

UNCOPUOS – Technical Presentation, German Delegation

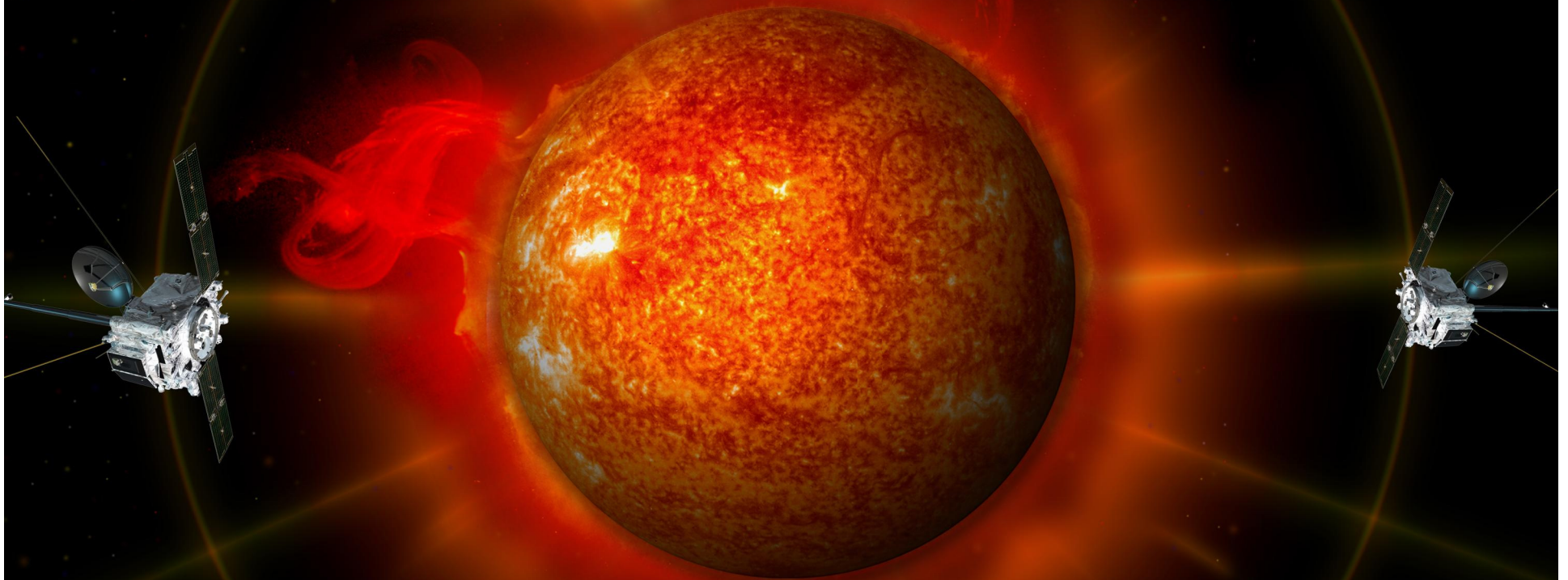
Vienna International Center, Vienna, Austria

10 February 2011

Dr. Volker Bothmer

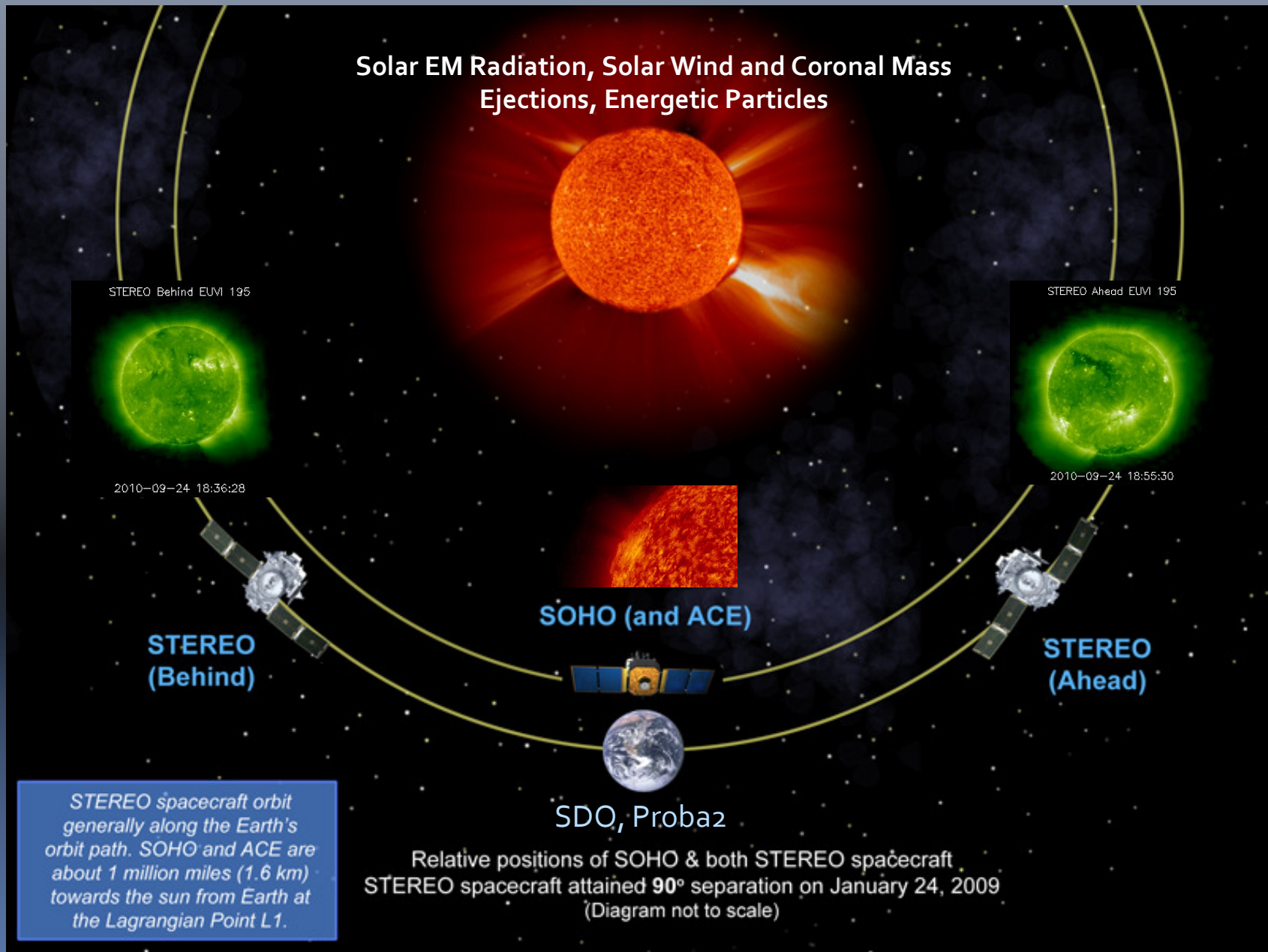
University of Göttingen

Institute for Astrophysics



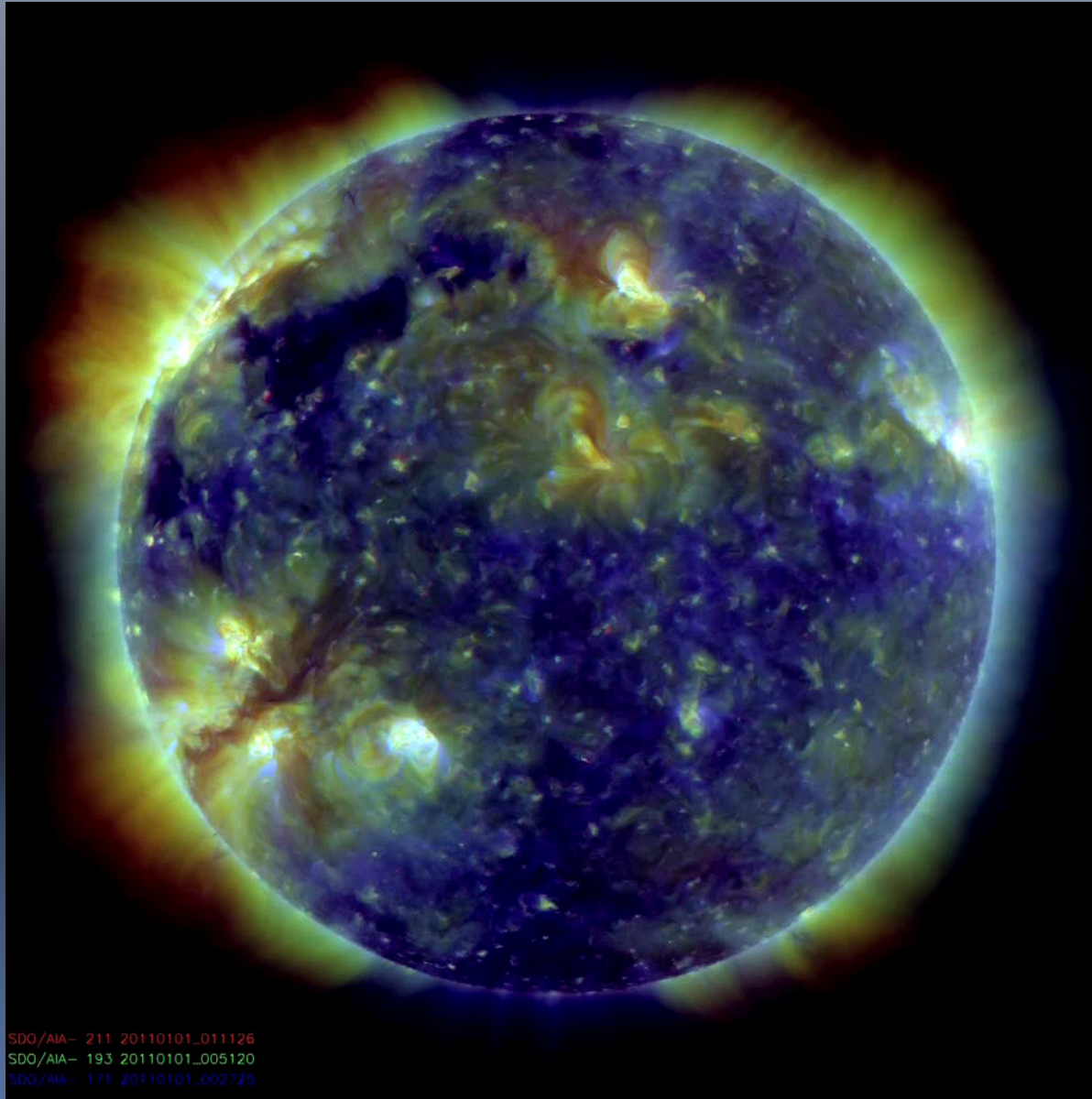
From Research to Operations – Ongoing and Planned  
European and International Space Weather Projects

# Multi-point Space Observations



# Solar Activity – SDO Observations

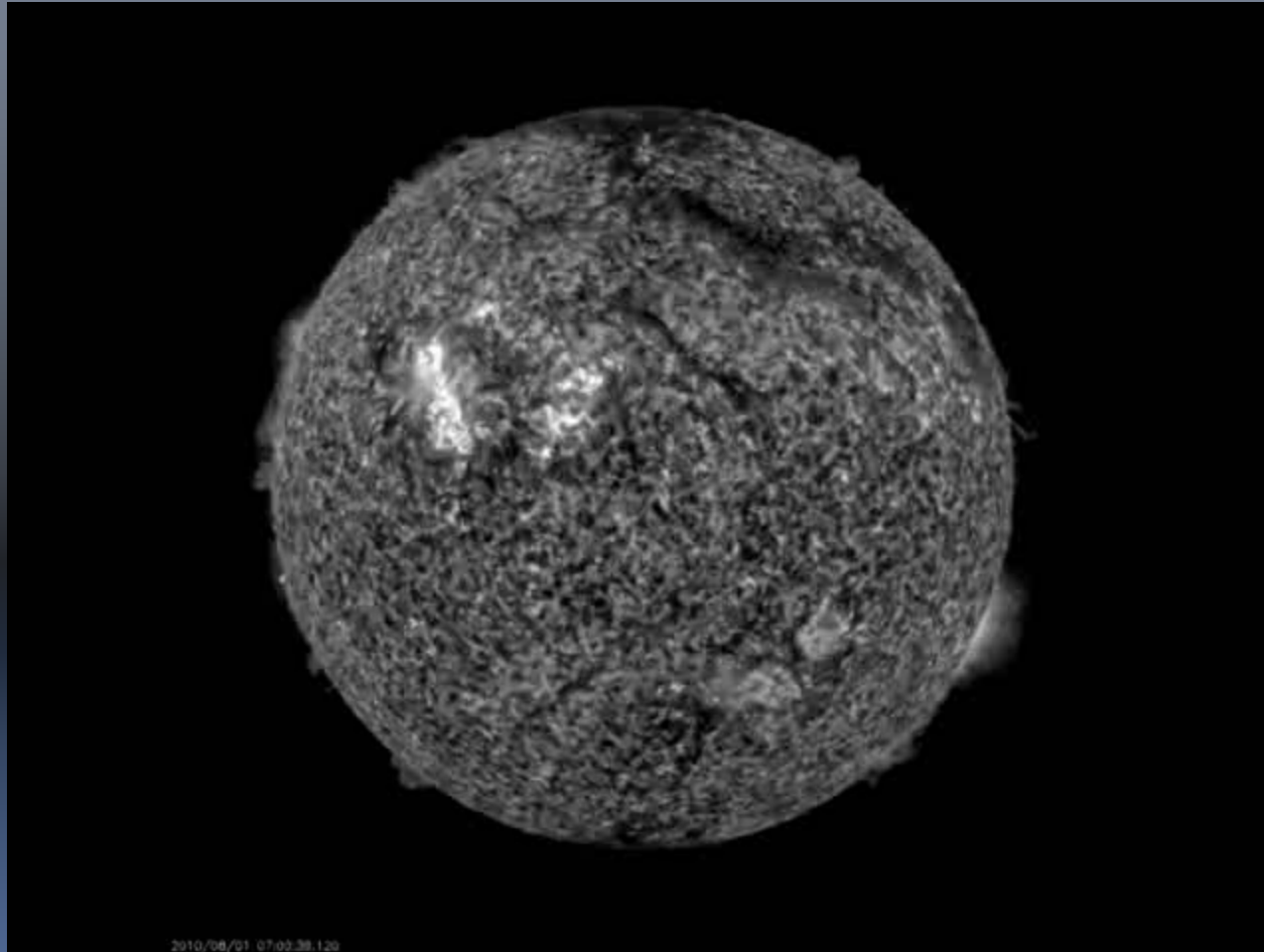
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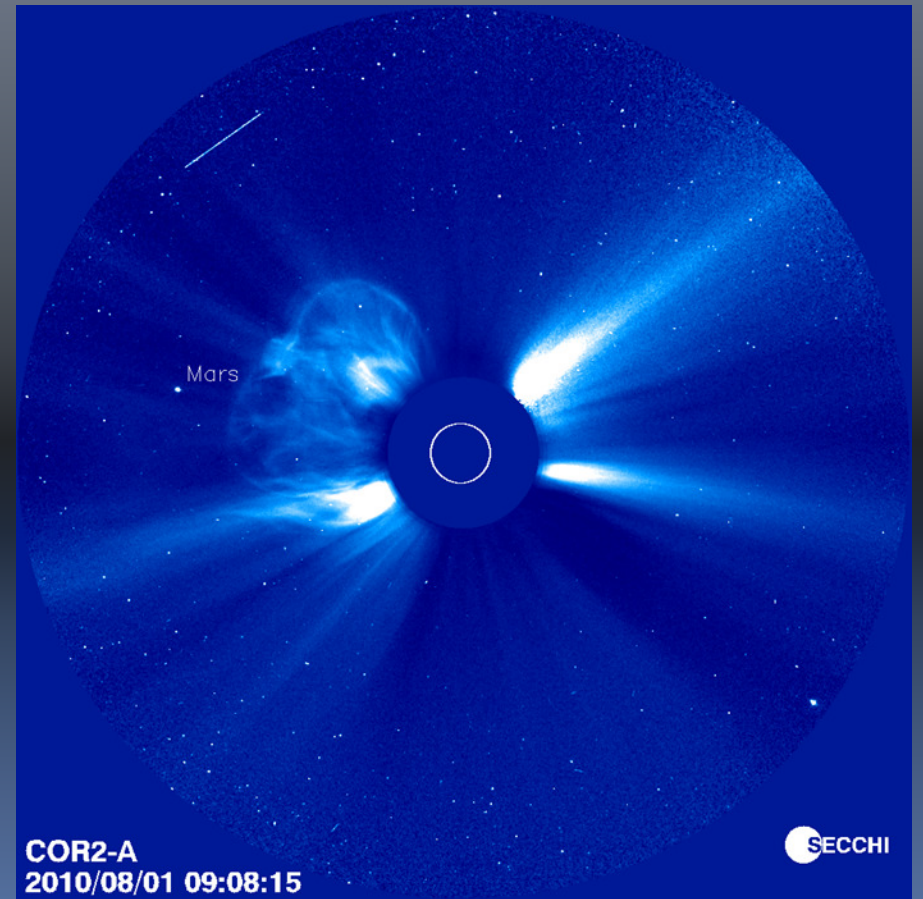
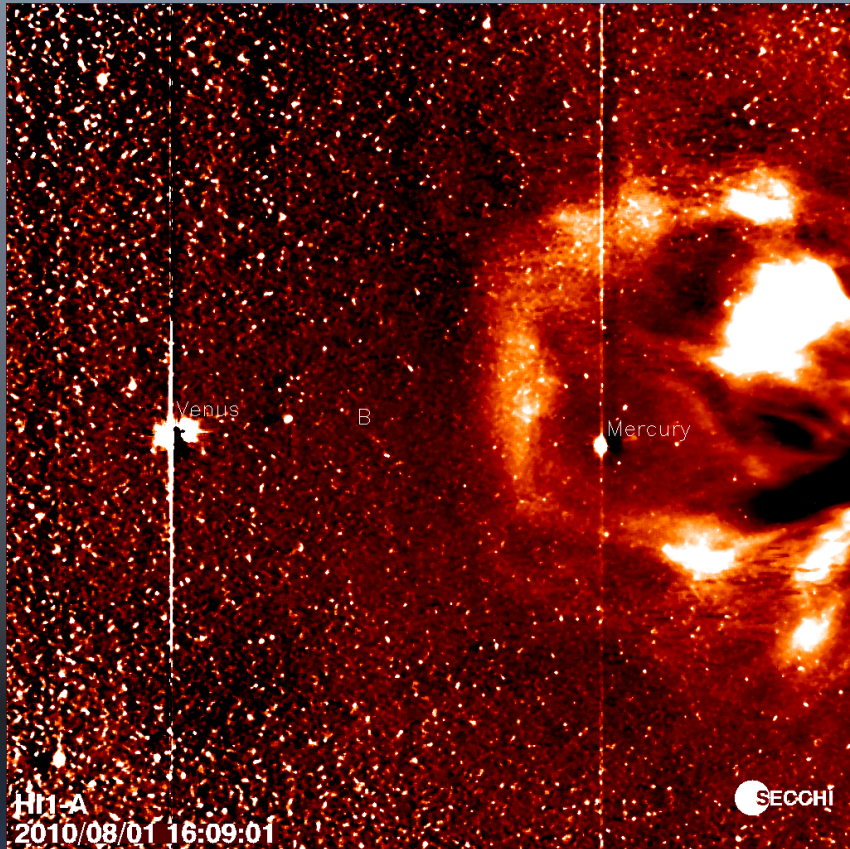
SDO/AIA- 211 20110101\_011126  
SDO/AIA- 193 20110101\_005120  
SDO/AIA- 171 20110101\_002725

# SDO/AIA Observations

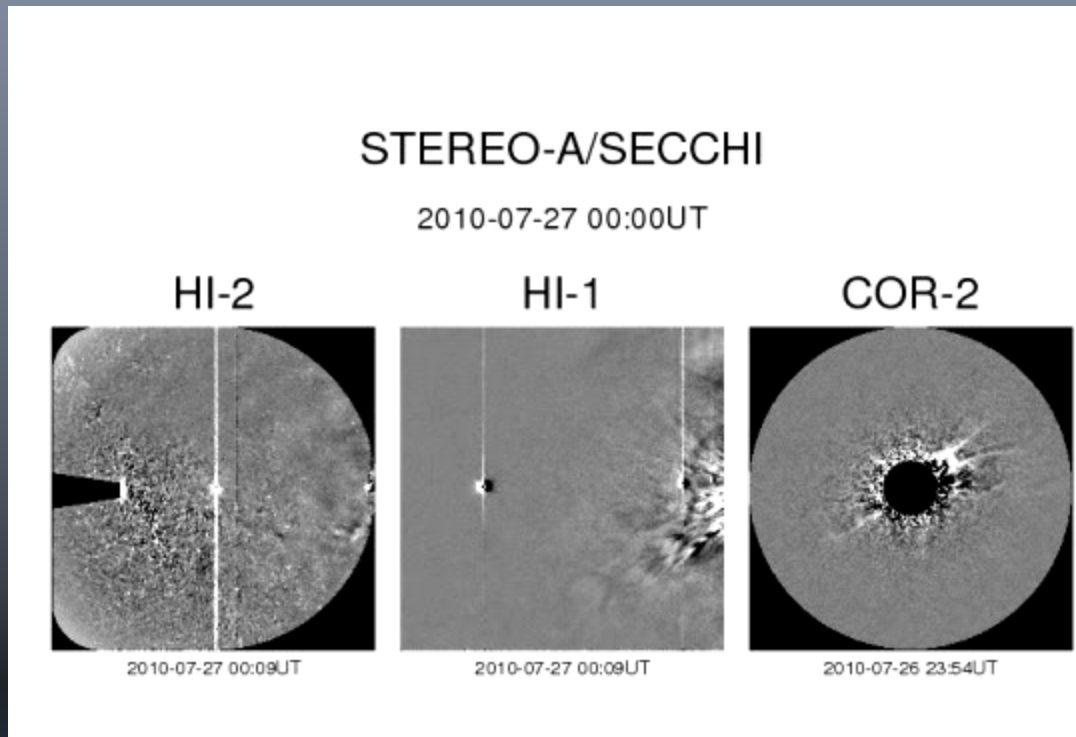
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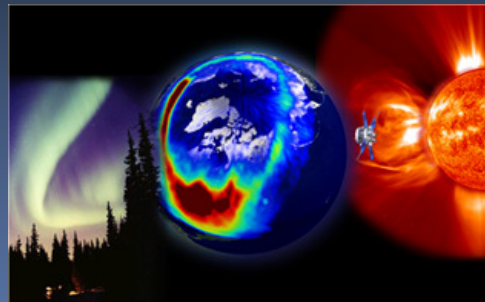
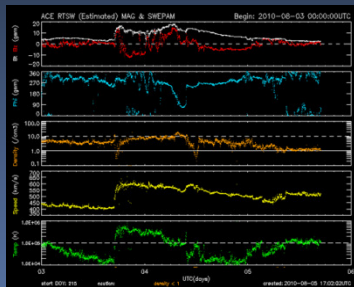
# STEREO/SECCHI Observations



# Tracking the CME Towards Earth – SECCHI



ACE

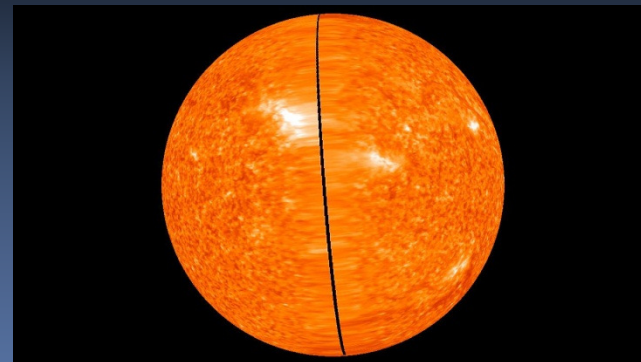
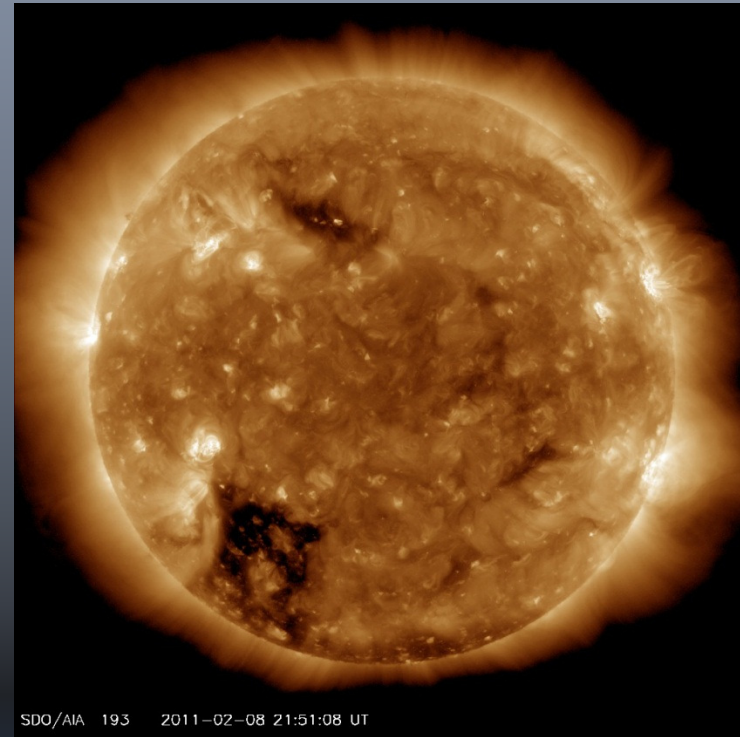
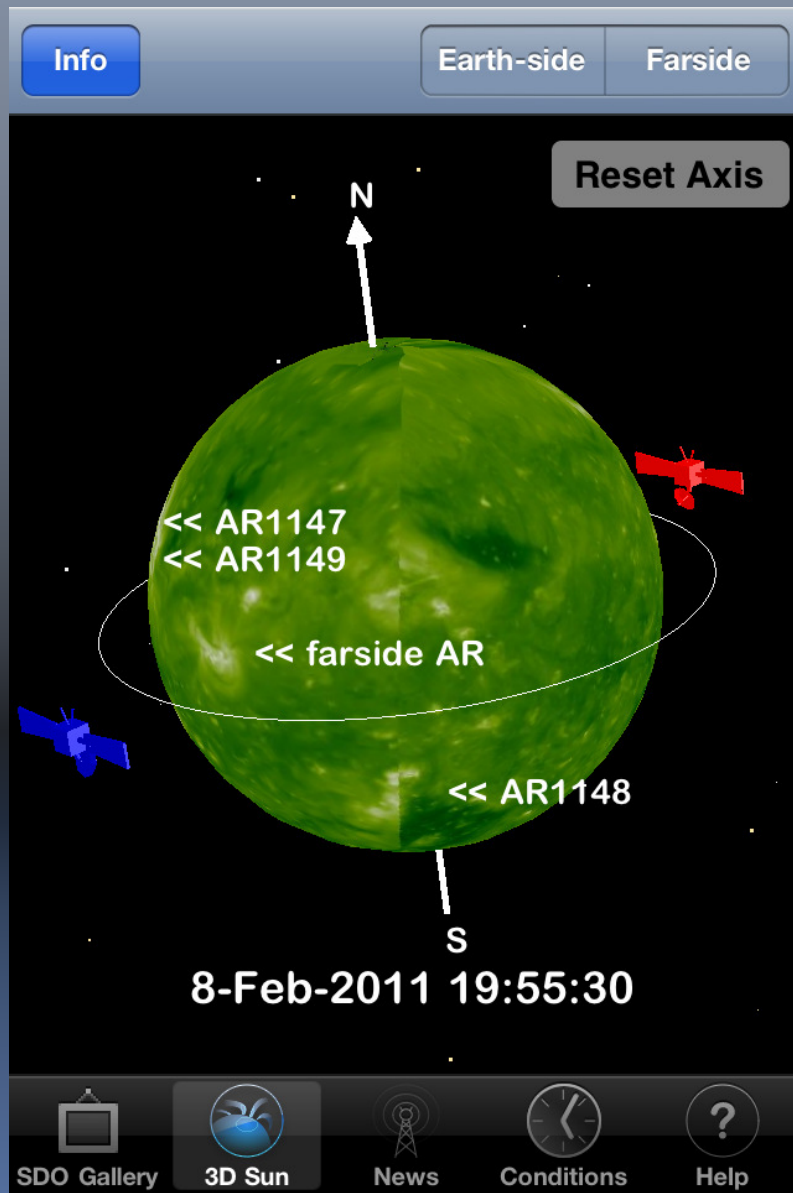


# Germany's E/PO Space Weather Observatory



<http://www.planetarium-hamburg.de>

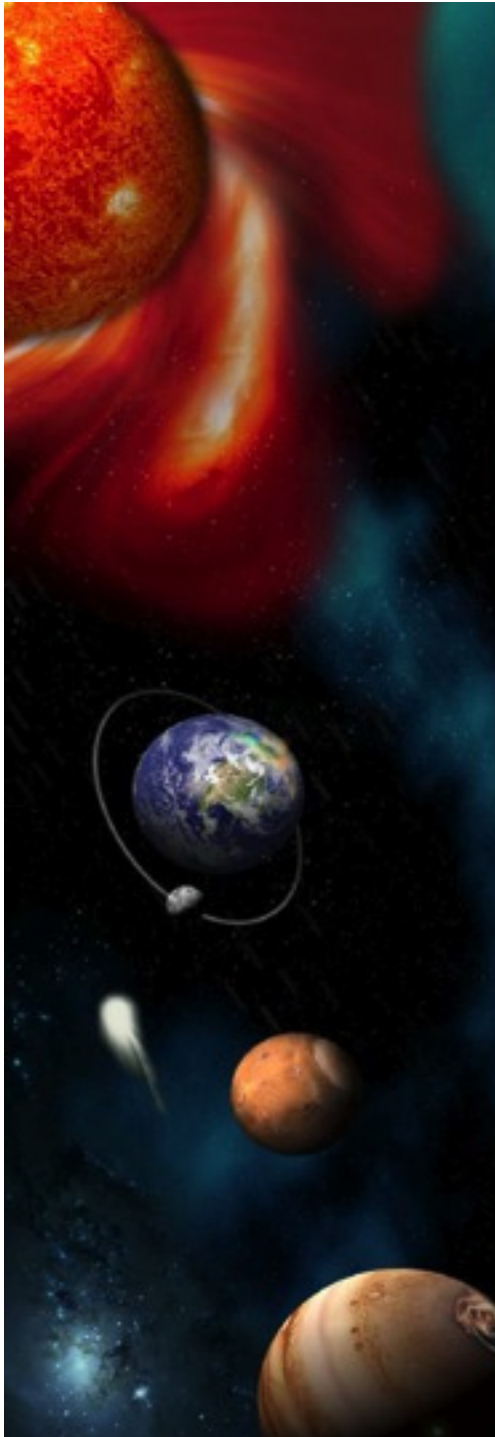
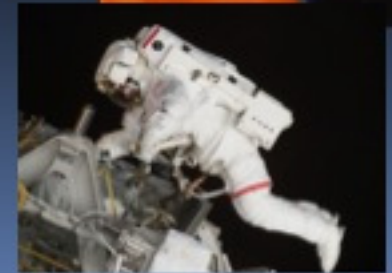
# The Sun on your cell phone – STEREO, SDO





# Space Weather Impacts

- *Electric Power*
- *Aviation*
- *GPS Applications*
- *Satellite Operations*
- *Deep Space Missions*
- *Manned Space Flight*



# The Importance of Space Weather

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- Space missions have led to fundamentally new understandings of physical processes in the Sun-Earth system and Heliosphere (e.g., solar EUV/coronal imaging, tracking of solar storms in space, solar wind impact on planets)
- Modern societies infrastructures are vulnerable to space weather effects (e.g., telecommunication/navigation systems, power grids)
- Strengthens interdisciplinary science and addresses fundamental physics questions (e.g., solar and magnetospheric physics – heliospheric physics, origin of solar wind and CMEs, knowledge on technology impacts of debris, and energetic charged particles, research on atmospheric processes and climate)
- Need for Future Space Exploration (robotic and human)

**Quantification of  
Space Weather Processes  
is a Logical Step –  
From Research to Operations (R2O).**

Selected Major Dedicated Ongoing and  
Planned Projects with German Involvement

# Space Situational Awareness (SSA)

## ESA/EU Programm (2009-2018/20)

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### SSA-Components:

- Observation and Tracking of Objects
- Earth Observations
- Space Weather

Ongoing ESA

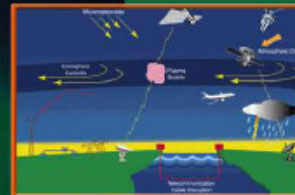
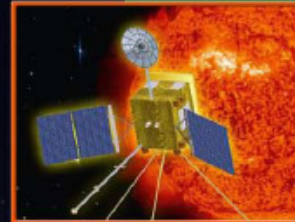
SWE –Studies as pp

# ESA SN-II Project: Implementation Design Study of Space Weather Instruments (2010 – 2011)

## Implementation Design Study of Space Weather Instruments

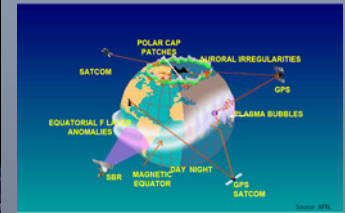
Astrium GmbH  
University of Göttingen  
Space Application Services N.V.

Astrium GmbH  
Proposal No.: A.2010-4131-0-1  
May 2010



*weather*  
All the space you need





# AFFECTS

Advanced Forecast For Ensuring Communications Through Space

Selected Proposal in Response to

EU CI FP7-SPACE-2010-1

Funding Scheme: Collaborative Project

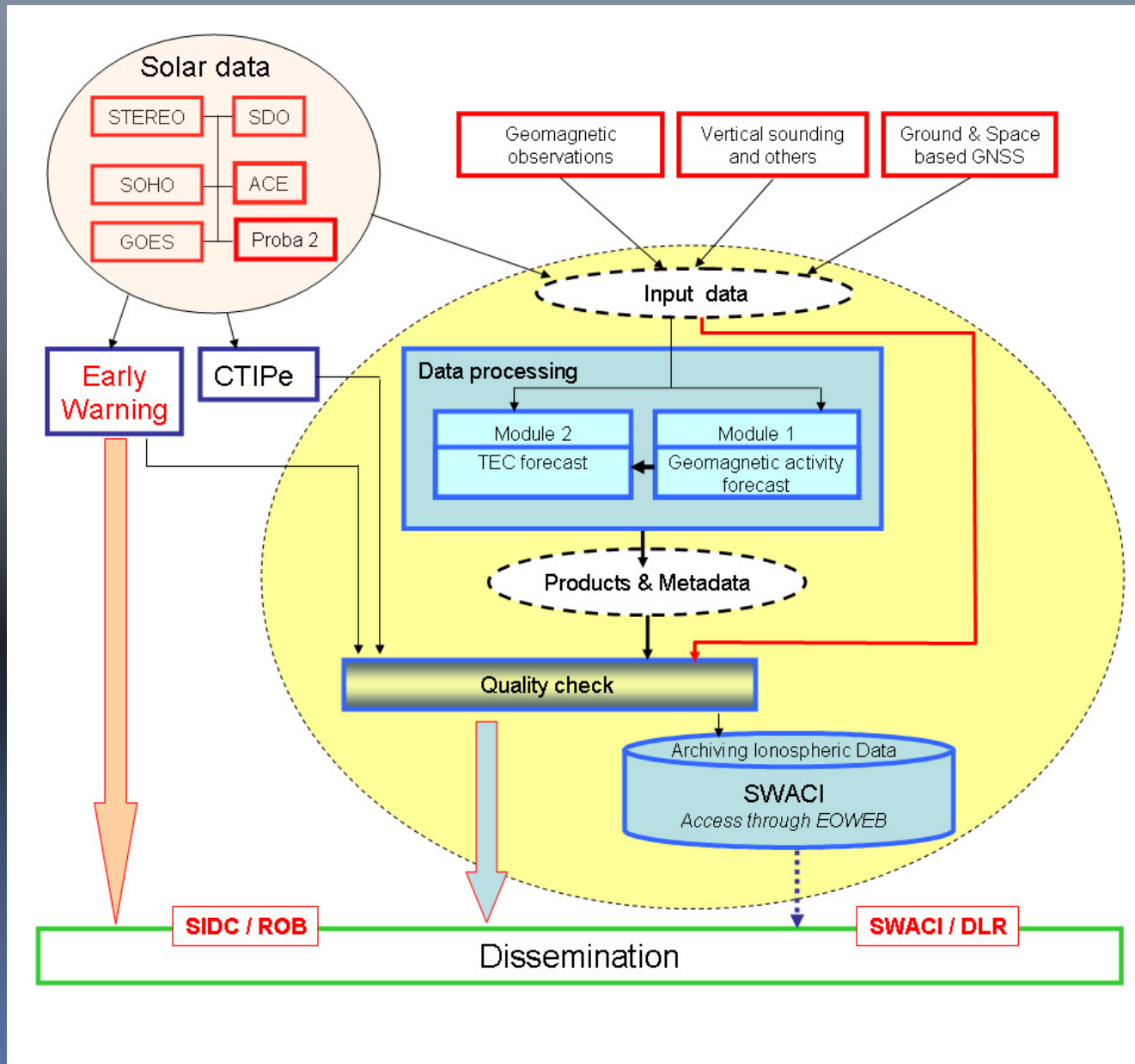
Timeframe: 2011-2014

Project Coordinator: Volker Bothmer

Georg-August-Universität Göttingen, Göttingen, Germany



# AFFECTS Workflow





- Presentation by V. Bothmer at German Ministerium for "Umwelt, Naturschutz und Reaktorsicherheit (BMU)", Berlin, 5. Oktober 2009. Informations forwarded to German Ministry of Interior.
- Investigation of US NRC Study "Severe Space Weather Events - Societal and Economic Impacts".
- 11 April 2011: Participation in "The 2nd annual world infrastructure security summit", April 11, 2011, US Congress.

## SOLAR STORMS AND POWER OUTAGES

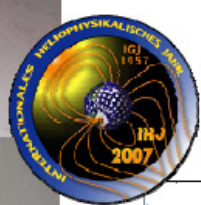
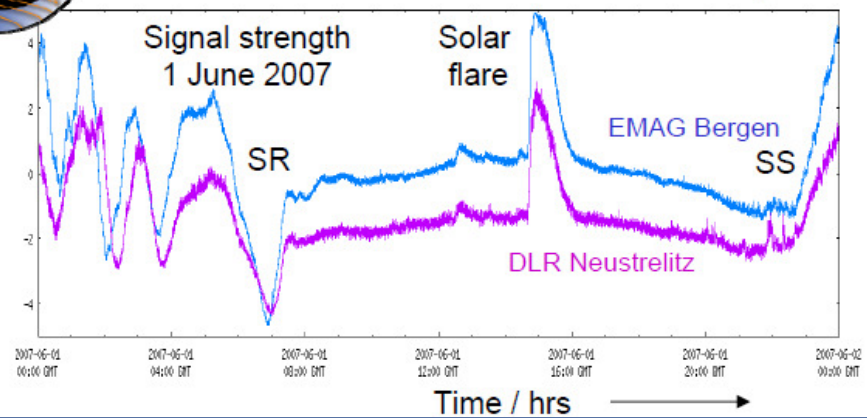
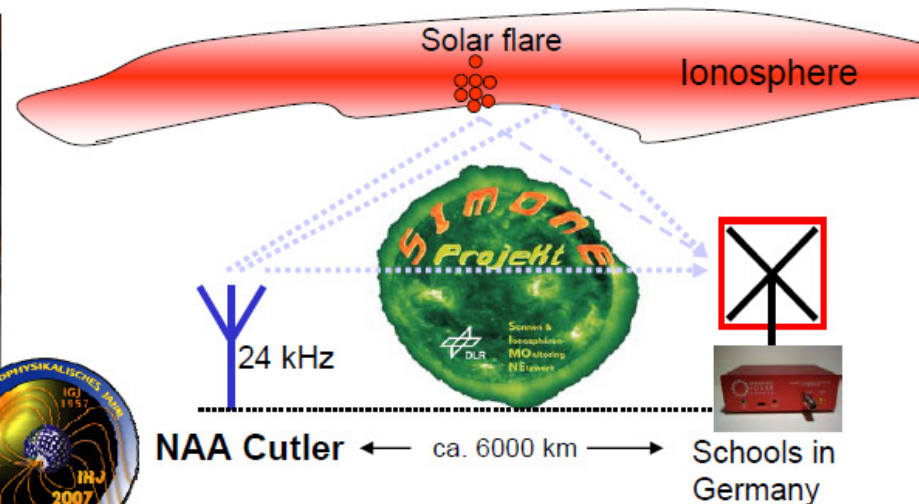


# Space Weather Journals and Books



# Continuation and Development of German Project SIMONE (Sun and Ionosphere MONitoring Network) as Major Contribution to ISWI

## Sun & Ionosphere MONitoring Network -SIMONE



## Conclusion

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Germany is Actively Supporting  
European and International Space Weather  
Activities at Various Levels and will Provide  
Major Support to ISWI