SolACES – SOLar Auto-Calibrating EUV / UV Spectrophotometers on the International Space Station

Fraunhofer Institute for Physical Measurement Techniques (IPM), Freiburg (Germany)
(PI: G. Schmidtke)

Cols: Kiepenheuer Institute for Solar Physics, Freiburg (Germany)
Institute for Meteorology, University of Leipzig (Germany)
Astrophysical Institute Potsdam, AIP (Germany)
DLR / DFD, Neustrelitz (Germany)
Space Environment Technologies, Los Angeles, CA (USA)
Laboratory for Atmospheric and Space Physics (LASP), Boulder, CO (USA)
Space Science Center (SSC) of the University of Southern California, Los Angeles, CA (USA)
Service d'aeronomie, Verrières-le-Buisson (France)
Phys.-Meteorologisches Obs. Davos / World Radiation Center (PMOD / WRC), Davos (Switzerland)

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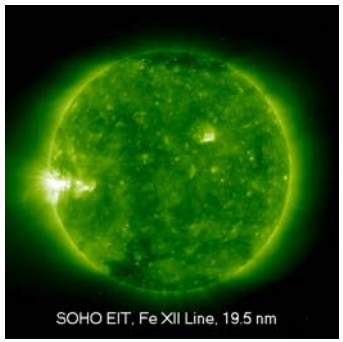
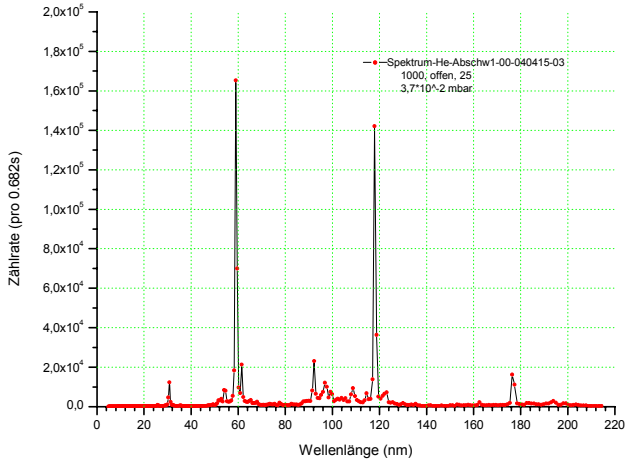
SolACES: Scientific Objectives & Applications

Primary Goal:

(Quasi) continuous spectral monitoring (15 spectra per day) of the extreme UV (EUV) & UV radiation of the Sun in the wavelength range 17…220 nm with a high absolute radiometric accuracy (better than 10%)



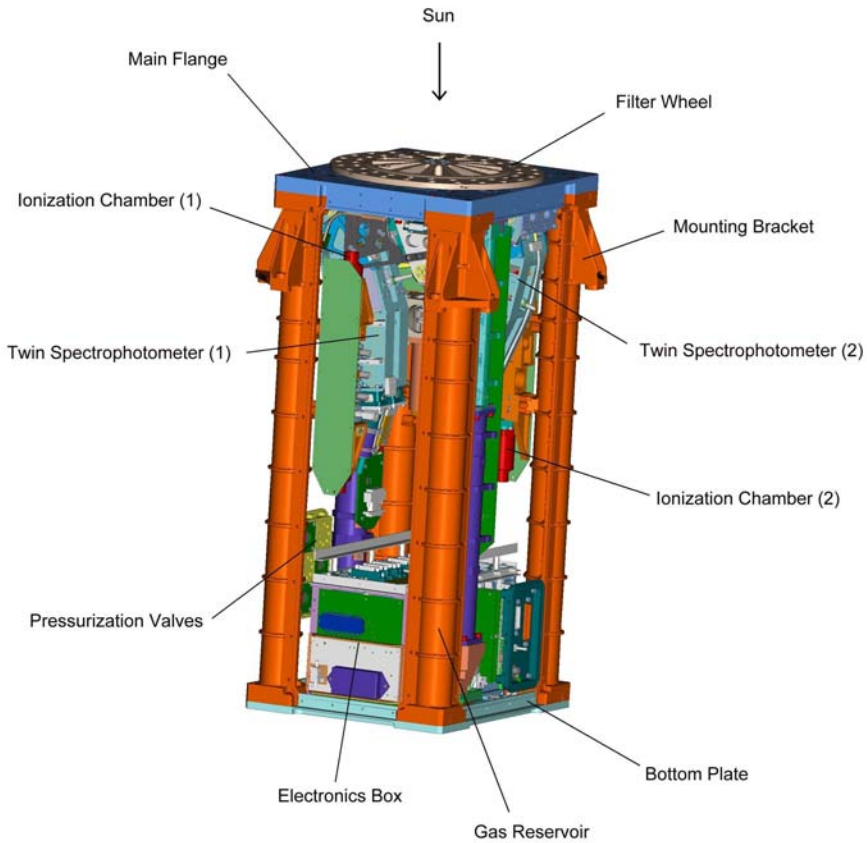


Deduced Goals & Applications:

- Determination & modelling of the solar EUV / UV spectral irradiance
- Modelling of the terrestrial thermosphere & ionosphere (EUV / UV indices)
- Semi-empirical modelling of active regions on the Sun
- Investigation of solar-terrestrial relations & solar-stellar connections
- Aspects of space weather (impacts on satellite communication & navigation)
- EUV / UV space instrumentation & its calibration

SolACES: Instrument & Measurement Principle

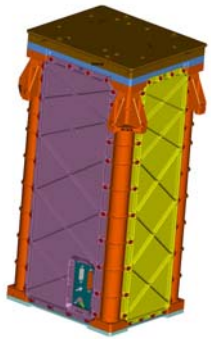
- **Standard Spectroscopic Measurement**
  - ⇨ two twin spectrophotometers with channel electron multipliers
- **Auto-Calibration Procedure**
  - ⇨ absolute EUV / UV fluxes by ionization chamber measurements with filters
  - ⇨ determination of instantaneous filter transmissions by spectrophotometric measurement with & without filters



SolACES instrument with subunits (size: 25 x 29 x 60 cm^3)

SolACES: Mission & Instrument Characteristics

SolACES Flight Model

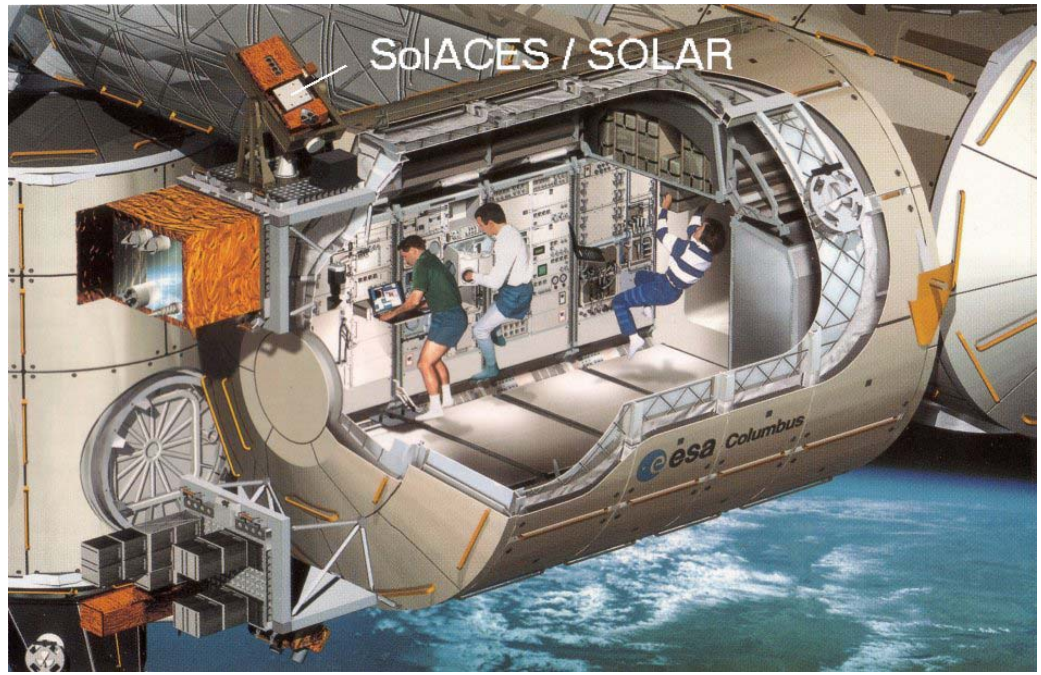


Mission Characteristics:

- Start of operation / launch: August 2006 (?)
- Launcher: Space Shuttle (NASA)
- Nominal / potential mission duration: 18 / 36 months
- Orbit characteristics: ISS orbit (altitude ~400 km)
- Observation schedule: max. 20 minutes per orbit

Instrument Characteristics:

- Mass: 23.0 kg
- Size: 25 x 29 x 60 cm3
- Electrical power consumption:
  typ.< 25 W / max. 60 W
- Data rate: ~1.0 kbit/s
- Spectral range:
  17…220 nm (EUV/UV)
- Spectral resolution: 0.5…2 nm
- Radiometric accuracy:
  < 10% (goal: < 1…3%)



SolACES / SOLAR on Columbus

SolACES: Further & Detailed Information

DLR – German Aerospace Center
Space Management / Space Science
Dr. H.-G. Grothues
Königswinterer Straße 522 – 524
D-53227 Bonn, Germany

E-mail: hg.grothues@dlr.de

Fraunhofer Institute for Physical Measurement Techniques
R. Brunner
Heidenhofstraße 8
D-79110 Freiburg, Germany

E-mail: raimund.brunner@ipm.fhg.de