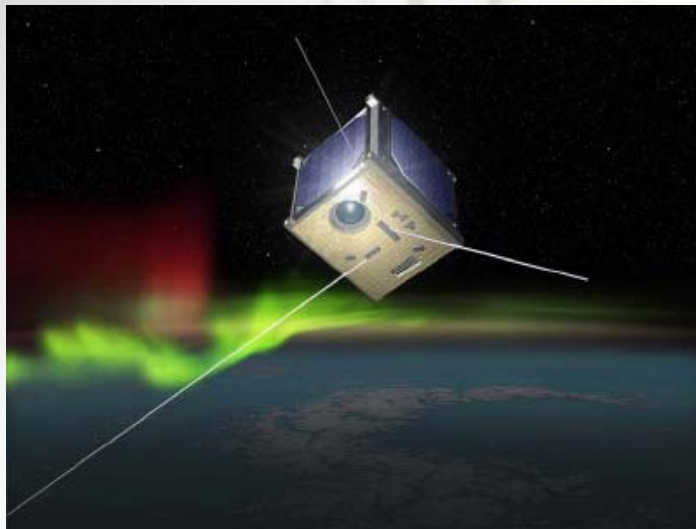


The 2007 CubeSat Developers' Workshop

SwissCube Project



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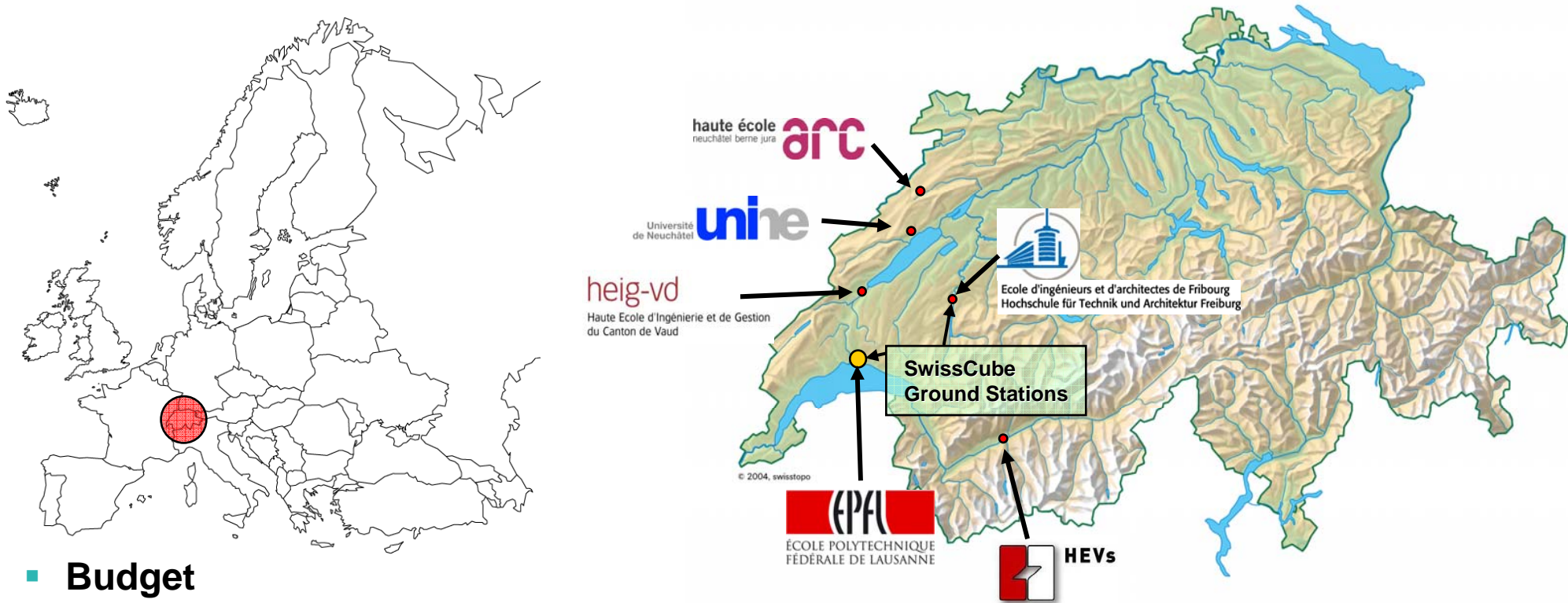
Dr. Maurice Borgeaud
Director, Space Center EPFL

Muriel Noca
Project Manager
Space Center EPFL
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SwissCube Project

- **Goal: to have a Swiss cubesat in orbit by end of 2008**

- Satellite and ground segment defined, designed, built, tested and operated by students.
- Multi-disciplinary, multi-lab, multi-university collaboration
- Strong educational aspect: student/industry ties, ESA/NASA development phases and standards

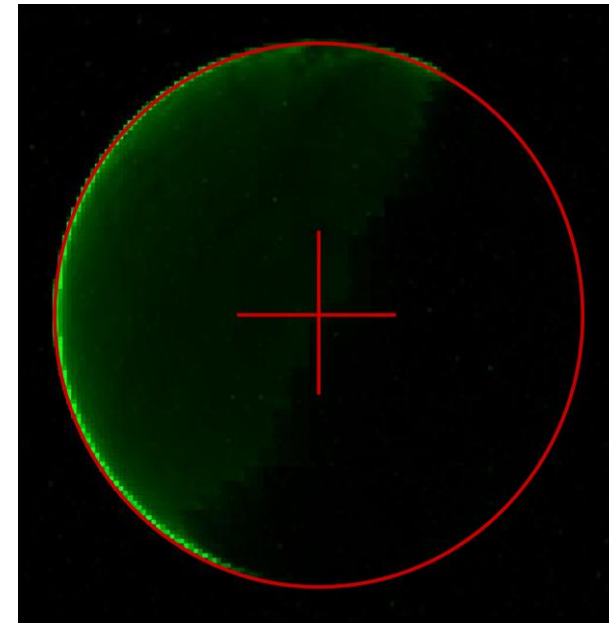
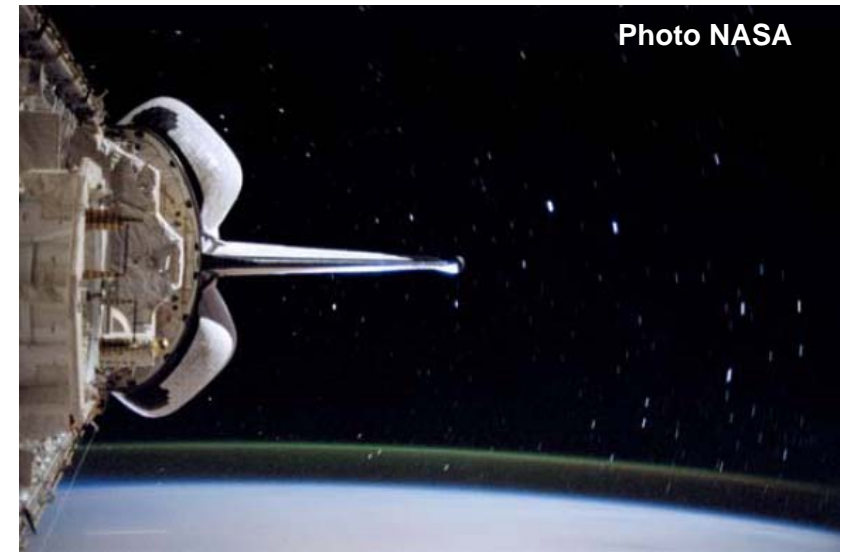


- **Budget**

- ~ 400 kUSD (including launch), over 3 years
- already gathered 2/3 of budget

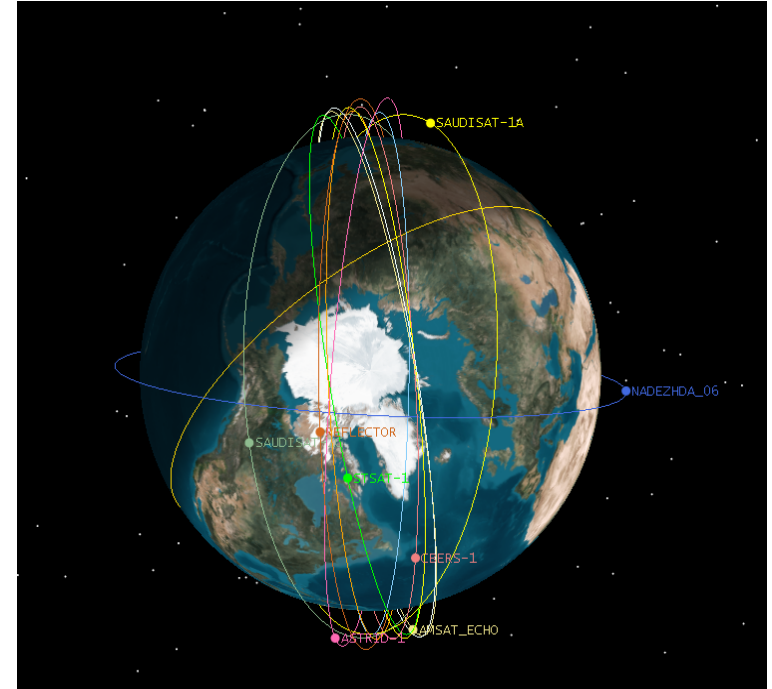
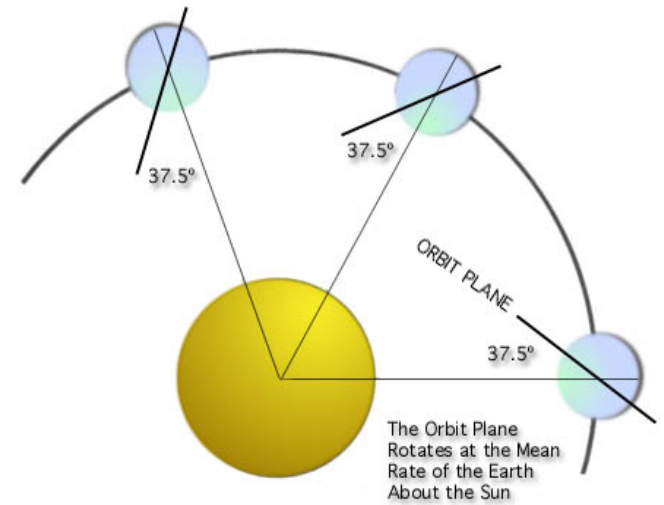
Mission Objectives

- **Objective 1**
 - Deliver a fully tested cubesat to launch site
- **Objective 2**
 - Launch, close RF link and download telemetry
- **Objective 3**
 - Receive Science data and characterize operations
- **Science Objective**
 - Characterize variability of Airglow phenomena in intensity and altitude
 - Fly a new SPAD for use as a technology demonstration for the development of a low-cost Earth sensor

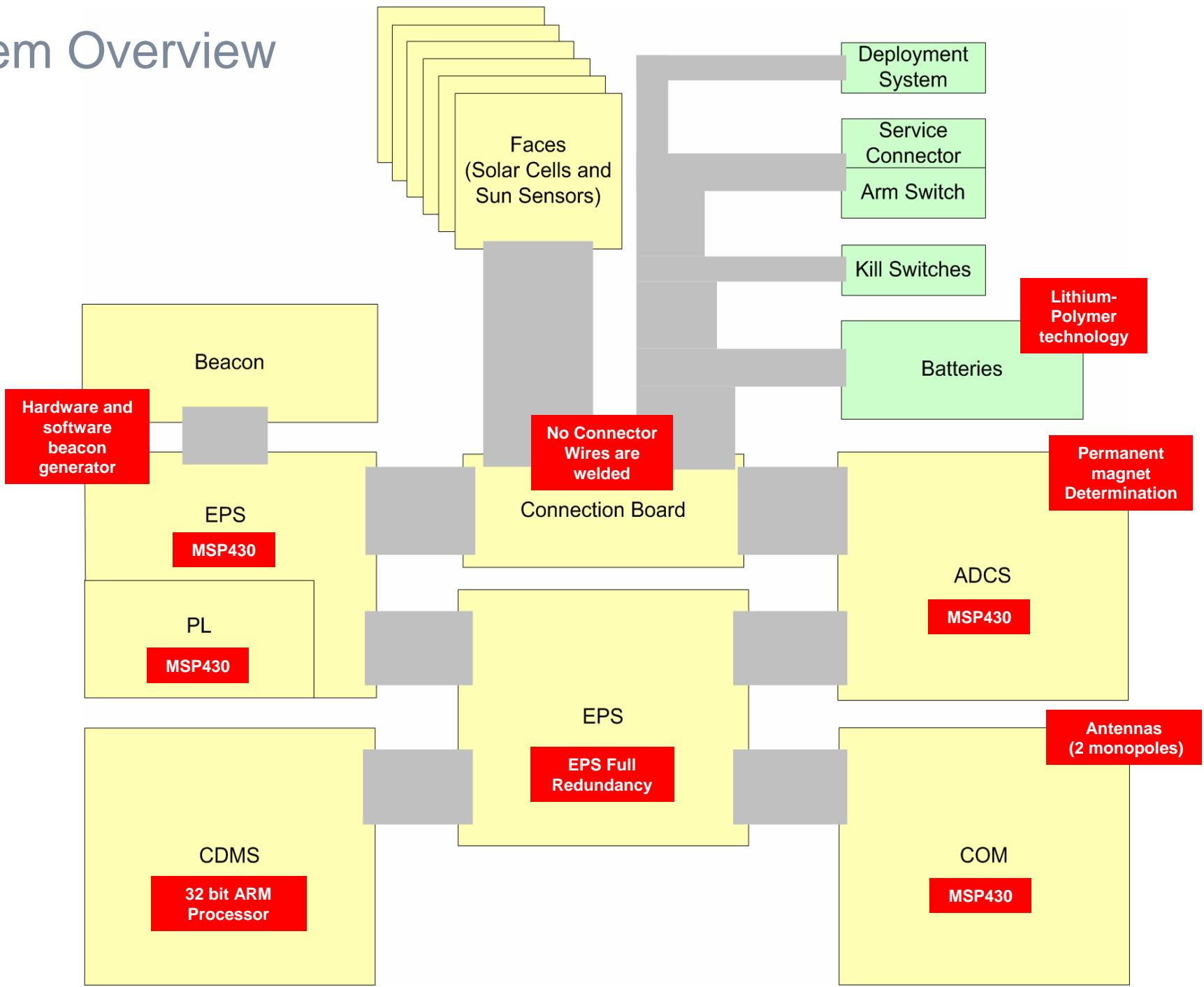


Mission Characteristics

- Launch DNEPR or/and VEGA launch vehicle
- Orbit Sun-synchronous
- Inclination ~ 97 - 99°
- Orbital altitude ~ 400 - 1000 km
- Orbital period ~ 90 - 105 min
- Eclipses ~ 30 % of orbital period
- Avg. power ~ 1.8 W (Power bus voltage: 3.3 V)
- Mean pass duration ~ 10 min
- Data downlink rate ~ 1 kbps

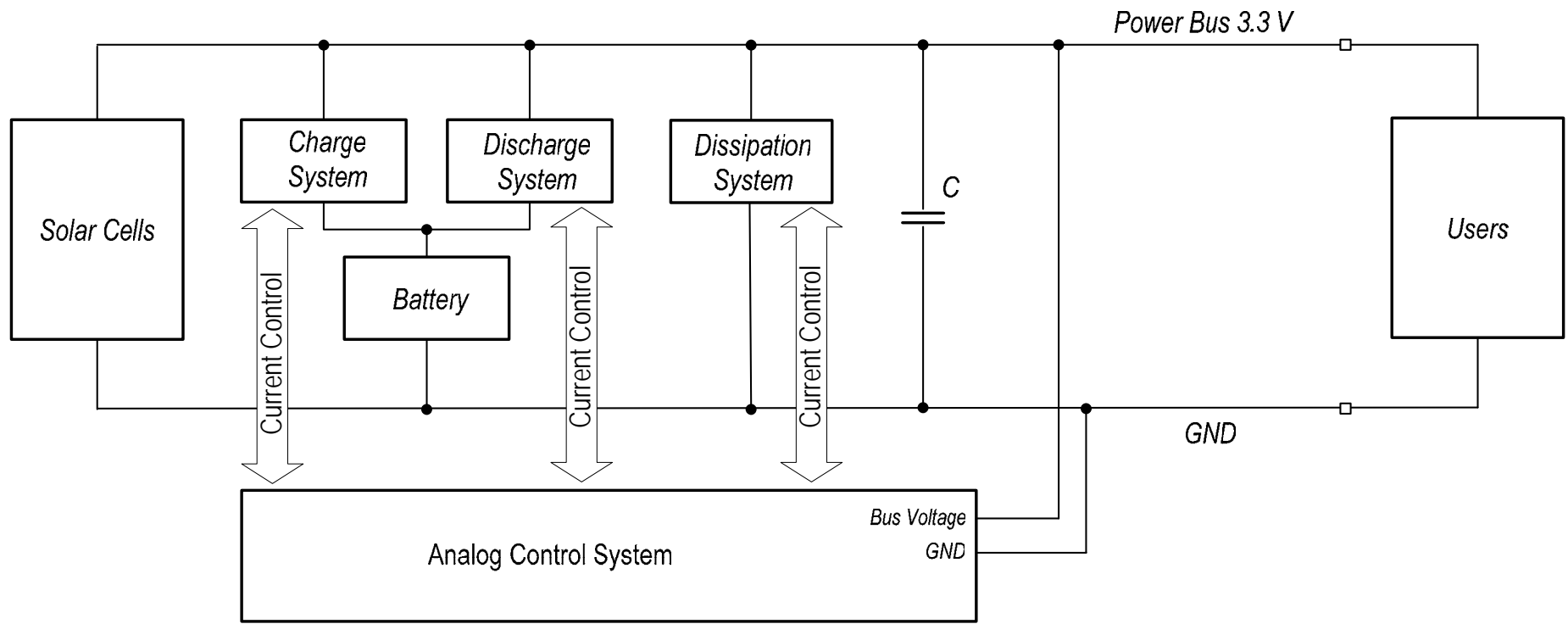


System Overview



System Overview

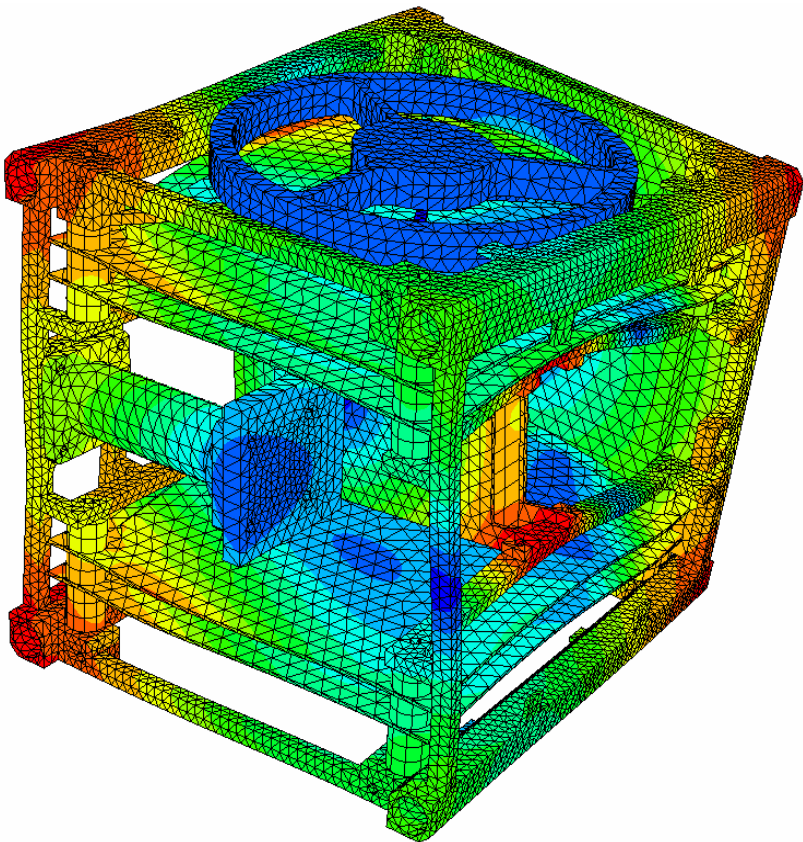
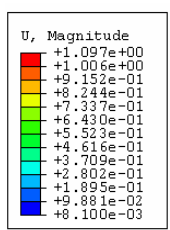
- **Electrical Power System**



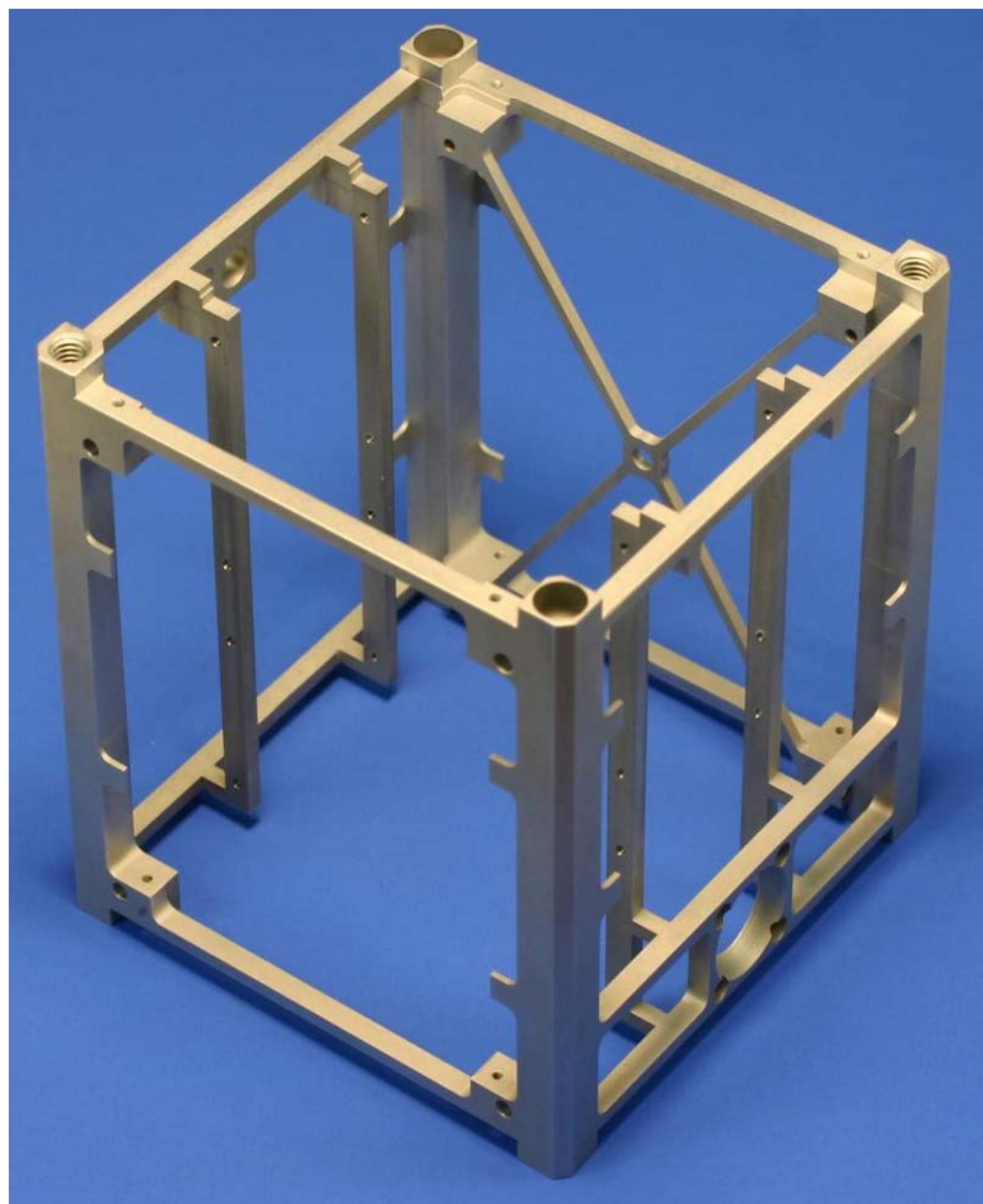
System Overview – Structure & Configuration

■ Structure

- Monobloc concept =>
- Mass: 106 grams
- Machined per CNC and electro-erosion



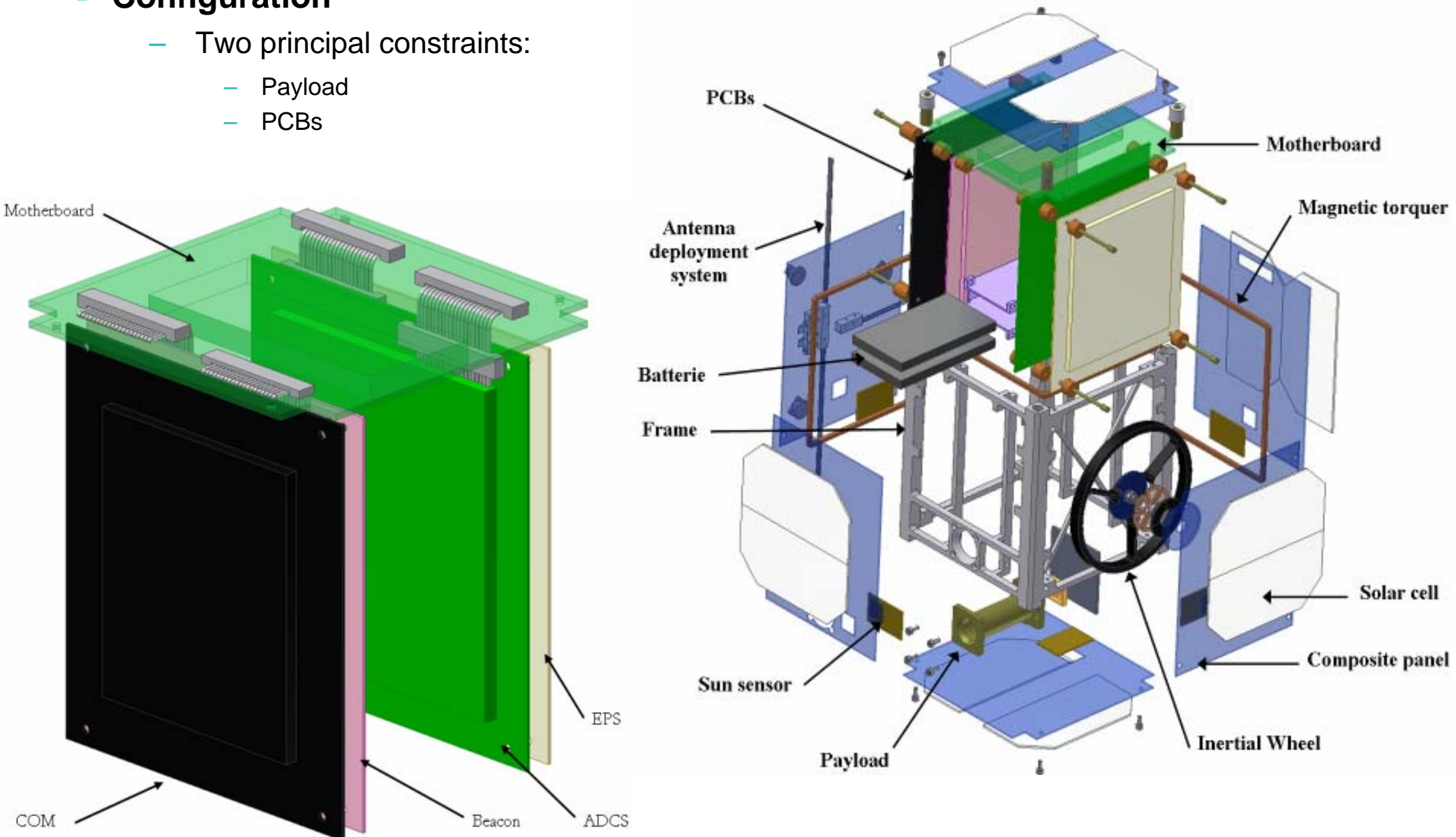
Step: Modall
 Mode 14: Value = 4.88524E+07 Freq = 1112.4 (cycles/time)



System Overview – Structure & Configuration

■ Configuration

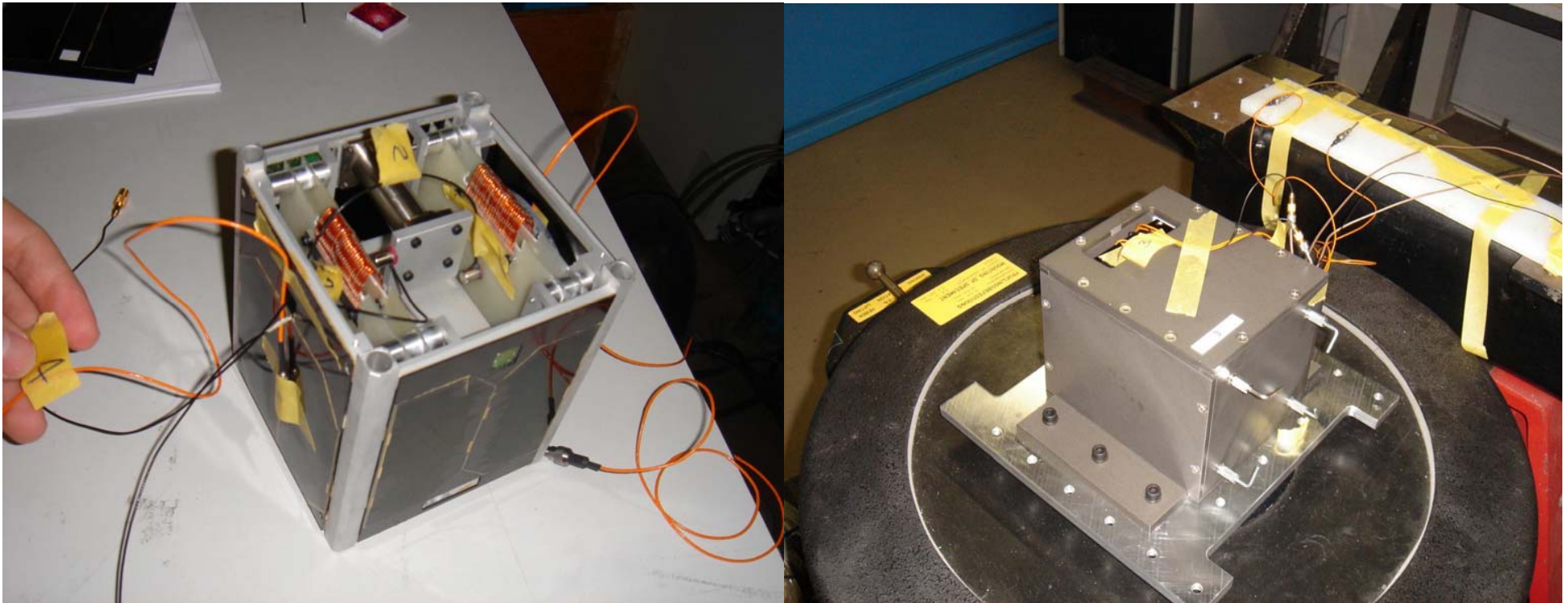
- Two principal constraints:
 - Payload
 - PCBs



Test Plan - Model Philosophy

■ Phase C

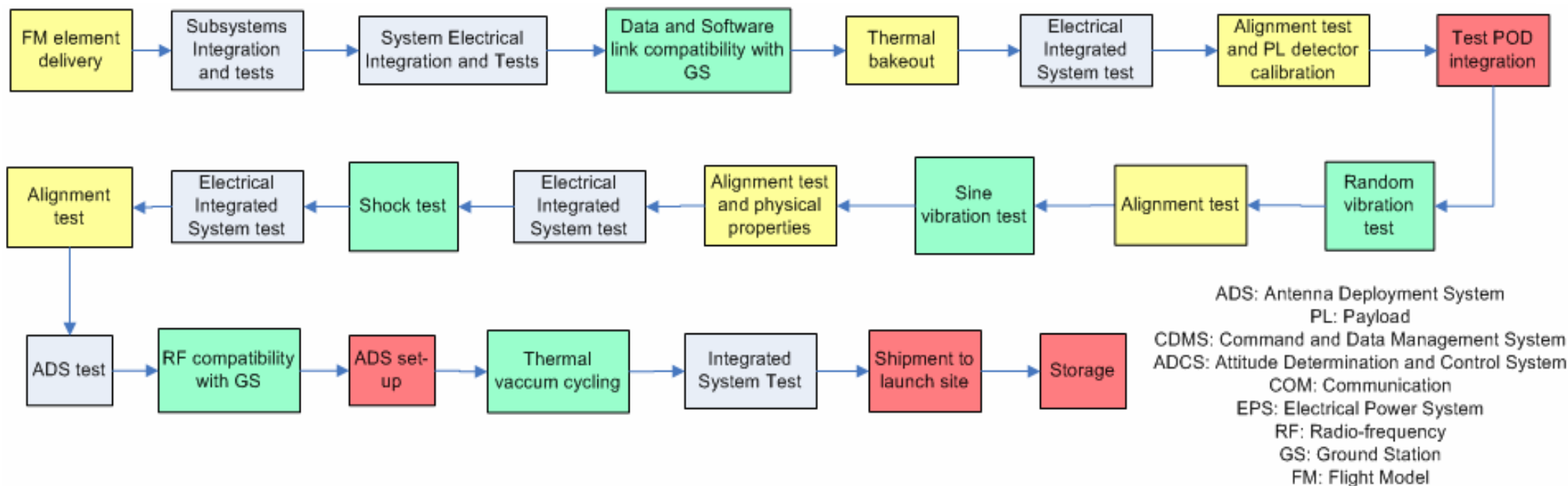
- Structural and Thermal Model (STM)
 - Dummies
- Integration Model (IM)
 - Functionally representative in terms of electrical and software



Test Plan - Model Philosophy

Phase D

- Engineering Qualification Model (EQM)
 - Flight representative, tests at qualification level
- 2 Flight Models (FM)
 - Tests at acceptance level



Conclusion

- **Next important deadlines :** **CDR - Nov 07 / QR – April 08 / AR – August 08**
2 launches - Nov+Dec 08

- **Critical items:**
 - Permanent magnets
 - Control algorithm
 - Composites and adhesive bonding
 - Solar Cells bonding
 - Tests in general (radiation, EMC)

- **All advices, sharing of experience are welcome, and remunerated by Swiss chocolates!**

- **For more details or contact :** **<http://swisscube.epfl.ch>**
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guillaume.roethlisberger@epfl.ch

Celebrating Sputnik 50th Anniversary

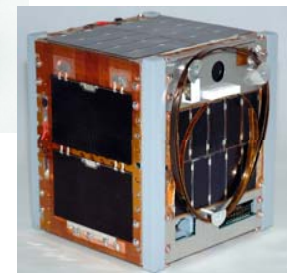
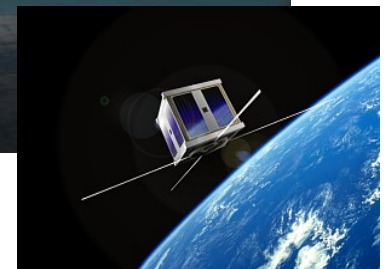
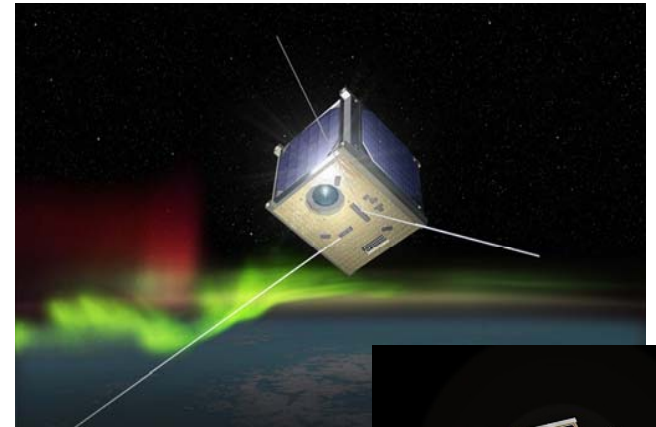
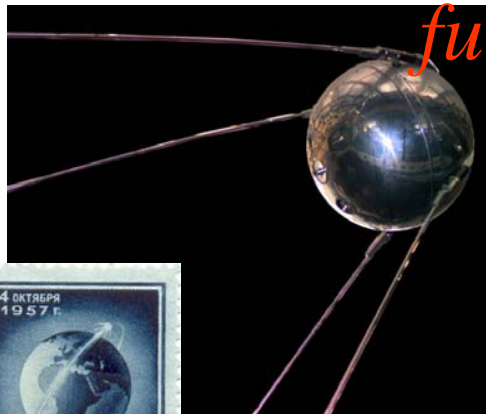
October 4, 2007

Lausanne, Switzerland

3rd EPFL Space Research Day

Early days of the space conquest and visions for the

future



*What was it like to
build a small satellite then?*

What is it like now?

More info : <http://space.epfl.ch> muriel.noca@epfl.ch

Questions?

- Thank you for your attention !!!

