Satellite of the day: GRAS

brought to you by Lukas Kluft

Optik, Strahlung, Fernerkundung

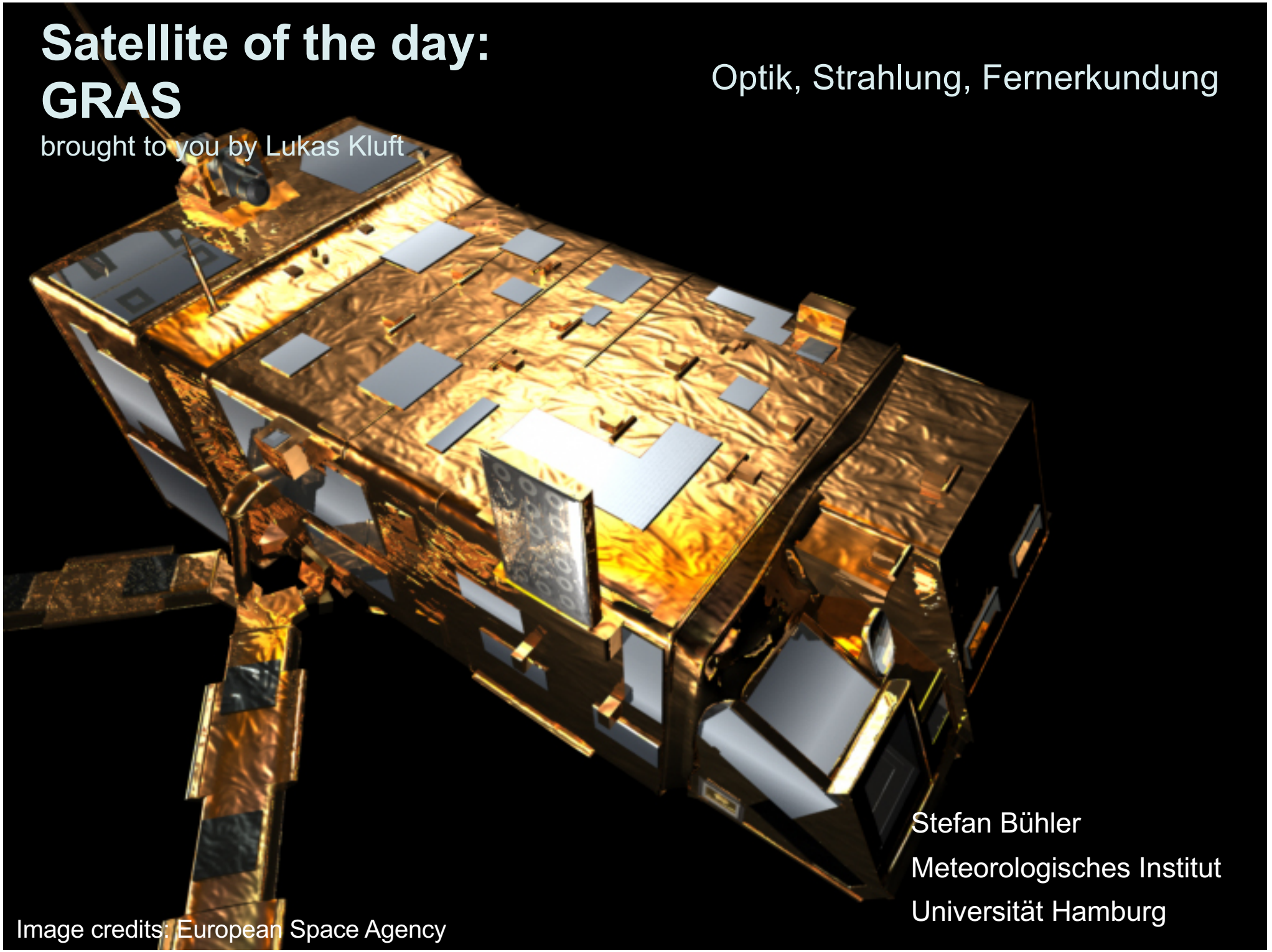

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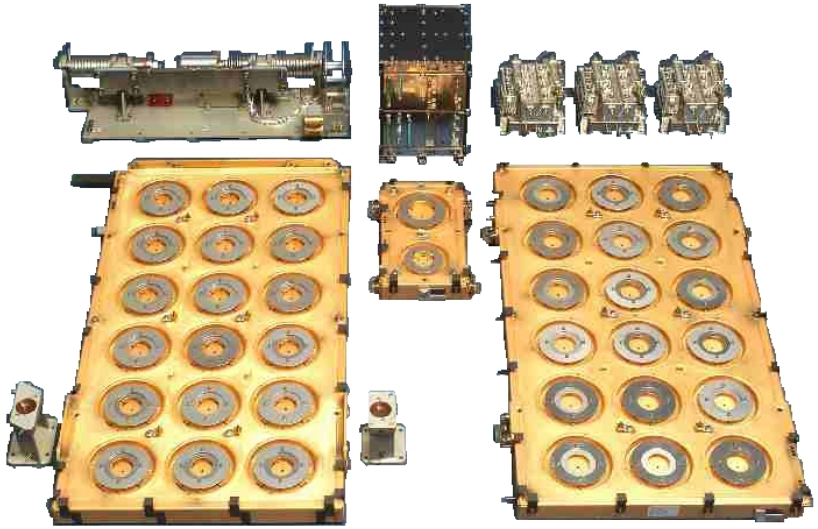
Image credits: European Space Agency

GNSS Receiver for Atmospheric Sounding (GRAS)

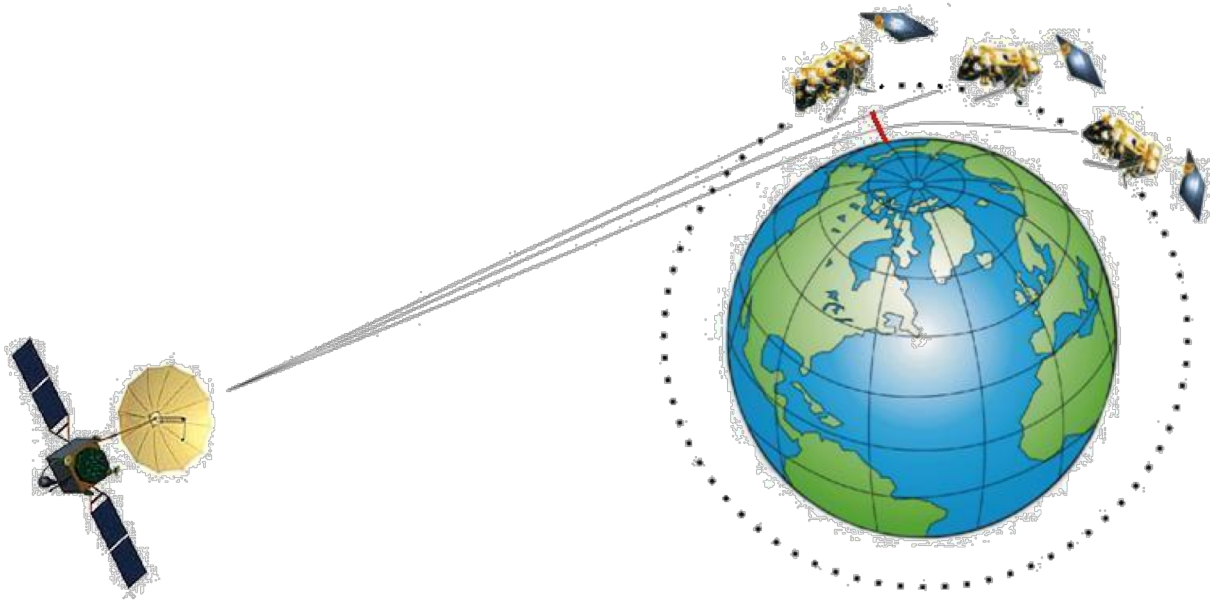
- Uses the Global Navigation Satellite System (GNSS)
- Not a classical instrument, but requires a full system to provide products.
- Circular sun-synchronous polar orbit



The GRAS instrument (Source: European Space Agency)

- Weighs about 30 kg and comprises three antennae receivers positioned separately on MetOp

Measurement principle

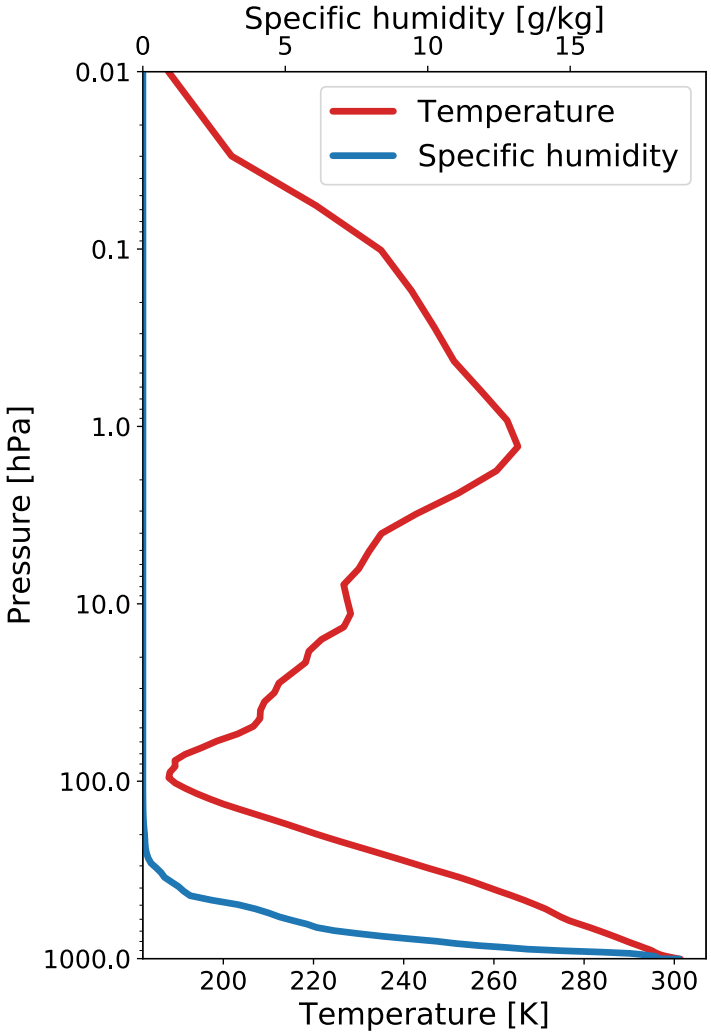


GRAS measurement principle (Source: European Space Agency)

- High quality radio signals from GPS navigation satellites
- The GPS signal is refracted and slowed as it traverses the Earth's atmospheric limb
- Phase delay that relates to characteristics of the Earth's atmosphere

High-level products

- Atmospheric temperature and humidity profiles
- Stratosphere and upper troposphere:
  - Low water vapor density
  - Refraction is dominated by the vertical temperature gradients
  - Accurate temperature profile can be retrieved
- Lower troposphere:
  - The water vapor effects are dominant
  - Combined temperature and water vapor retrieval



Temperature and specific humidity profile