

EURECA – European REtrievable CARrier



- Unmanned research platform with 15 experiments from ESA)
- Orbit at an altitude of 508 km

- Payload: automatic material science cells and small telescopes for solar observation
- EURECA was planned to be sent to space 5 times within 10 years, this planned re-use of EURECA did not take place

01.08.1992

Recapture
Endeavour space shuttle



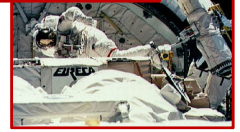
November 2000

Satellite at Empa

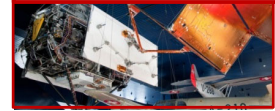


Deployment
Atlantis space shuttle

01.07.1993

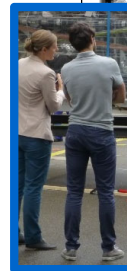
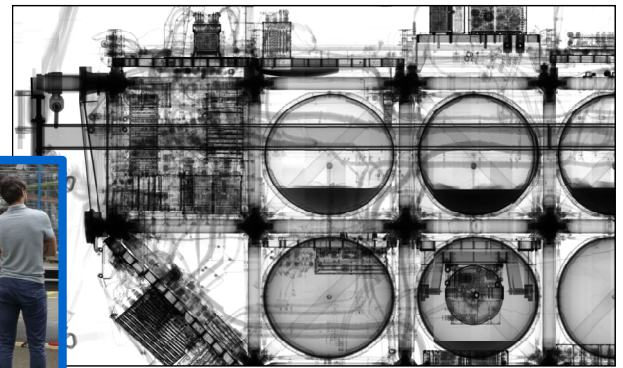
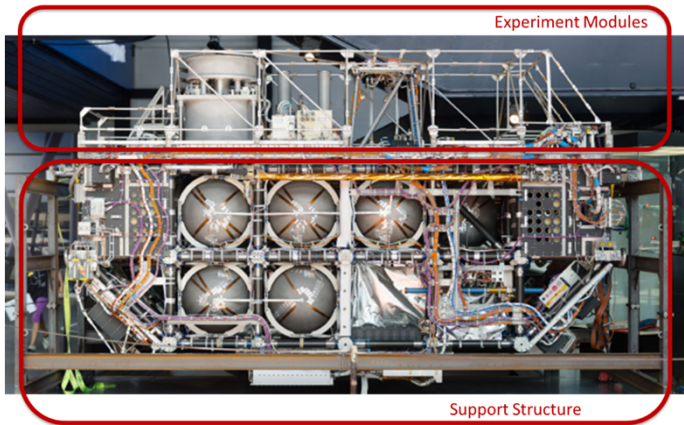


Swiss Museum of Transport



August 2016

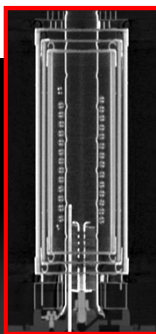
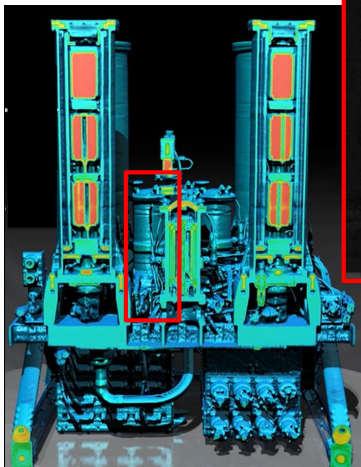
EURECA at Empa - X-ray analysis on multiple scales



YouTube: Eureka X-Ray Scan

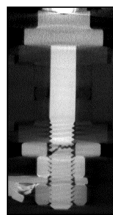
Results

Experiment Module: Furnaces



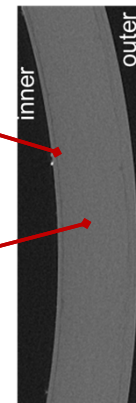
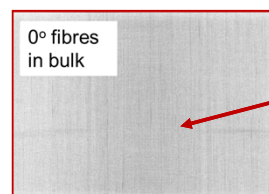
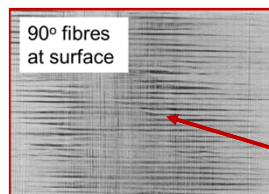
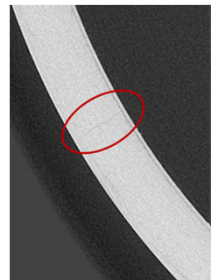
Linac

ICT 450kV
100x100x151µm³



CFRP struts

- Cross-section:
- Outer diameter: 65mm
- Thickness: 3mm



⊥ cracks



Crack formation by:

- Extreme temperature gradients in space
- Extreme temperature gradients inside & outside the furnace (T_{max}=1400°C)
- Differences in thermal expansions inside the female screw & above
- Stress formation in material (Ti/Al) → stress relaxation, grain size changes, ...