

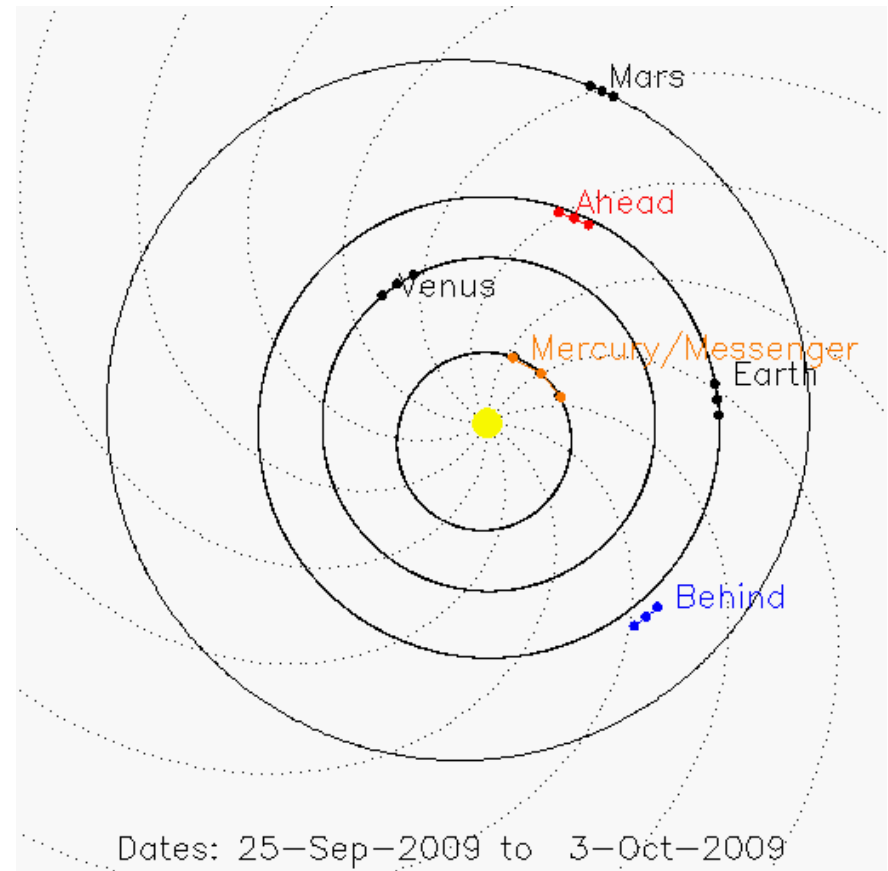
STEREO Science Center Status Report

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STEREO SWG #21
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Dublin, Ireland

Recent Science Events

- Herschel sounding rocket launch, September 14
- JOP 224, Solar tomography with minimal solar rotation, September 27–October 27
- Messenger fly-by of Mercury, September 29
- JOP 222, Detecting the Origin of Shock-Accelerated Solar Energetic Particles, Oct 28 – Nov 1



Upcoming Science Opportunities

- 2010
 - SUMI sounding rocket launch, June 8
 - Total solar eclipse, July 11, South Pacific
- Targets of opportunity
 - JOP 222, Detecting the Origin of Shock-Accelerated Solar Energetic Particles
 - SECCHI/EUVI concentrates on 195 Å (same as current synoptic program)

Much Farther Ahead

- 2011
 - **Reach 180° separation—see full solar sphere, February 6**
 - Messenger Mercury orbital insertion, March 18
 - DAWN arrives at Vesta, July
- 2012
 - DAWN leaves Vesta, July
 - **Total solar eclipse, November 13, Australia**
- 2013
 - **Ahead: Mercury transit, Dec 12**
- 2014
 - **Behind: Mercury transit, Apr 29**
 - MAVEN arrives at Mars, September
- 2015
 - DAWN arrives at Ceres
 - **STEREO goes behind Sun (3°)**
 - Ahead, Feb 17–Aug 2
 - Behind, Jan 10–Apr 12, Jul 23–Nov 10

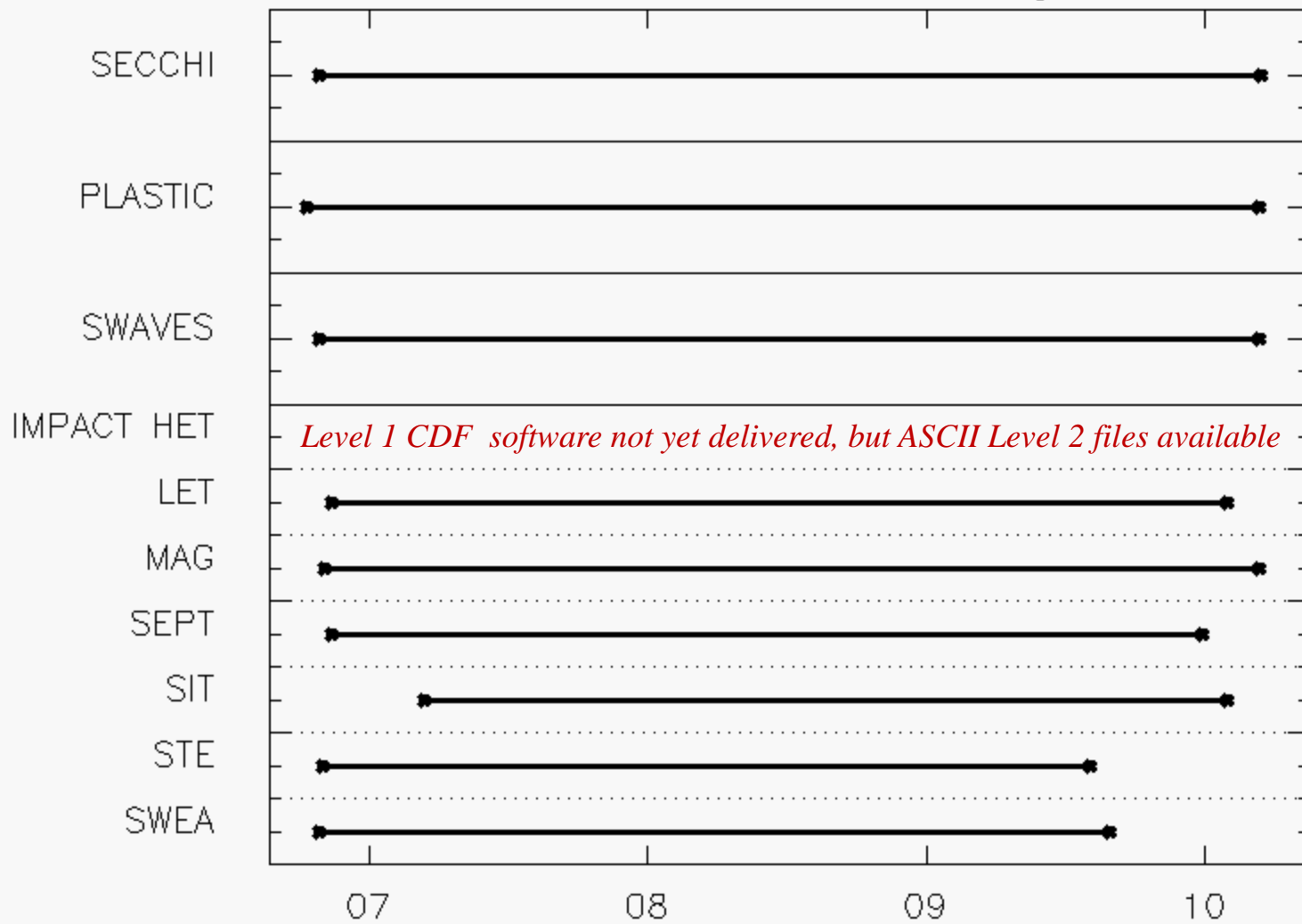
Telemetry Rates

- Ahead is currently operating at **360 kbps**, and Behind is operating at **240 kbps**.
- Ahead will switch to **240 kbps** on **April 26**.
- Occasionally passes are conducted using a 70 m DSN station. Behind is operated at 720 kbps for those passes.
 - Same will be done for Ahead after switch to 240 kbps
 - Use 480 kbps on 70 m stations beginning early autumn
- Switch to **160 kbps** on **September 13** on both spacecraft.
- Switch to **120 kbps** on Behind: **Nov 15**, Ahead: **Apr 11**
- Switch to **96 kbps** in **September 2011** for both spacecraft
- Currently planning for switch to **30 kbps** in **August 2012**
 - APL looking into possibility of intermediate rate(s)
 - Need to start planning update to SOP

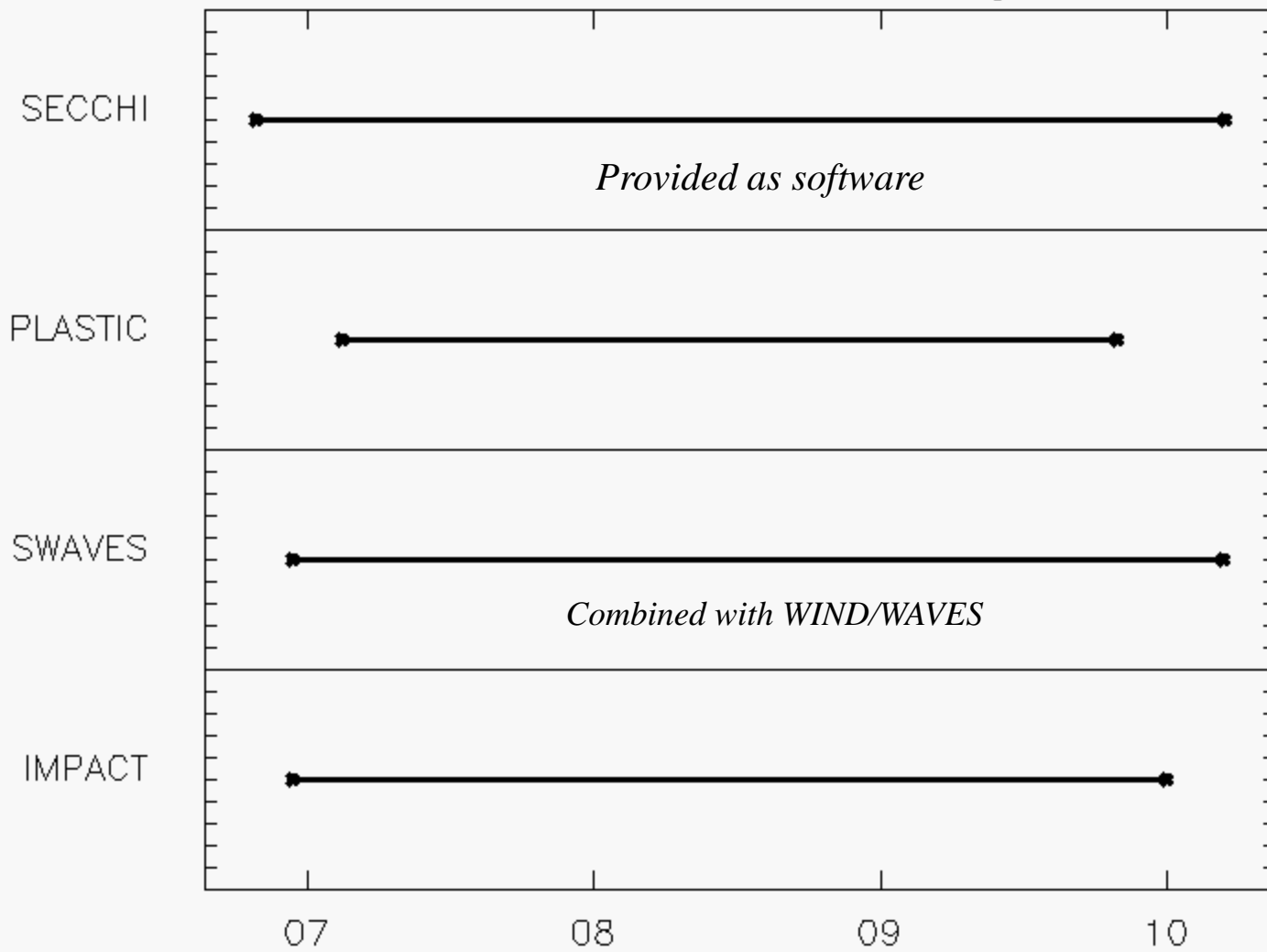
Data Availability

- Following plots show data archived within SSC for various data levels.
- Data available through Virtual Solar Observatory, but customized interface is still not available
 - Much data available through individual instrument data pages
- IMPACT/MAG data available through VHO.
 - Plans to include other STEREO data
- Now archiving IMPACT/PLASTIC Level-3, PLASTIC Level-2 in SSC
 - Need to start archiving IMPACT Level-2
 - ... and SWAVES Level-2

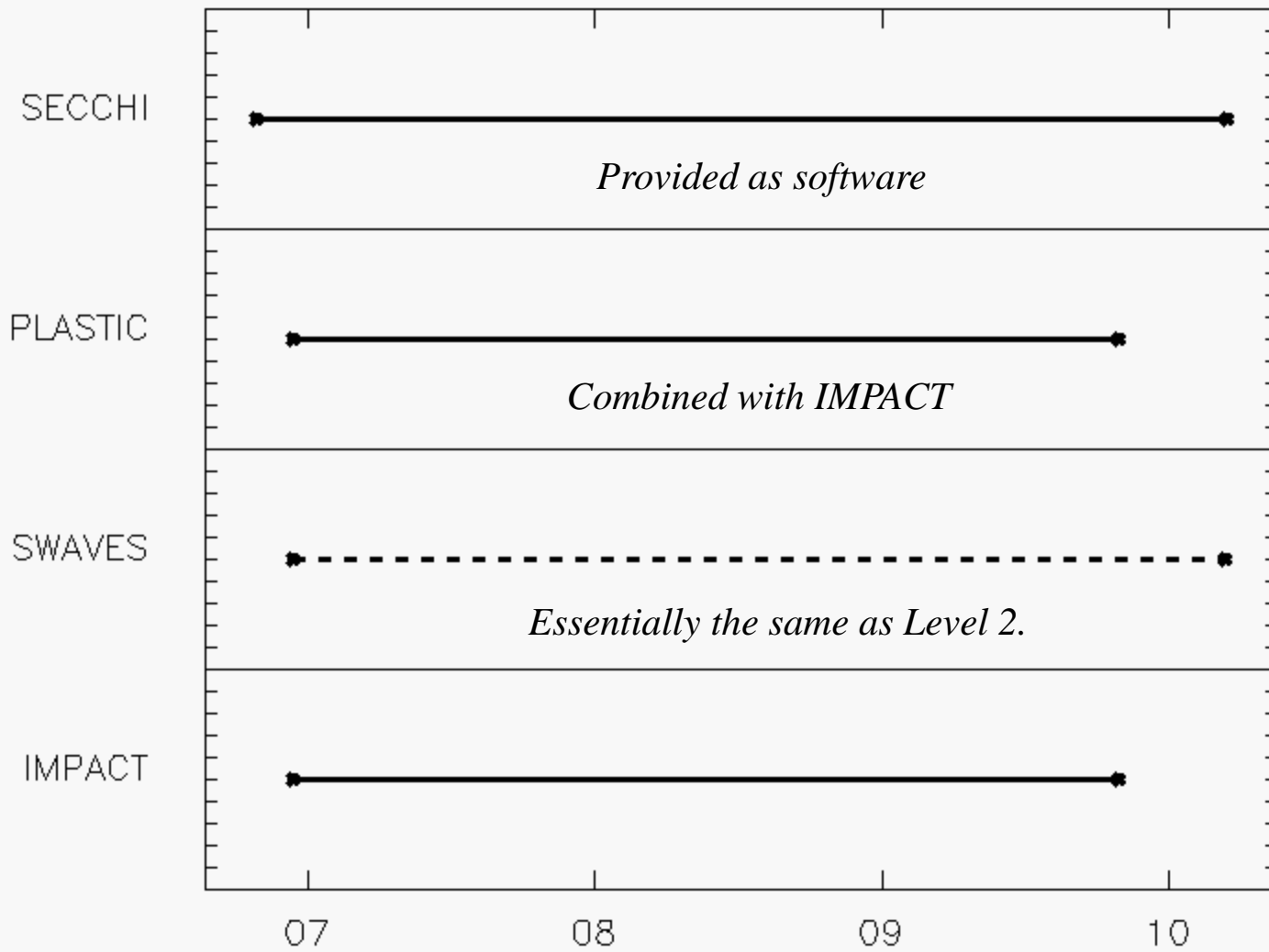
Level-1 Data Availability



Level-2 Data Availability



Level-3 Data Availability

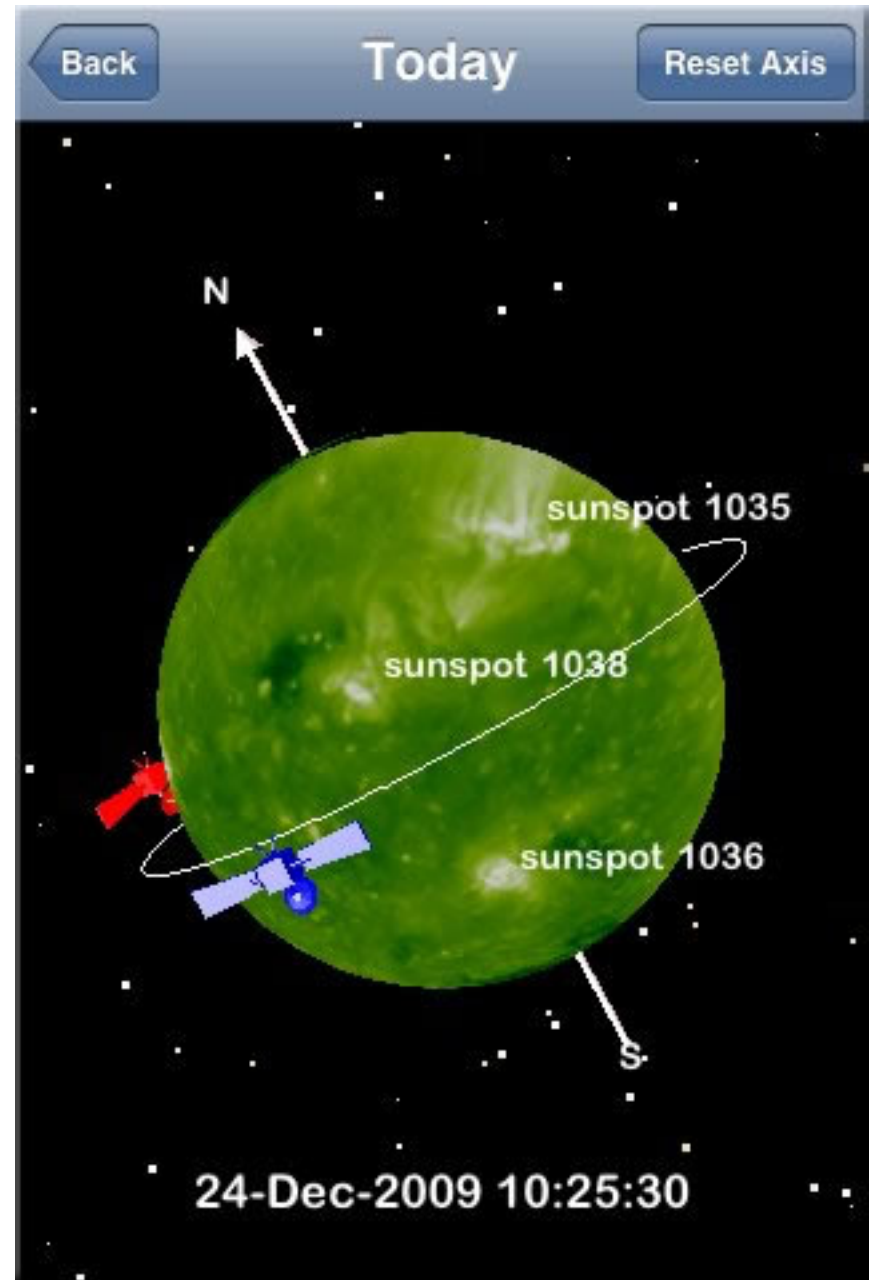


Beacon Status

- Receiving telemetry regularly from the following stations:
 - Koganei, Japan
 - Toulouse, France
 - Kiel-Ronne, Germany
 - Bochum, Germany
- Chilbolton (UK) station has dropped out of network—signal dropped too low.
- Possibility of adding station in Finland.
- NOAA in discussions with Korea about building station for ACE (and maybe STEREO?)
- Still no station in U.S.—gap in coverage.
- NOAA examining link margins for extended mission
 - Switch from Convolutional to Turbo encoding (*delayed*)
 - Possibly changing the modulation index

“3D Sun” iPhone app

- A new application for the iPhone, developed by Tony Phillips *et al.* (spaceweather.com), uses STEREO data to show the Sun as a globe.
- Also provides space weather alerts
- Gallery of images and movies.

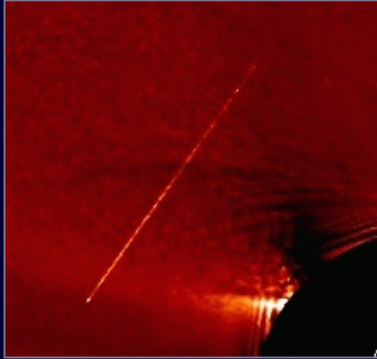


SSC Hardware & Software Status

- The SSC has recently completed significant upgrades in both hardware and operating system software.
- All servers have been upgraded from PowerPC Apple Xserves to Intel Apple Xserves, now with redundant power.
- All data have been moved off older Apple Xserve-RAIDs onto larger Nexsan Satabeasts or onto a Pillar Axiom fileserver.
- All servers have been upgraded to OSX 10.6, also known as Snow Leopard. Web, FTP, and perl have all also been upgraded in the process.
- Hardware and software upgrades required some changes in the SSC software.

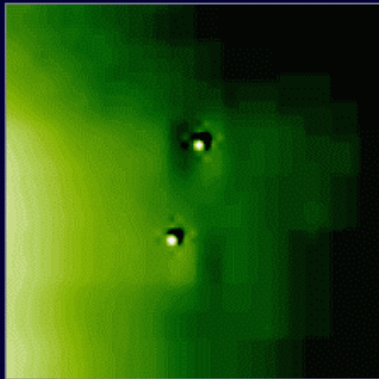
IMAGE ARTIFACTS - COSMIC RAYS

Cosmic rays and solar energetic particles are highly energetic particles that travel through space. Some of these originate from the Sun. Others, known as galactic cosmic rays, come from outside the solar system. When they pass through the detectors, they produce thin bright spots or streaks.

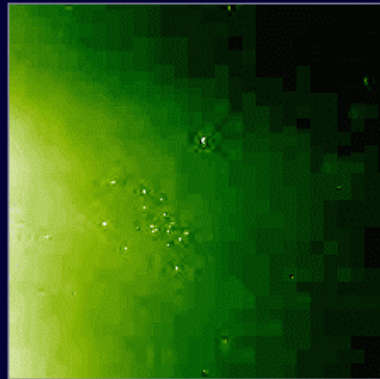


Close up of cosmic ray track seen on the STEREO Behind COR2 detector.

The high compression factors used for the **beacon** images can cause cosmic ray events to be significantly distorted, as shown in the sample images below. Even the full resolution data have some compression applied to them, resulting in a small amount of distortion of the brightest cosmic rays.



Two cosmic rays distorted by the high compression factors applied to beacon data, as seen by the STEREO Behind EUVI telescope on January 18, 2010



Same cosmic rays as seen in the full resolution data. Many more cosmic ray events are visible.

Artifacts

- Recently added a page on artifacts to the “What to look for in STEREO images” pages.
- Describes effects due to beacon telemetry, cosmic rays, reflections, etc.
- Used to help defuse (*but not completely*) a recent internet flap over supposed spheres seen in the beacon images.

SSC & STEREO Website Status

- The SSC website has recently been hit hard by increased usage.
- Upon investigation, it was determined that this was because of people looking for supposed UFOs in STEREO images.
- To remove some of the load from the SSC website, we redirected some of that traffic to the STEREO website.
 - Because the SSC website is on the NASCOM operational network, we're required to offload excessive network traffic.
- We plan to split service between known science users and the general public.
- We're also looking into what steps can be taken to make the websites more efficient.
 - A recent change in the configuration of the STEREO website server improved the load considerably. We now believe we've solved the immediate problem.

Science Publication Database

- Because of security problems, we were forced to take the STEREO publication database application offline.
- Has been temporarily replaced with a printout of the database in Word and PDF formats.
- Working on converting the database to use software from the SOHO project.
- Still maintaining the database. Send new entries to
C.Alex.Young@nasa.gov
- Contains published papers *only*.

EPO Developments #1

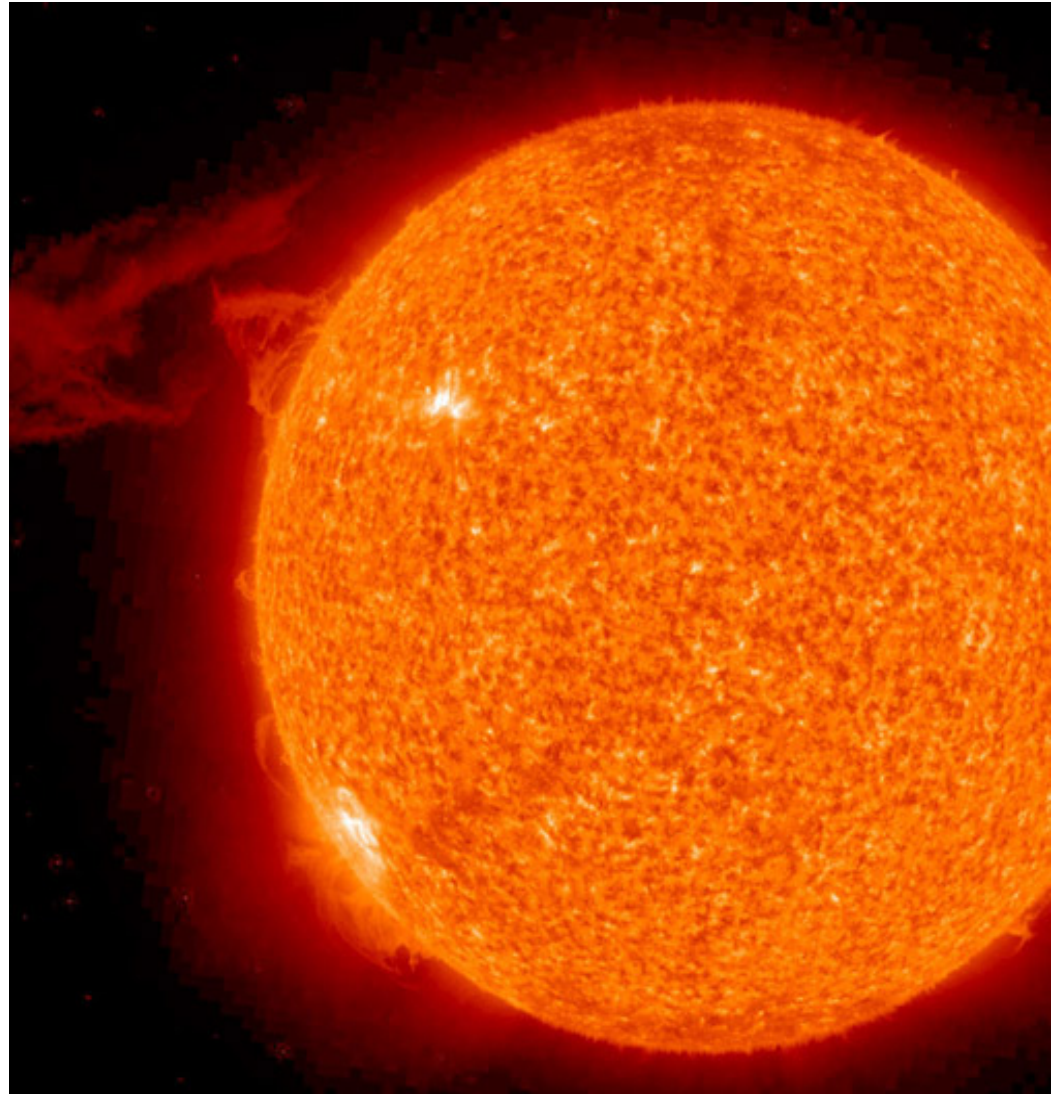
- Supported Events:
 - Goddard Informal Educators workshop
 - National Park Service staff Share-a-Thon (at Goddard)
 - National Science Teachers Conference
- Products:
 - New 3D hi-res. tapes arrived from JPL for generating QuickTime and MPG movies.
 - We expect to add significantly to the STEREO 3D movies available online.
 - Distributed over 800 of the Our Sun posters to schools and libraries around the U.S. through NASA's Space Place network.

EPO Developments #2

- Considering putting together a publication for the general public highlighting stereoscopic images from the mission.
- This publication could be a magazine article (e.g. *Stereo World*), or if there's enough material we might try to publish a book.
- We need help putting together content:
 - Direct stereo images of the Sun from the two spacecraft
 - Indirect stereo images based on analysis of the data
 - 3D models
 - Images of the spacecraft and instruments during testing
 - Images of solar observatories?
- Content should be of publication quality
 - Optimal is separate left-right images
 - Anaglyph images would also be acceptable.

EPO Developments #3

STEREO featured
on “Astronomy
Picture of the Day,”
20 October 2009.



<http://antwarp.gsfc.nasa.gov/apod/ap091020.html>