reflectron Time Of Flight (Mass Spectrometer)

DFMS: Double Focusing Mass Spectrometer



Launch of „Rosetta“ 2 March 2004



00.02



In the last 20 years **55 joint projects** of academia and industry for the development of space research experiments were successfully completed with over 100 MCHF invested



Disciplines funded (today 18 projects ongoing)

- Comets 23 %
- Fundamental physics 19 %
- Astrophysics 17 %
- Biology & μ -Gravitation 13 %
- Planets 12 %
- Solar Physics 9 %
- Earth Observation 6 %





There are more than **30 Space Research Groups** across Switzerland with a significant potential and a variety of skills to actively and successfully participate in space programmes all over the globe.

Observatories

- Davos
- Neuchâtel
- Geneva

Universities

- Basel
- Bern
- Geneva
- Zürich

ETH- Domain

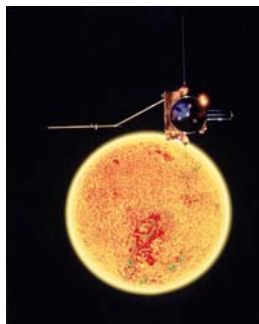
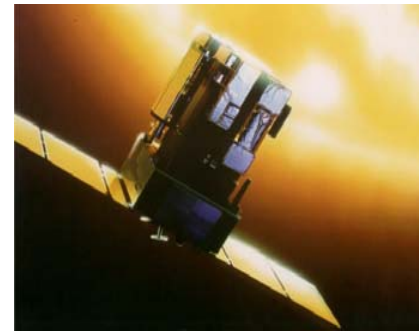
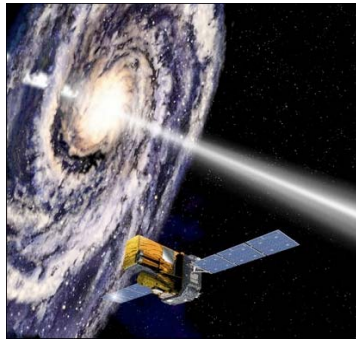
- Zürich
- Lausanne
- PSI, Villigen
- EMPA

Institutions

- International Space Science Institute (ISSI), Bern
- Integral Science Data Centre (ISDC), Versoix
- CSEM
- Museum of natural history of Bern



scientific spacecraft

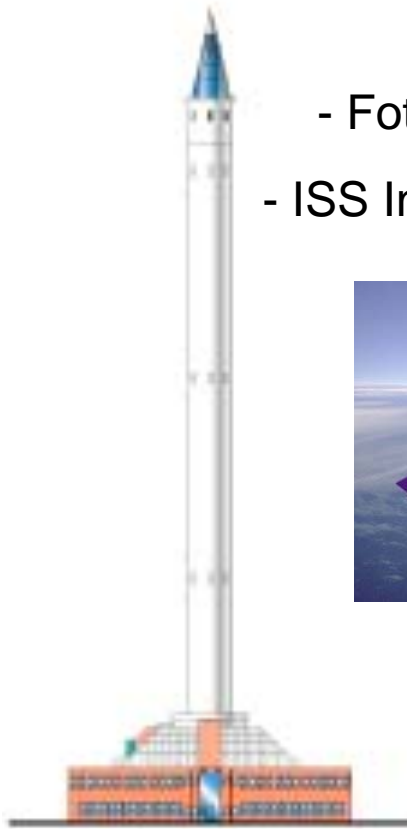




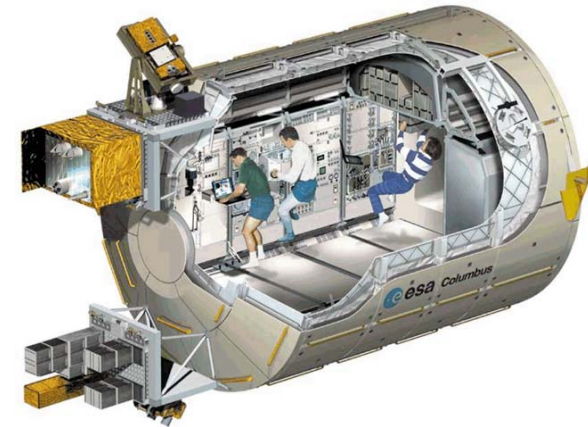
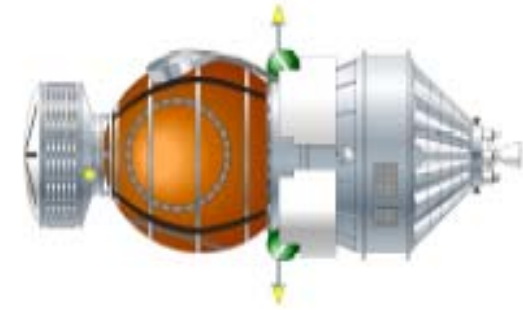
ELIPS*

Research Platforms

- drop tower
- parabolic flights
- sounding rockets
- Foton (free flyer capsules)
- ISS International Space Station



FRONT VIEW



*European **L**ife and **P**hysical **S**ciences Programme



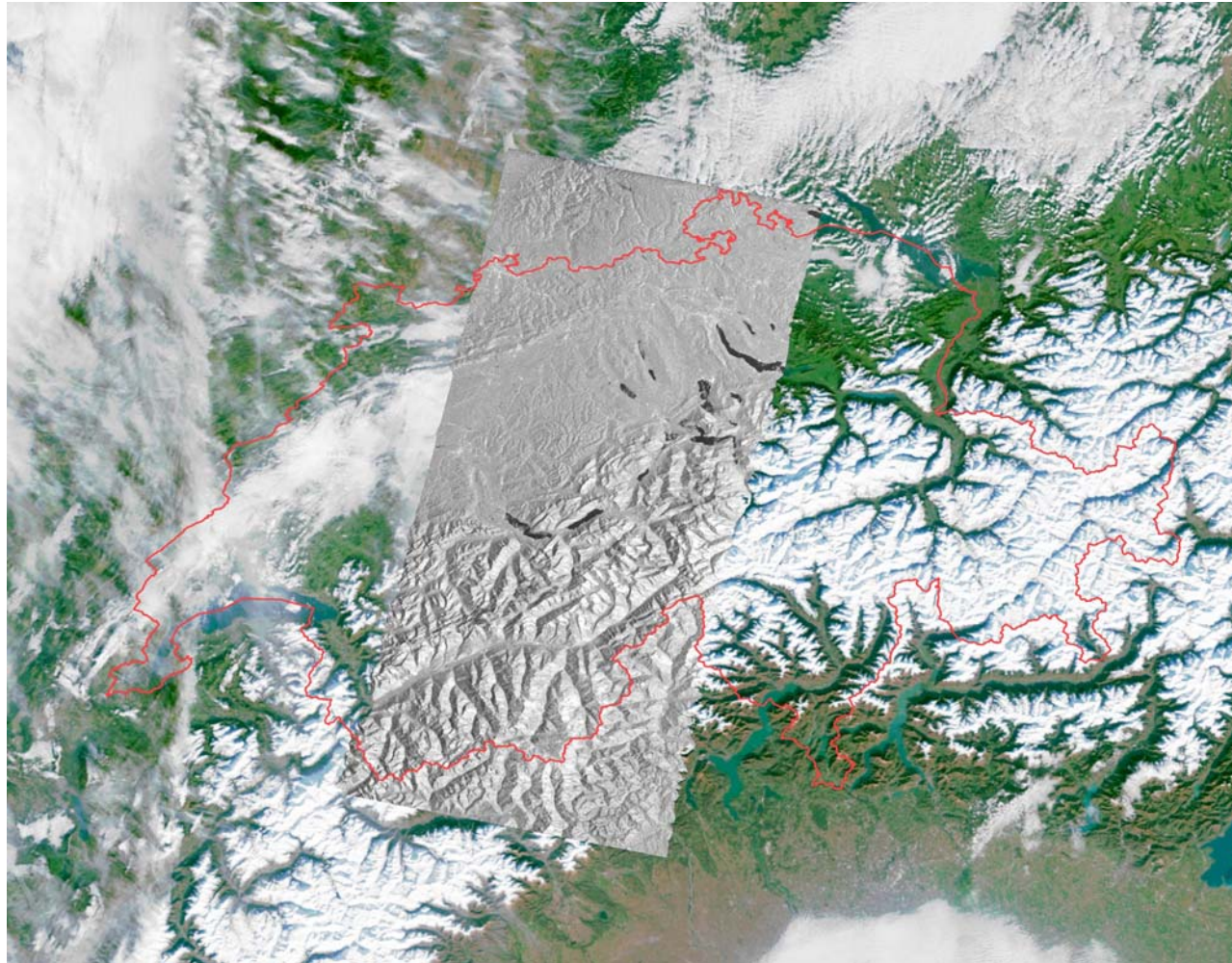
ExoMars



- Launch in 2013
- 3 new key capabilities (EDLS, Mobility, Drill)
- Search for traces of past or present life
CH scientists involved (Microscope, Close up imager, ..)



Earth Observation





PRODEX *Summary*



- is science driven with responsibility at Principle Investigator positions (contracting by ESA Prodex Office)
- experiment proposals are evaluated by ESA peer review
- or ESA programme board approval for programmatic coherence
- Swiss proposals are evaluated by the national PPK advisory committee
- is an optional ESA Programme with a guaranteed return to Switzerland and a >50% industry involvement
- funding is allocated by Swiss Delegation (Swiss Space Office)



ESA Premises





Budget ~ 3'000 M€ /y

mandatory programmes

optional programmes

Science

~ 395 M€/y

- Studies
- Documentation
- Technologies

