PRESS BRIEFING:
Solar Orbiter Science Begins

Thursday, 10 December
11:00 am US Eastern Time
INFORMATION FOR REPORTERS

• Slides from this presentation are available in the Fall Meeting Media Center: https://www.agu.org/Fall-Meeting/Pages/Attend/Media-Center

• A recording of this event will be posted to AGU’s YouTube channel: https://www.youtube.com/c/AGUvideos
  • Playlist “Fall Meeting 2020 Press Conferences”

• An informal, 30-minute discussion room via Zoom will follow this event:
  • Link will be posted in this event’s chat box
  • Meeting ID: 962 1469 2326
  • Passcode: agupress

• Questions: Email news@agu.org
Solar Orbiter

On its way to explore the Sun and Heliosphere

Press Briefing, AGU Fall Meeting 2020

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Solar Orbiter
On its way to explore the Sun and Heliosphere

Overarching Science Question
How does the Sun create and control the heliosphere – and why does solar activity change with time?

Observations
– *In situ*: Measurements of the solar wind plasma, fields, waves and energetic particles as close as 0.28 AU
– *Remote-sensing*:
  • Observe the entire Sun in visible light, UV, X-rays, including its uncharted polar regions
  • Simultaneous high-resolution imaging and spectroscopy
  • Measure the Sun’s vector magnetic field at the surface
  • Image the corona and heliosphere

Mission overview: Müller et al., A&A Special Issue, 2020
Mission Milestones

- 10 February 2020 UTC: Launch
- 15 June: Commissioning completed, cruise phase starts; first perihelion @0.51 AU
- 16 July: ‘First Light’ media event
- 30 September: First public data release
- 27 December 2020: First gravity assist manoeuvre at Venus
- November 2021: Start of nominal mission
- March 2022: First close solar encounter @0.32 AU
**The New York Times**

**Closest Pictures Ever Taken of Sun Show Tiny Campfire Flares**

Images of the new phenomenon were captured by Solar Orbiter, a joint European-NASA mission to study the sun.

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**Selected Headlines**

- Solar probe reveals sun's tiny 'campfires' in closest-ever photos
  - Reuters, 16.07.2020
- So nah haben wir die Sonne noch nie gesehen!
  - bild.de, 16.07.2020
- Las imágenes más cercanas del Sol muestran minierupciones nunca vistas antes
  - EFE, 16.07.2020
- Esa-Raumsonde Solar Orbiter macht spektakuläre Sonnenbilder
  - EFE, 16.07.2020
- Una nave europea toma la imagen más cercana del Sol
  - EFE, 16.07.2020
- Le vaisseau spatial Solar Orbiter zoome sur le soleil et dévoile ses tourments
  - Les Échos, 17.07.2020
- Un vaisseau spatial de l'ESA se rapproche du soleil
  - Corriere della Sera, 16.07.2020
- Esa-Raumsonde Solar Orbiter macht spektakuläre Sonnenbilder
  - Spiegel.de, 16.07.2020
- Las imágenes más cercanas del Sol muestran minierupciones nunca vistas antes
  - EFE, 16.07.2020
- The Sun's On Fire!
  - Daily Mail, 17.07.2020

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Images captured by the European Space Agency's solar orbiter show many tiny solar flares that scientists are calling "campfires." The small circle at left represents the Earth to scale.
SOLAR ORBITER FIRST IMAGES AND MEASUREMENTS

The in situ instruments
- SoloHI
- EPD
- MAG
- RPW
- SWA
- STIX
- EUI
- Metis
- PHI
- SWA

The remote-sensing instruments
- Extreme Ultraviolet Imager (EUI)
- Coronagraph (Metis)
- Solar Wind Analyser (SWA)
- Spectral Imaging of the Coronal Environment (SPICE)
- Energetic Particle Detector (EPD)
- Magnetometer (MAG)
- Polarimetric and Helioseismic Imager (PHI)
- X-ray Spectrometer/Telescope (STIX)
- Heliospheric Imager (SoloHI)
- Radio and Plasma Waves (RPW)

#TheSunUpClose
COMBINING REMOTE OBSERVATIONS AND IN SITU MEASUREMENTS

Both sets of data are used to piece together a more complete picture of what is happening on the Sun and in the solar wind, the flow of electrically charged particles that is continuously released by our star.

The remote-sensing instruments (such as EUI and SPICE) observe the Sun from afar.

The **in situ** instruments (such as SWA) measure the electric and magnetic fields, and the particles near the spacecraft.

**Extreme Ultraviolet Imager (EUI)**

**Spectral Imaging of the Coronal Environment (SPICE)**

**Solar Wind Analyser (SWA)**

Relative Intensity

- Short Wavelength Channel
  - Mg IX
  - D II
- Long Wavelength Channel
  - C III
  - Lyman-Beta
  - N III
  - Ne V
  - Mg X

Wavelength (nm)

- Ly
- C
- N
- O
- Ne
- Mg

Hydrogen
Helium
Carbon
Oxygen
Silicon
Iron

**#TheSunUpClose**
Solar Orbiter

Remote-Sensing Science

Frédéric Auchère
On behalf on the remote-sensing instruments consortia
Images & spectra from the visible to X-rays
- Velocity
- Density
- Temperature
- Magnetic field
- Chemical composition

Comprehensive measurements from the surface ...
... to the heliosphere
Solar Orbiter

In Situ and Connection Science

Tim Horbury
On behalf of the *in situ* instruments consortia
Early science highlights

Particle measurements around the entire orbit

Dust and waves from comet ATLAS

Credits: NASA, ESA, STScI and D. Jewitt (UCLA)
Constellation measurements: 19 April 2020

Coronal mass ejection imaged by STEREO

Models driven by Solar Orbiter measurements

Constellation measurements: 19 April 2020

Coronal mass ejection imaged by STEREO
Solar Orbiter provides unique new views of the Sun and heliosphere

- Measures all the way from the Sun’s surface into the solar wind
- First-ever images of the Sun’s poles

Timeline
- Now: First science results
- 27 December 2020: First Venus fly-by
- November 2021: Start of nominal mission
- March 2022: First close encounter

Fleet of heliophysics missions in orbit + New ground-based telescopes = Huge potential for joint science
QUESTIONS
Please write your questions in the Q&A box and AGU will ask it on your behalf.

Reminder: A 30-minute, informal discussion will commence in Zoom after this event ends.