



SECCHI Status

Russell A. Howard

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STEREO SWG

**KUDOS TO THE STEREO TEAM FOR
THE EXCELLENT MISSION**

Current Status

- All 10 telescopes are working extremely well and the commissioning/early calibration is virtually complete, although the calibration data need to be processed and incorporated into the software/headers
- SECCHI Issues that are being worked:
 - Optimum compression versus photometric and spatial resolution and therefore the optimum synoptic program
- We have recently greatly improved (>2X) the compression algorithm for the HI images that required a patch to the flight SW
- Software Status: 1 Full SW Upload, 1 partial – no known bugs remaining
- 2 Watch Dog Timer Resets on SECCHI-A (6 wks); cause unknown, but the 750 data sheet states that it is known to generate spurious resets

Operations

- **Stepped Roll April 17**
- **Campaign May 4-1**
- **We should be in a standard synoptic program very soon**
- **We use SSR1 for the synoptic program. This is the same on both spacecraft. SSR1 stops when it fills. An issue came up recently having to do with the maximum time between contacts and we have asked for a readjustment of the allocation of the relative size of the SECCHI partitions on SSR1 and SSR2**
- **We put observations of increased cadence into SSR2, which is operated on a recirculating buffer. The recirculation can be stopped either by the SECCHI schedule or by an on-board CME detection algorithm**
- **Special observation sequences will be entertained and the TM would probably go to SSR2**
- **We are scheduling about 7500 images/day. It takes us about 10 secs to process an image so this is the maximum number that can be taken in a day.**



Accessing the SECCHI Images

- **Image Files**
 - The archived image files are FITS files in Level 0.5. This is the same strategy as for SOHO/LASCO, in which no image interpolations are done, but the images are oriented so that the top of the image is “roughly” ecliptic north
 - Web sites at NRL, SSC, VSO, France/MEDOC have all the data – others have partial sets
 - Web Based Query Tools are available to select the image files – need to know the dates.
 - IDL routines (SECCHI_PREP, etc) enable the IDL user to access the images stored locally (See next slide)
- **Choosing the data interval**
 - Synoptic Maps
 - Solar Weather Browser
 - Festival

Using SECCHI Data

- **SECCHI_PREP, XSECCHI_PREP**
 - All of the SECCHI image data are converted to physical units using **SECCHI_PREP** in the command line version or **XSECCHI_PREP** in the GUI version
 - **Functions**
 - Reads Image and Header
 - Trims Image
 - Buffers Subfield Images
 - Calibrates Images (different for each telescope type)
 - Updates Header
 - Returns to Memory and/or Writes Image Files
 - FITS, PNG, and JPG
 - **Default call:** IDL> secchi_prep, files, image, header
 - Where 'files' is a list of file names to be read in and calibrated

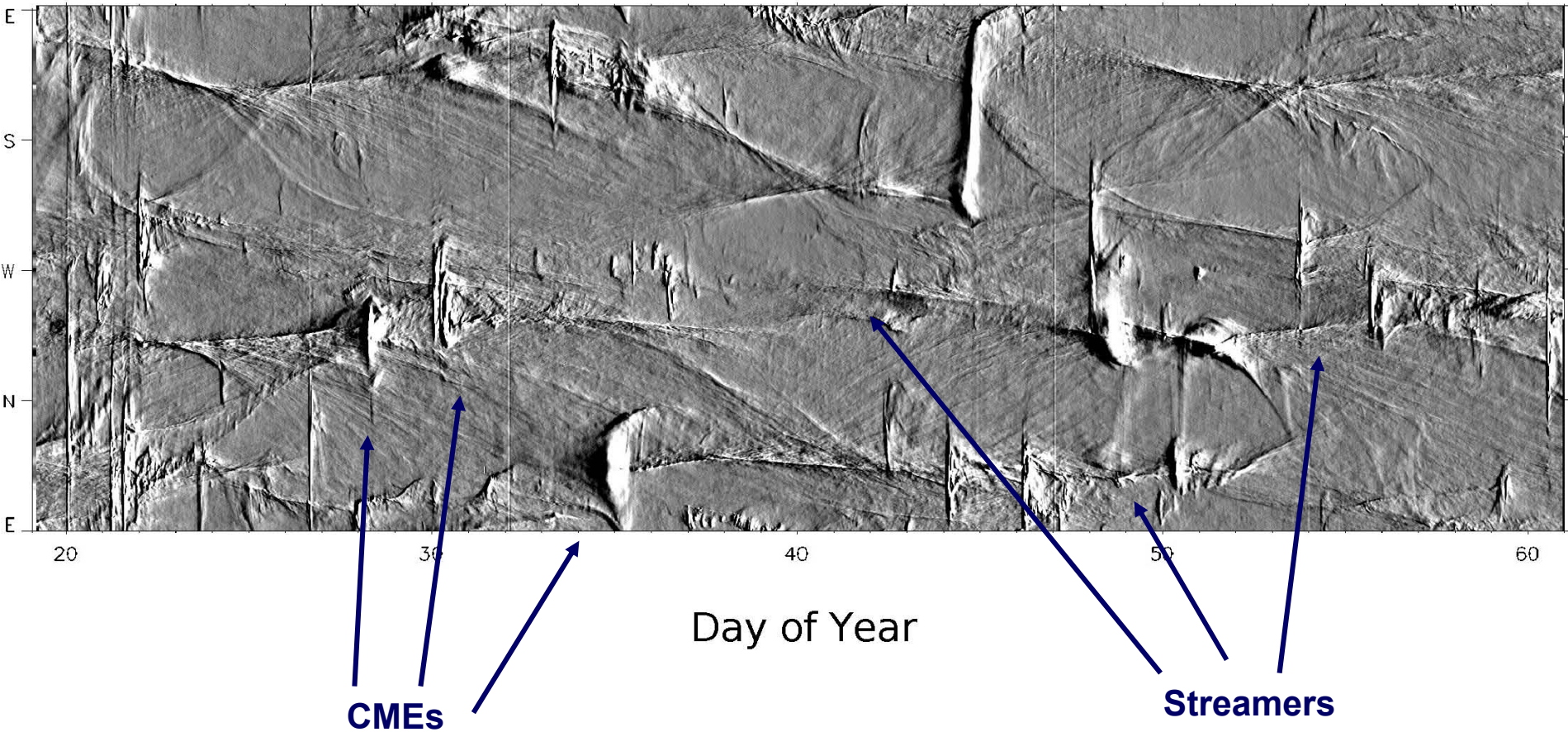


SYNOPTIC & CARRINGTON MAPS

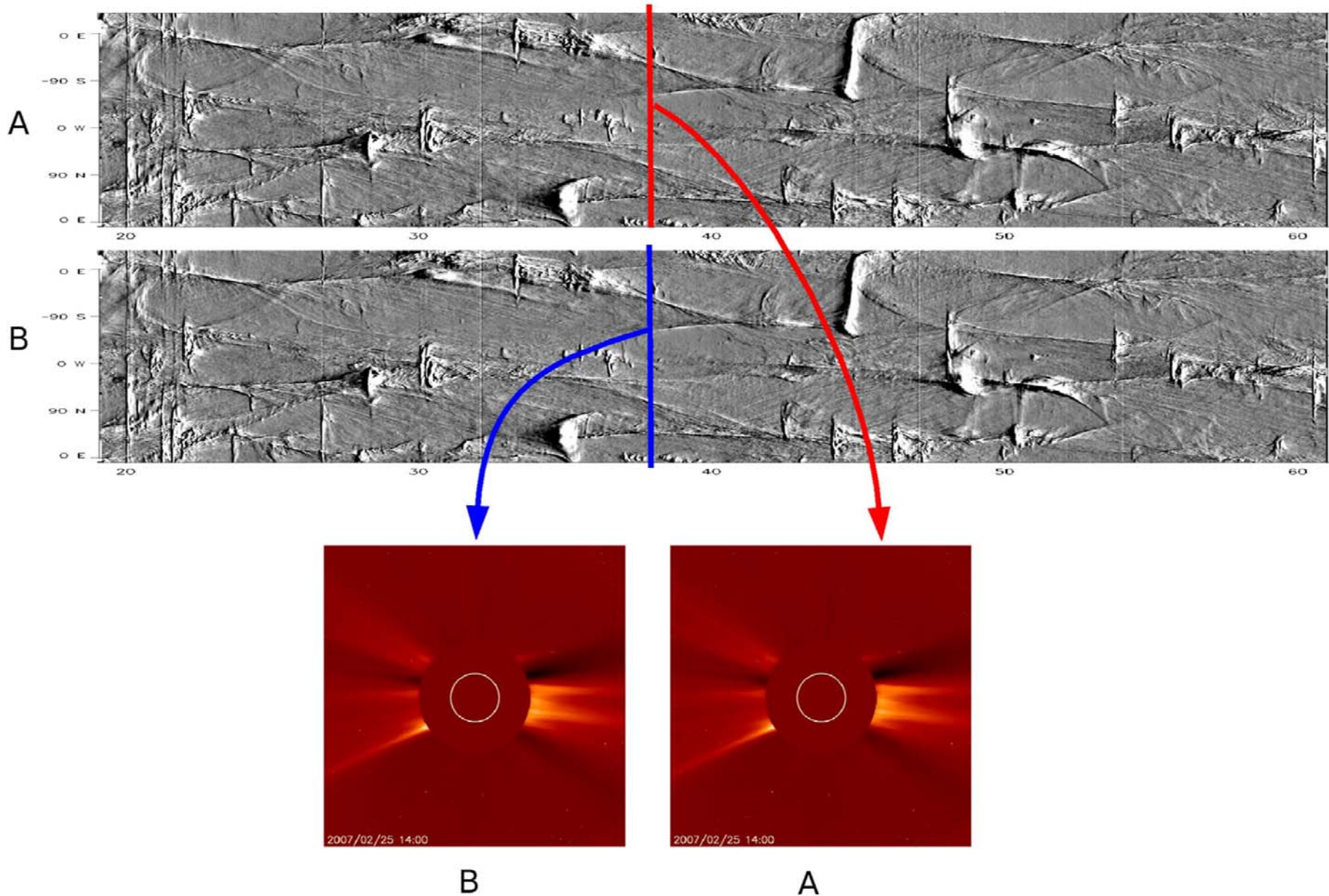
- **Constructed from scans at a constant radius as a function of time**
 - 20 radii from solar disk to 200 R_{sun}
 - Both spacecraft
- **2 Types of Intensity Maps**
 - Synoptic: Time increases left to right
 - Carrington Map: Time increases right to left
- **Quickly identify CMEs, Quiet Periods, Active Periods, Streamers, etc**

Example of Synoptic Map

LASCO C2, 3 R_{sun}, Jan-Feb 2004



Browsing Data Using Maps



Browsing Data Using Maps

SECCHI Synoptic Map Quick Look Browser - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://foie-gras/synomap/smapbrowser.html

Slashdot Laposte.net Yahoo! France Yahoo! TimeSheet Raytrace Software Raytrace local GnomeFiles Libération SynoLasco SynoAres

Disable Cookies CSS Forms Images Information Miscellaneous Outline Resize Tools View Source Options

SECCHI Synoptic Map Quick Loo...

Secchi Synoptic Map Quick Look Browser

EUVI A 195 EUVIB 195

1.2 R_sun
Next Month
Prev Month

A

B

2007-01-01 <prev next> ▲ 2007-02-01

20070117_191540_s4euB.fts 20070117_191540_s4euA.fts

Single Instr.
 All

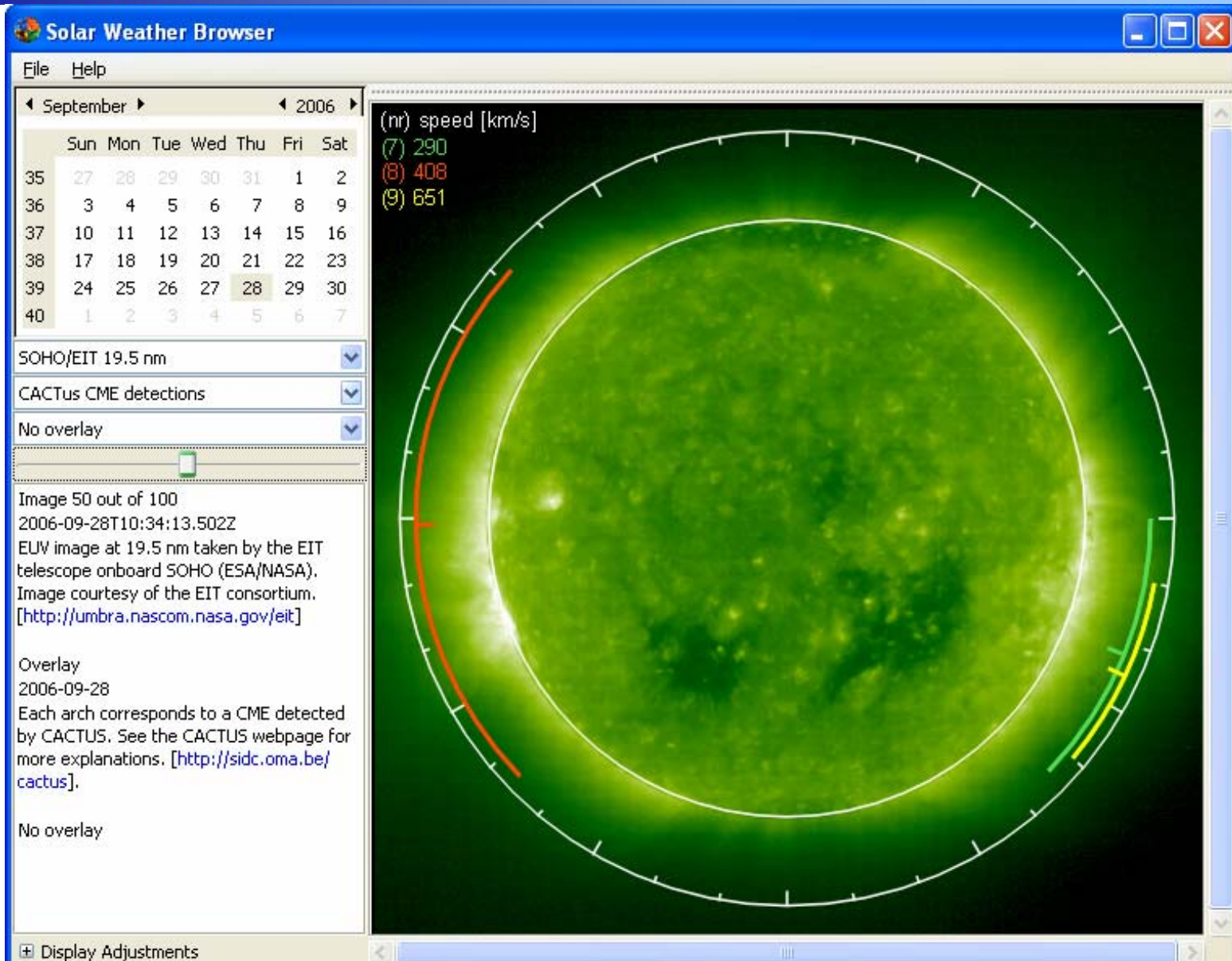
EUVI B **EUVI A**

Done

SOLAR WEATHER BROWSER

- Developed at Royal Observatory of Belgium
- Consists of two processes:
 - Server process currently running at ROB and NRL
 - Client process that must be set up on your machine
 - Download from <http://sidc.be/SWB>
- Many Data sets
 - SOHO: EIT, LASCO, MDI
 - STEREO: EUVI, COR1, COR2
 - Ground based observations : cm, H α , white light, magnetograms, Nancay radioheliograph
 - Overlays: Heliogrid, NOAA AR, Catania sunspot, CACTUS detection, solarsoft events
 - Future Datasets: XRT, SWAP, SDO

Sample Display: EIT & CACTus CME



Sample Display: EIT, Grid & NOAA Region

Solar Weather Browser

File Help

◀ October ▶ 2006 ▶

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
40	1	2	3	4	5	6	7
41	8	9	10	11	12	13	14
42	15	16	17	18	19	20	21
43	22	23	24	25	26	27	28
44	29	30	31	1	2	3	4
45	5	6	7	8	9	10	11

SOHO/EIT 17.1 nm

14 degrees long/lat

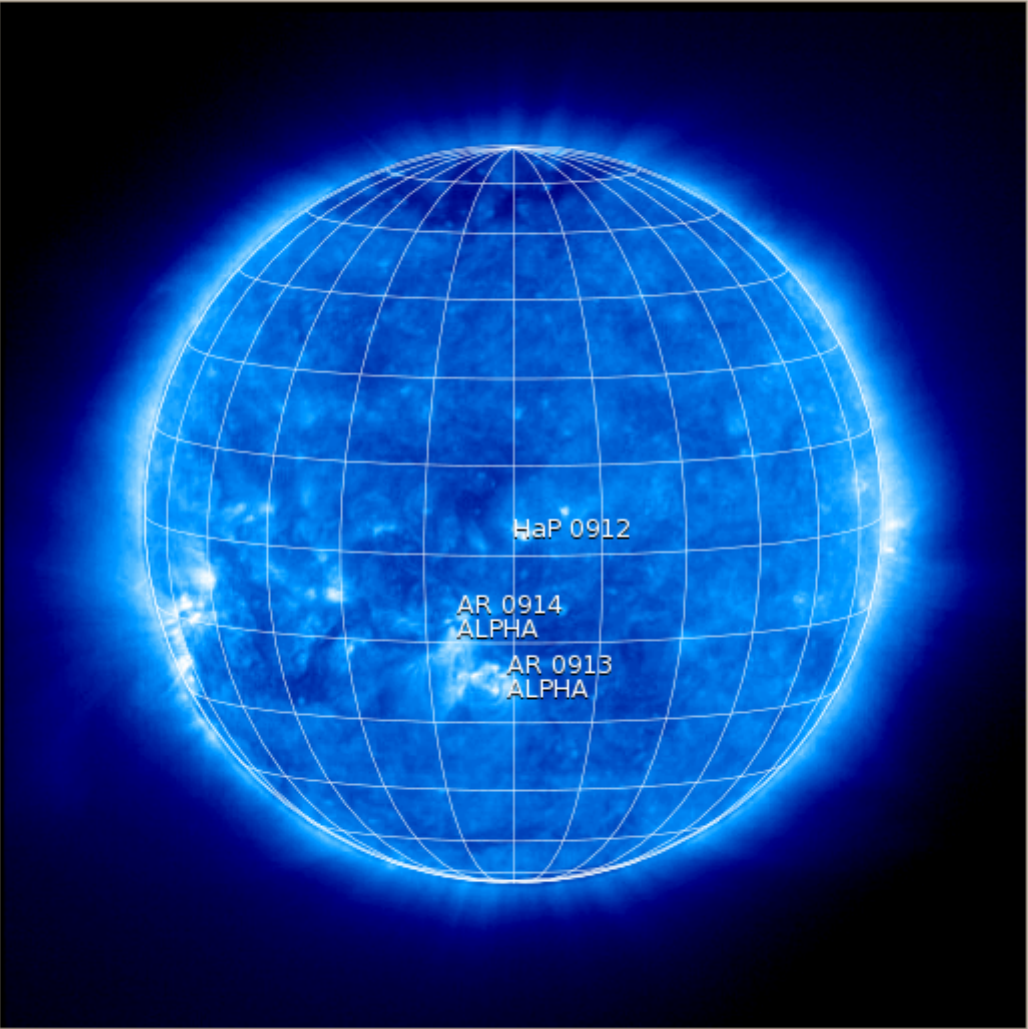
NOAA Solar Region Summary

Image 1 out of 2
2006-10-04T00:59:28.317Z
EUV image at 17.1 nm taken by the EIT telescope onboard SOHO (ESA/NASA). Image courtesy of the EIT consortium. [<http://umbra.nascom.nasa.gov/eit>]

Overlay
2006-10-04T12:00:00.000Z
14 degrees correspond roughly to the solar rotation during 1 day at the solar equator.

Overlay
2006-10-04T00:33:00.000Z

▶ Display Adjustments



HaP 0912

AR 0914
ALPHA

AR 0913
ALPHA

SECCHI

Festival

- **Developed by Institut d'Astrophysique Spatial, Orsay France**
- **Allows the user to select images from SOHO, STEREO-A or STEREO-B and to put them together in the right relationship to each other**
- **Available through SOLARSOFT**
- **Calls the SECCHI_PREP Routines**

Selection GUI

Festival [Window Title Bar]

File Options Help

STEREOA | STEREOB | SOHO

Synchro : Dates Instruments

Date min : 10-feb-2007 00:00:00
Date max : 10-feb-2007 15:58:00

LATEST IMAGES

Wavelength Filter/Polar

EUVI All All

COR1 All PB

COR2 All PB

HI1 All All

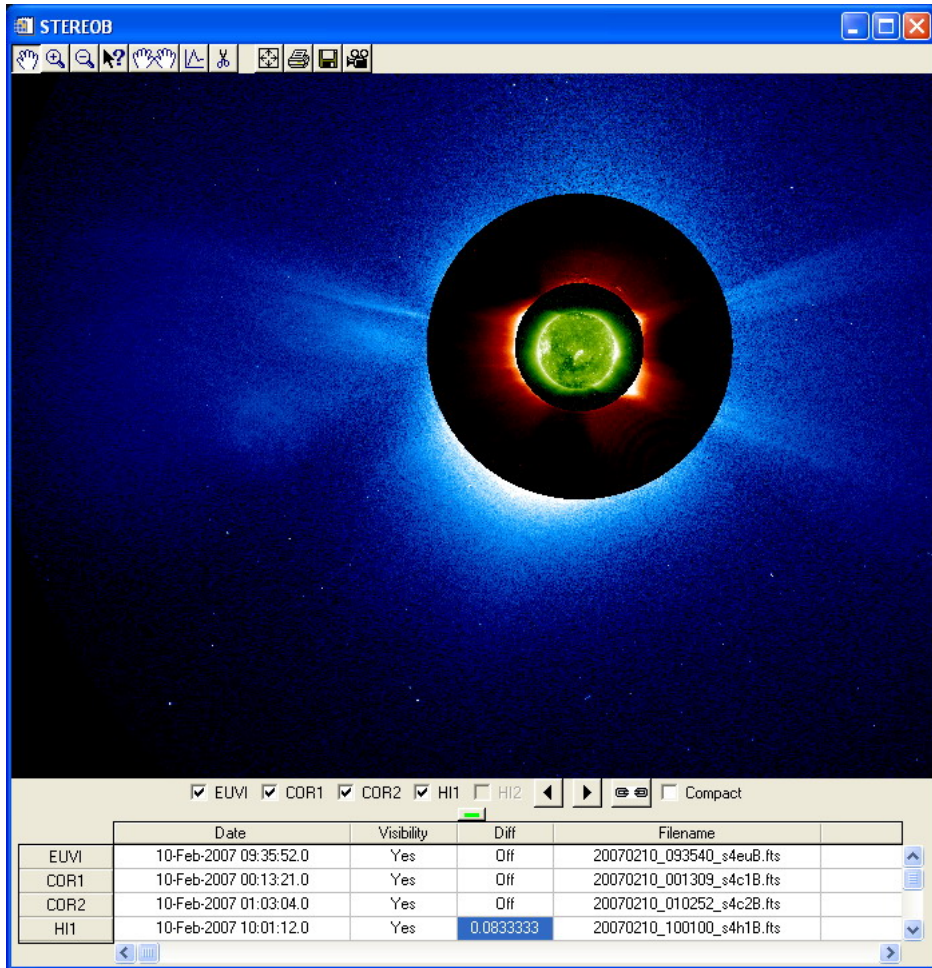
HI2 All All

Search

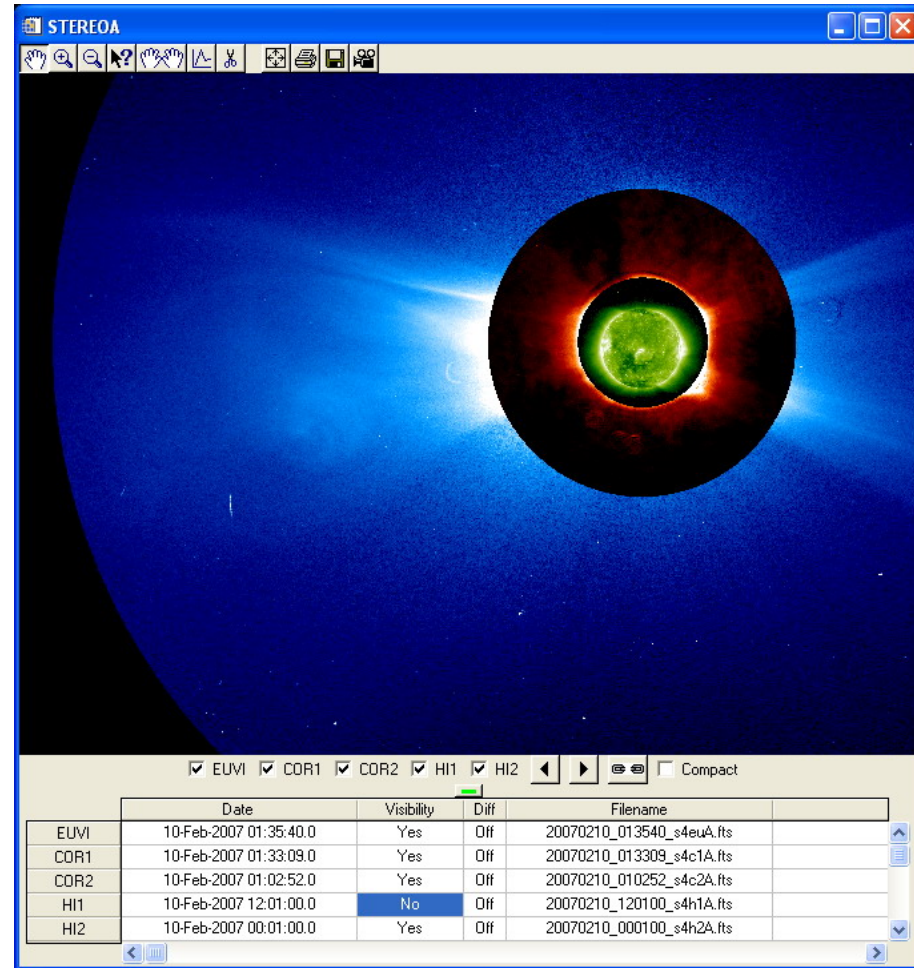
Date	Instrument	WL	Filter	Exp. time
10-Feb-2007 00:01:00.0	HI1	0	None	24.0000
10-Feb-2007 00:01:00.0	HI2	0	None	50.0000
10-Feb-2007 00:02:52.0	COR2	None	120	4.00000
10-Feb-2007 00:05:40.0	EUVI	195	S1	2.00000
10-Feb-2007 00:13:09.0	COR1	None	120	1.70000
10-Feb-2007 00:35:40.0	EUVI	195	S1	2.00000
10-Feb-2007 01:00:40.0	EUVI	195	S1	2.00000
10-Feb-2007 01:02:52.0	COR2	None	120	4.00000
10-Feb-2007 01:33:09.0	COR1	None	120	1.70000
10-Feb-2007 01:35:40.0	EUVI	195	S1	2.00000
10-Feb-2007 02:01:00.0	HI1	0	None	24.0000
10-Feb-2007 02:01:00.0	HI2	0	None	50.0000
10-Feb-2007 02:05:40.0	EUVI	195	S1	2.00000
10-Feb-2007 02:29:12.0	COR2	None	120	4.00000
10-Feb-2007 02:35:40.0	EUVI	195	S1	2.00000
10-Feb-2007 02:53:09.0	COR1	None	120	1.70000
10-Feb-2007 03:07:14.0	EUVI	171	S1	2.00000
10-Feb-2007 03:51:40.0	EUVI	195	S1	2.00000
10-Feb-2007 04:01:00.0	HI1	0	None	24.0000
10-Feb-2007 04:01:00.0	HI2	0	None	50.0000

Visualisation GUIs

STEREO B visu GUI



STEREO A visu GUI



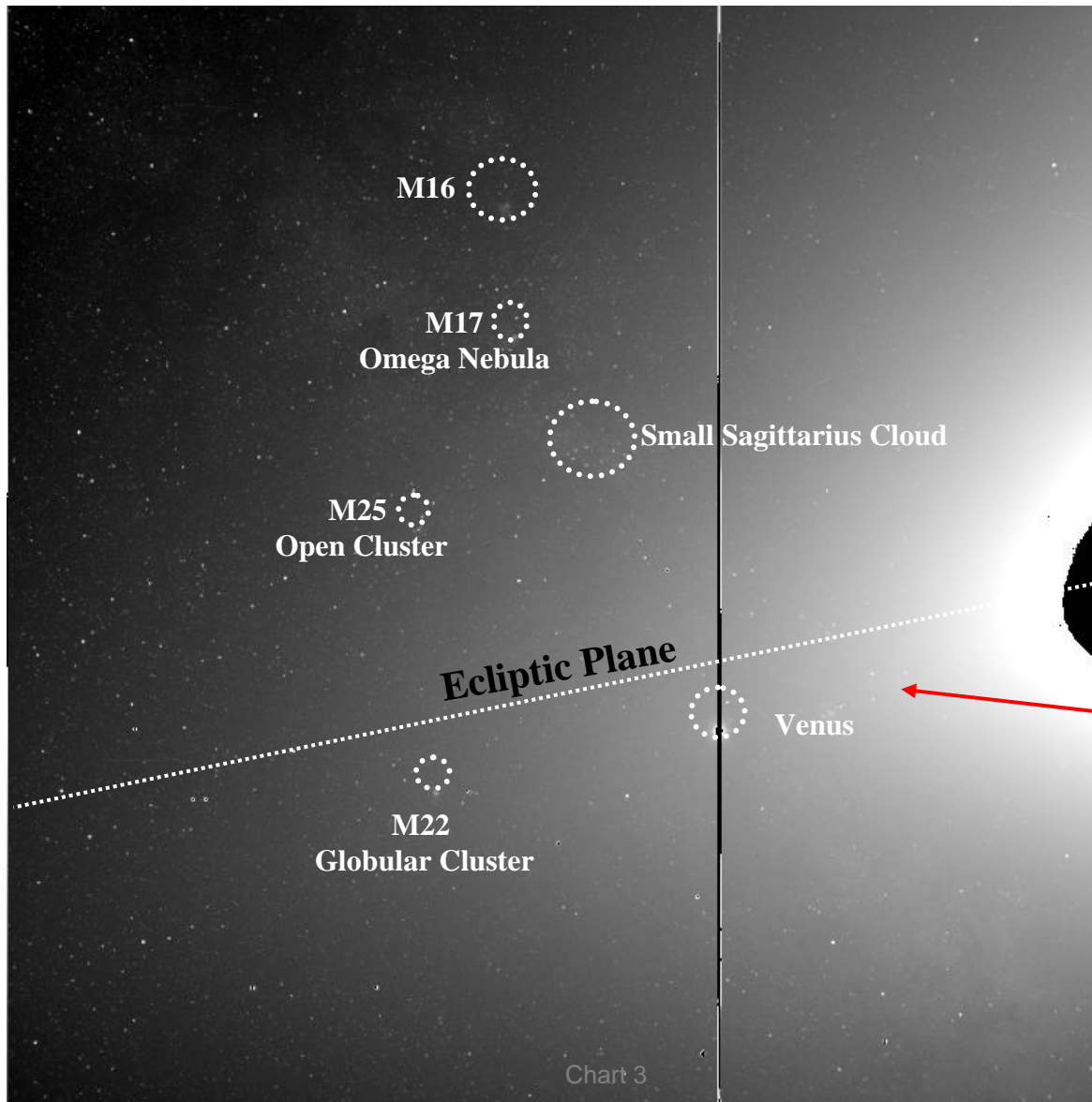
HI Instrument Status

- The HI instruments are performing superbly
- HI CEB and other electronics performance entirely nominal
- Thermal performance nominal
 - All temperatures within operating temperature limits
 - CCDs operating at $\sim -80^{\circ}\text{C}$; dark charge negligible, high tolerance against radiation damage effects
- *No new issues or problems since launch*
- Calibrations of flat fields, pointing offsets, etc proceeding well
- Imaging performance consistent with pre-launch determinations
 - HI-2B PSF worse than HI-2A, but no impact on Level-1 science

Synoptic Program	HI-1	HI-2
Exposure Time	24 sec	50 sec
Exposure Cadence	30 sec	60 sec
Number of Images in Summed Sequence	50	99
Duration of Exposure Sequence	25 min	99 min
Summed Sequence Cadence	40 min	2 hr
Observing Duty Cycle	50%	67%

SECCHI HI-1 First Light Ahead STEREO Spacecraft

Stars &
Asteroids
seen to
mag 12



Approximate
Location of
Sun



F-Corona
(Zodiacal Light)

SECCHI HI-2 First Light Ahead STEREO Spacecraft

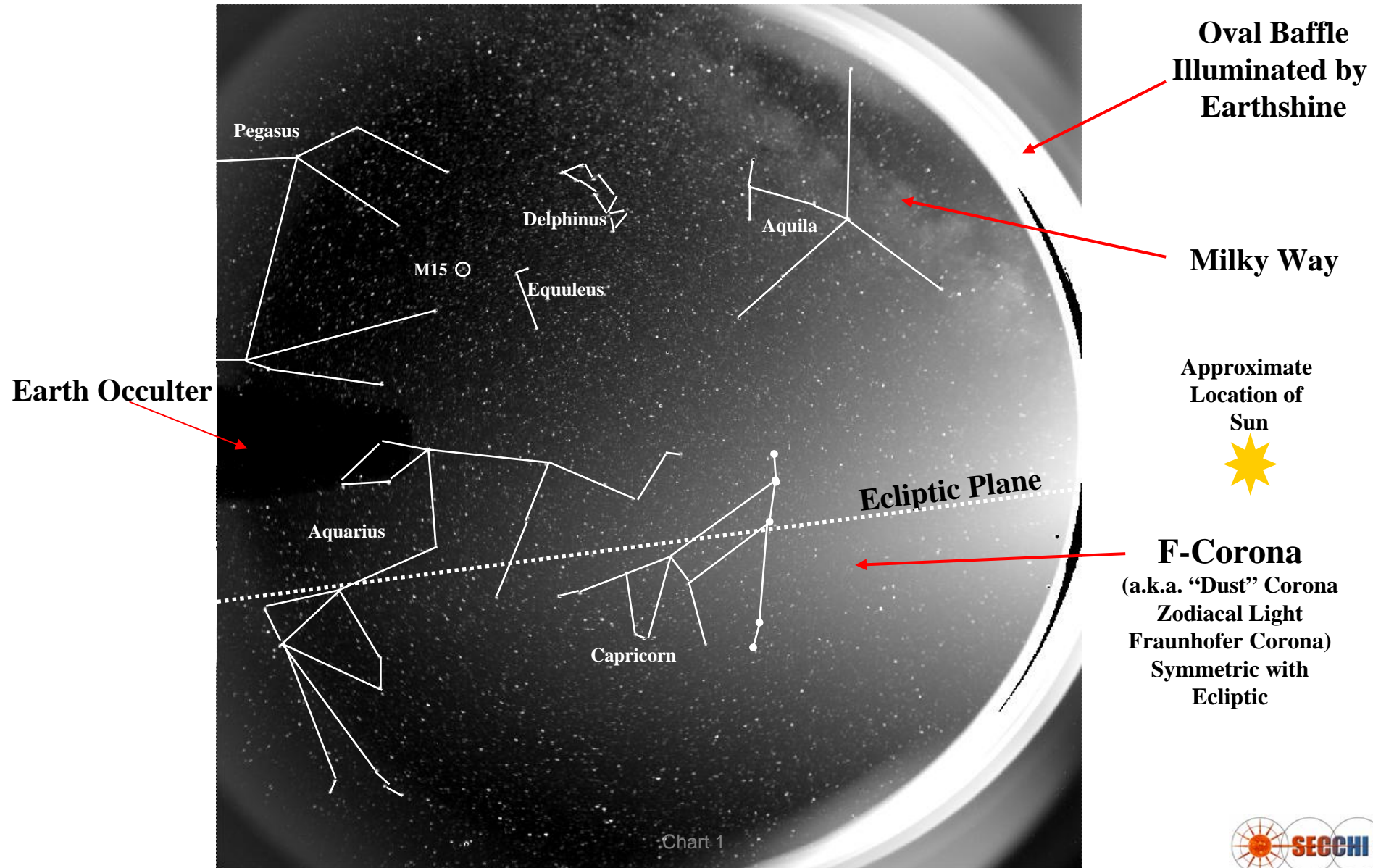
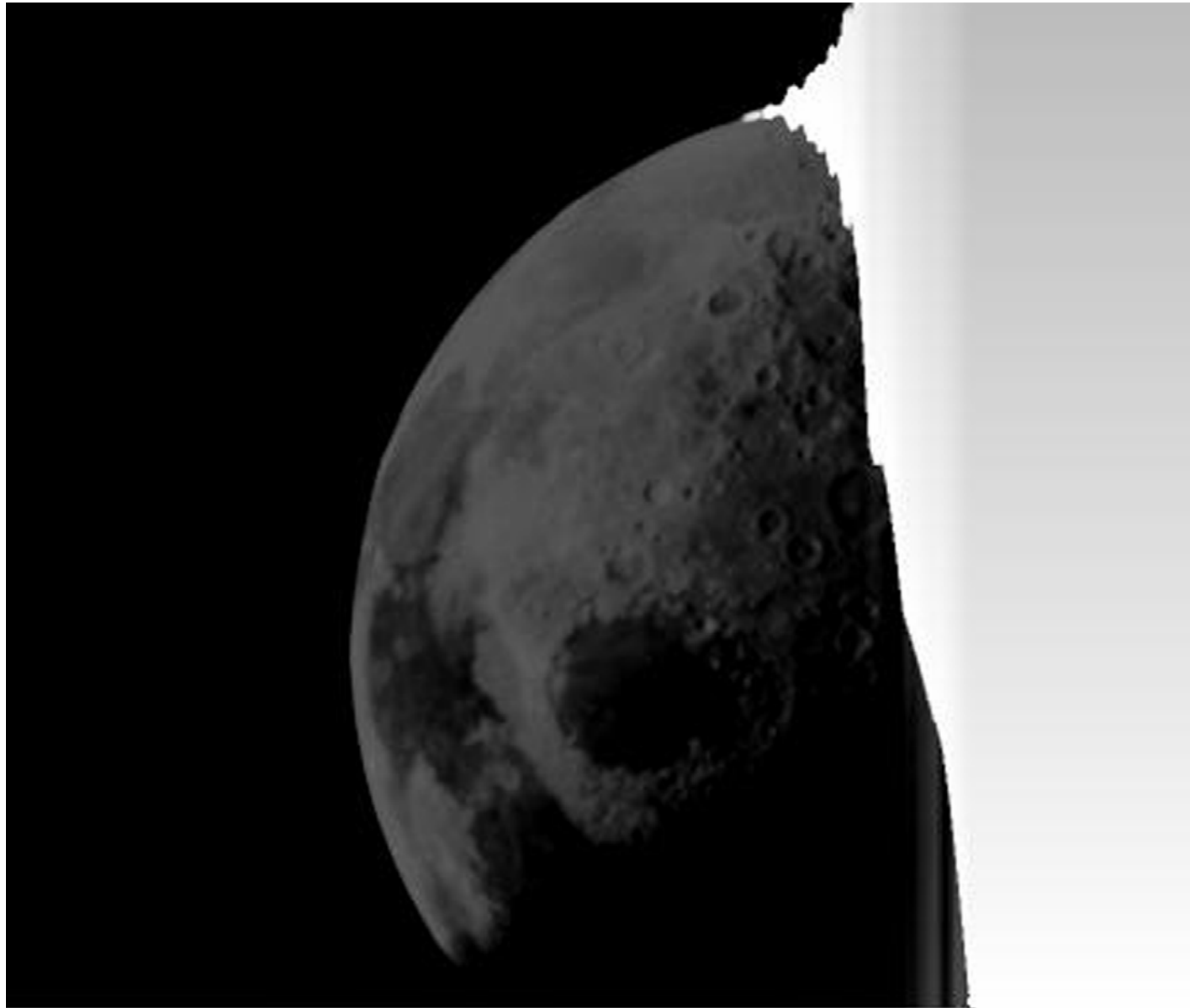
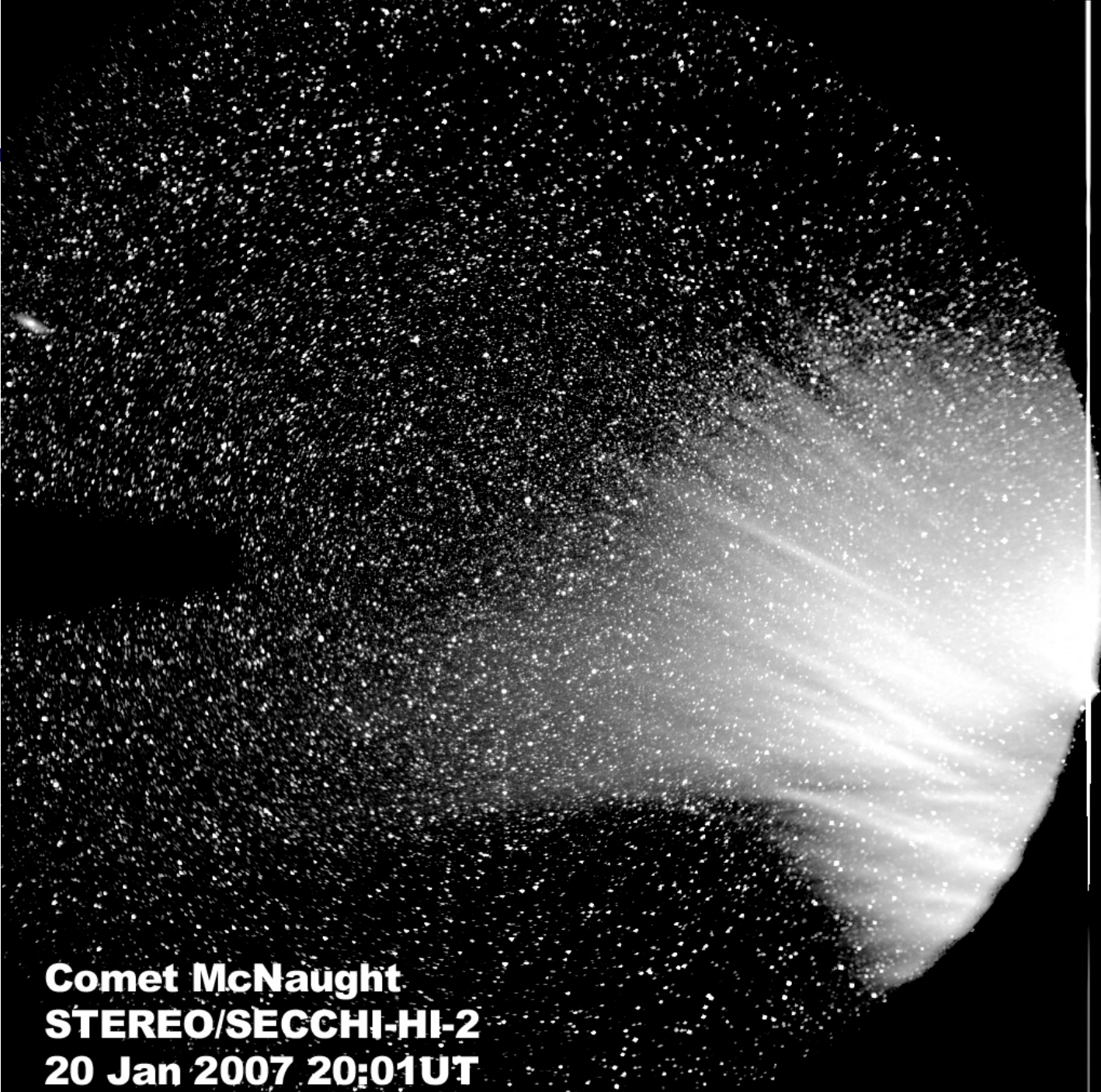


Image of Moon from SECCHI/HI-2 During STEREO-A Flyby 12/15/2006



A vertical strip of a comet's tail, showing a bright, glowing head at the top and a long, thin tail extending downwards. The background is a dark, starry sky. The comet's head is bright and has a distinct white coma. The tail is a long, narrow, and slightly curved stream of light, appearing to be composed of many small, bright particles. The overall appearance is that of a classic comet with a well-defined head and tail.

**Comet
McNaught
Movie HI-1**



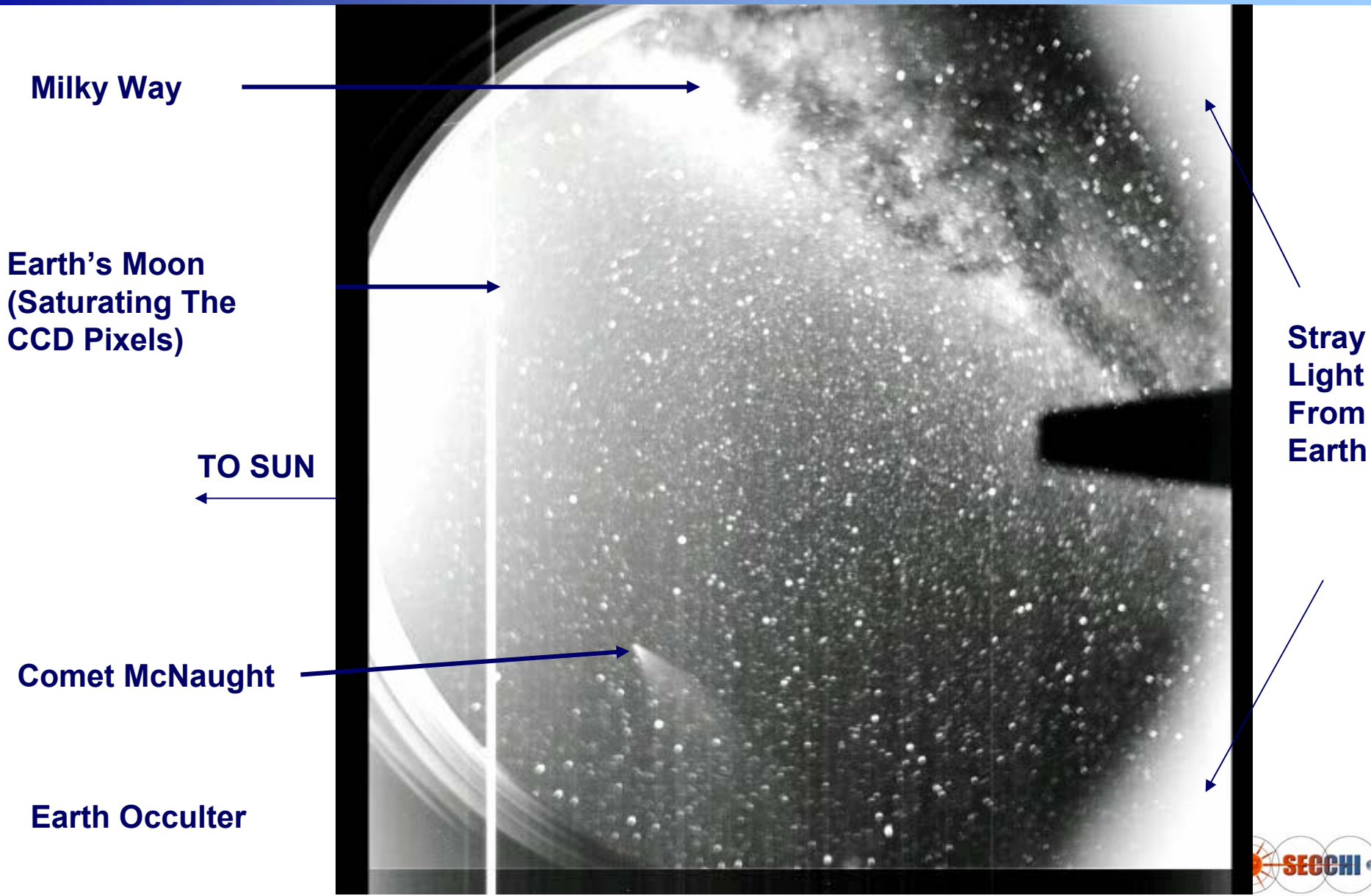
**Comet
McNaught
in HI2**

**Andromeda
in upper
left**

**Comet McNaught
STEREO/SECCHI-HI-2
20 Jan 2007 20:01UT**



HI-2B Comet McNaught Receding

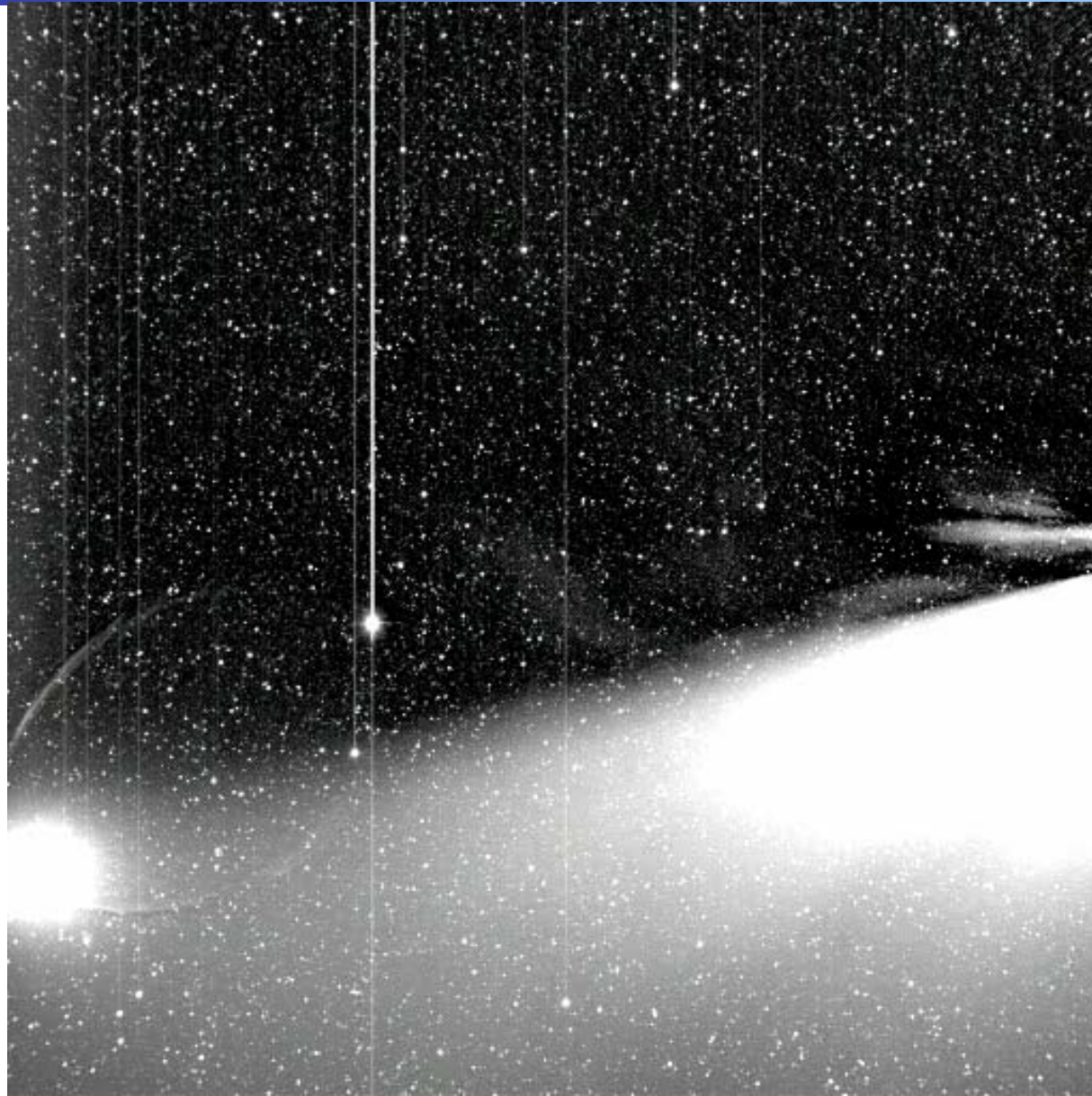


HI 1A: 2007 Feb 1-15

Mercury

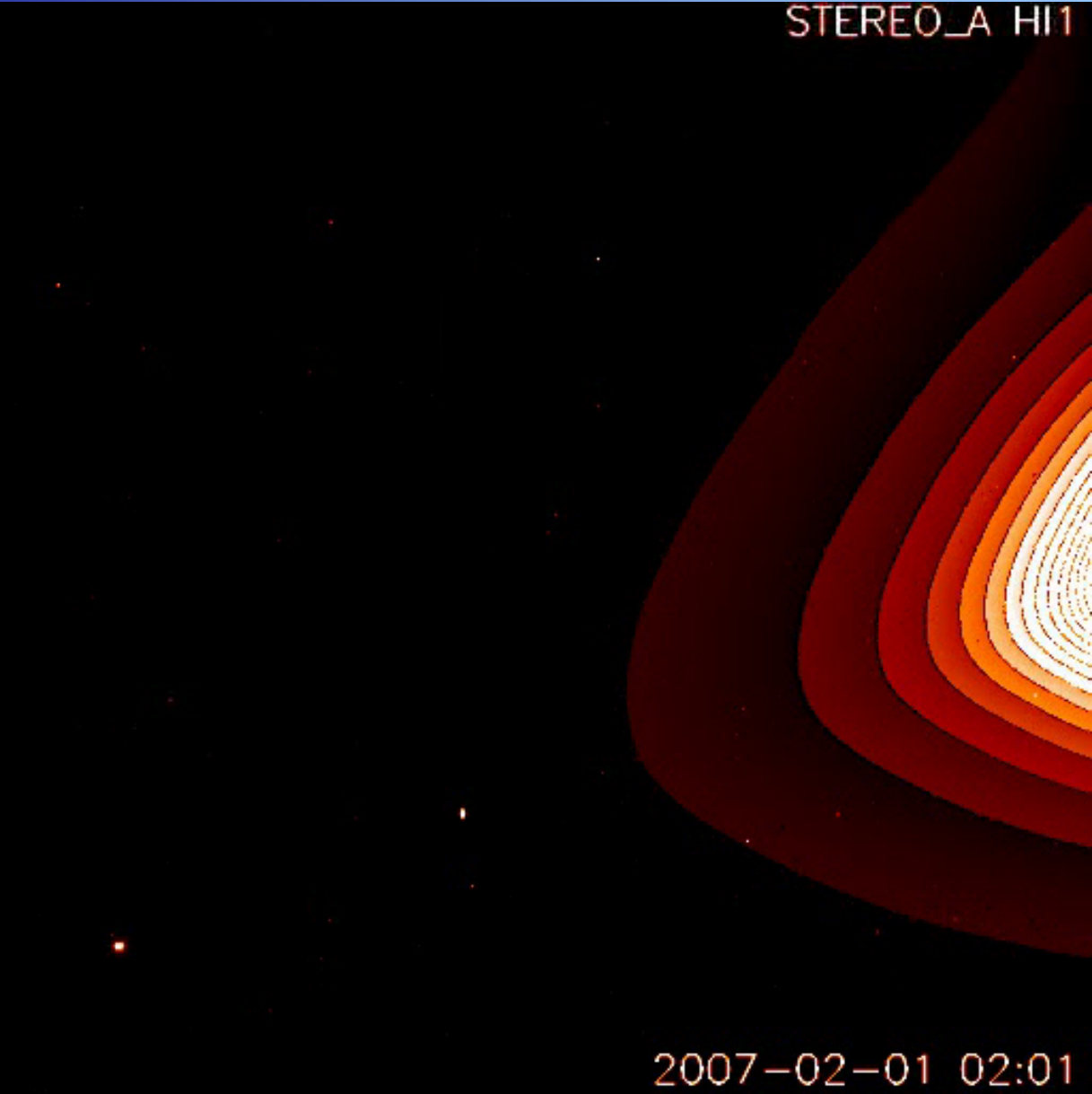


Venus
and
optical
system
ghost
artifact



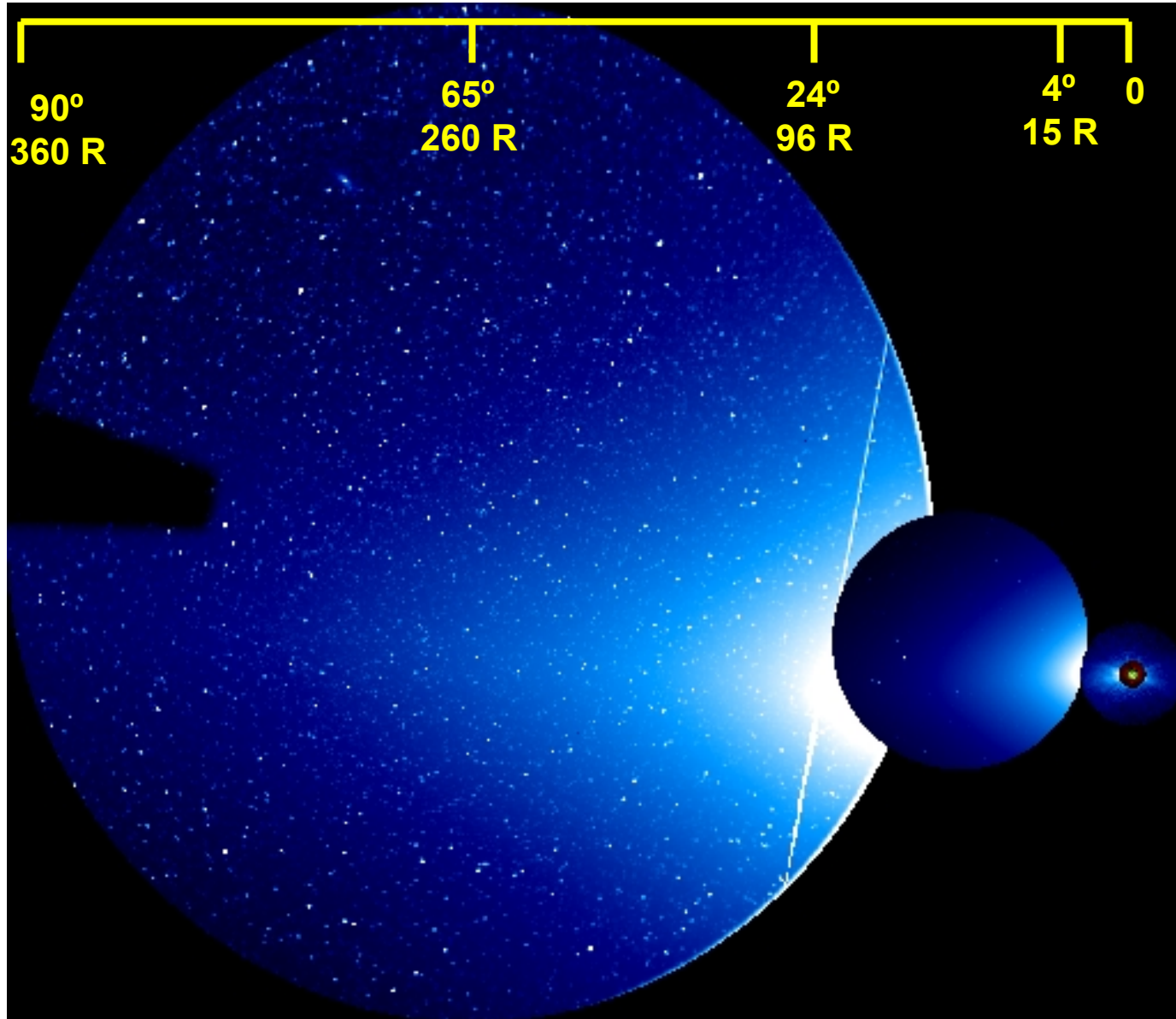
Streamer
relocates to
a higher
latitude

HI-1A Desmeared



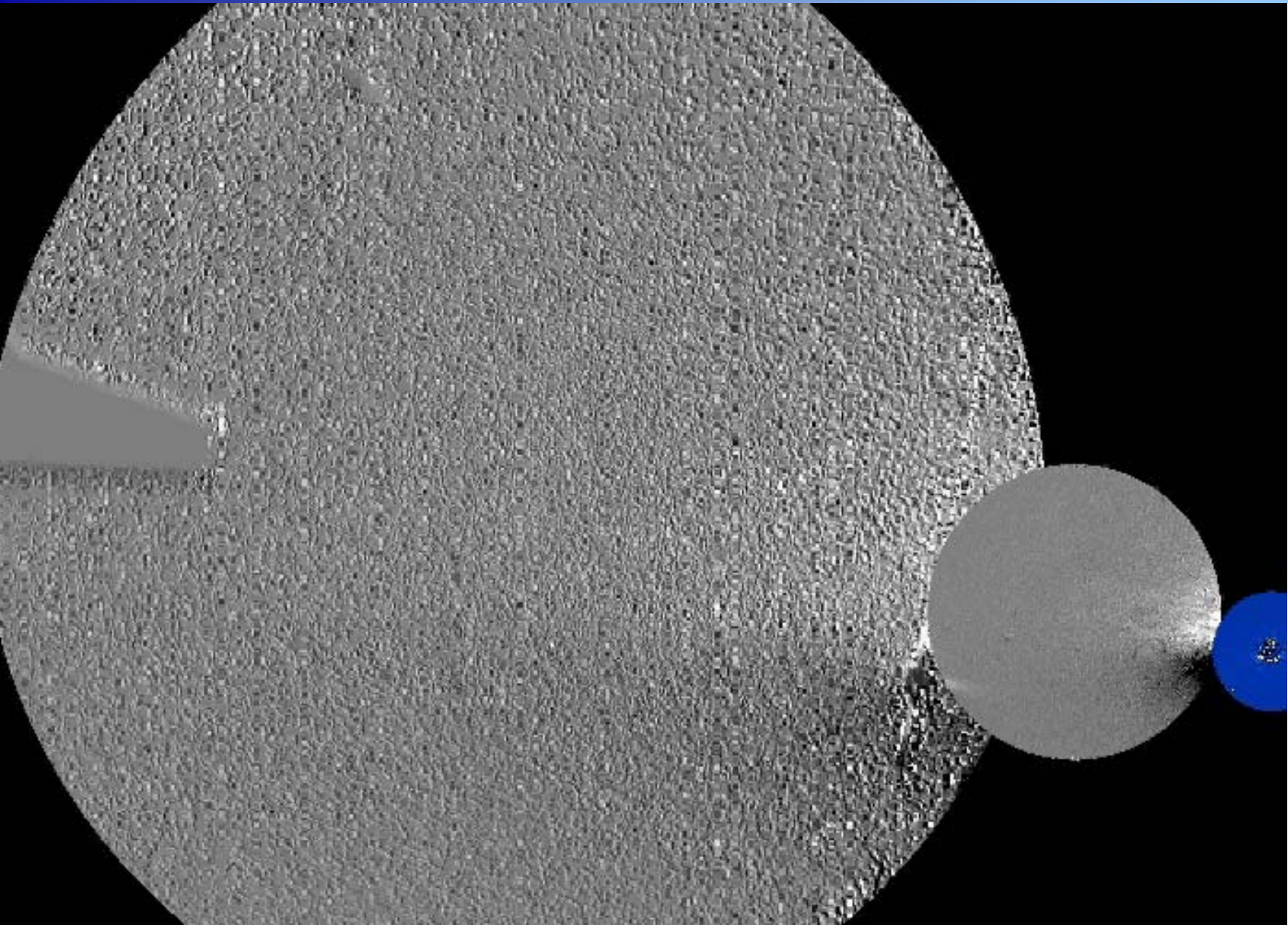
Putting All the A-Telescopes Together

$4R \approx 1^\circ$



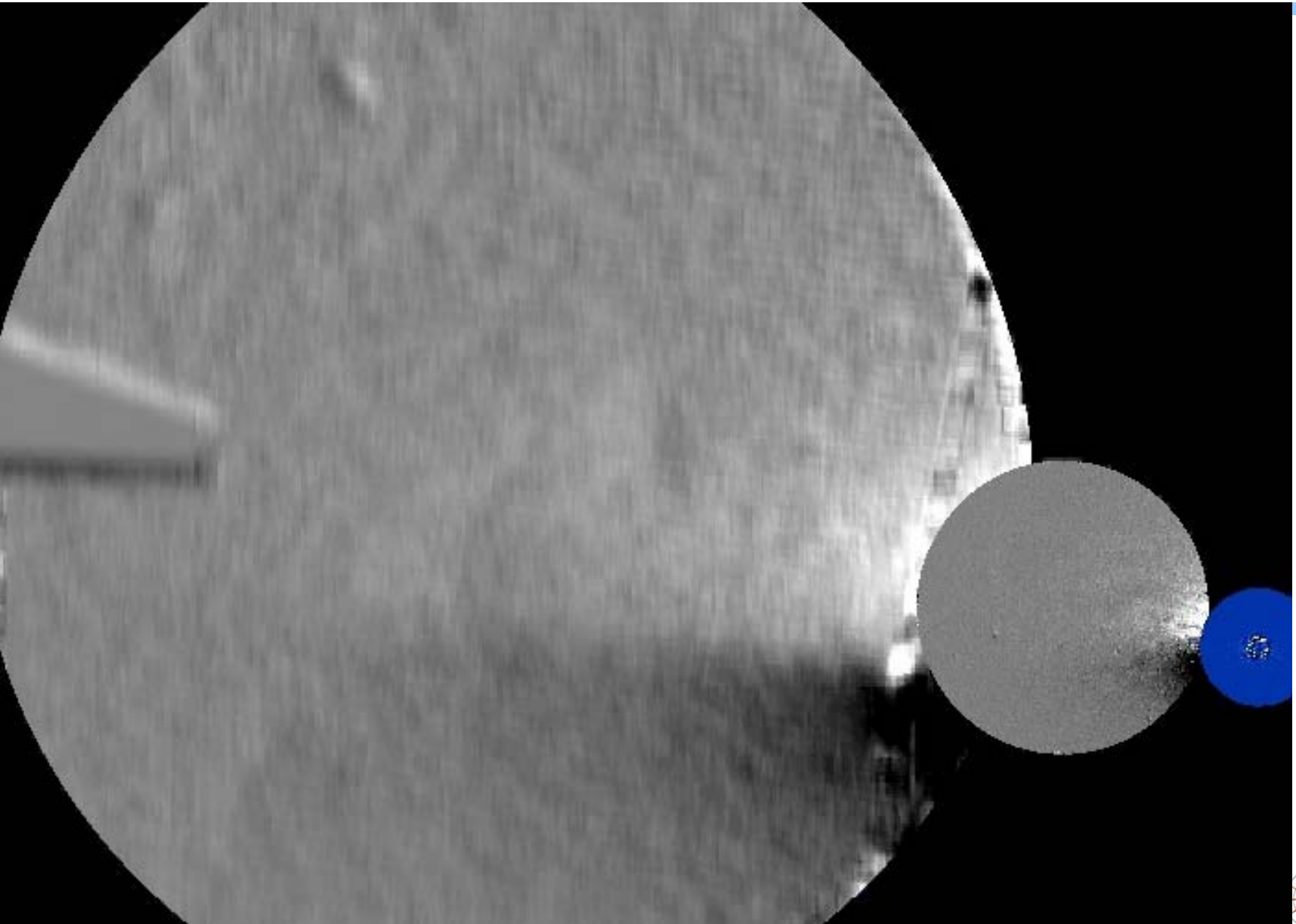
COR2, HI-1, HI-2: 9 Feb 2007

Running Differences



COR2, HI-1, HI-2: 9 Feb 2007

Running Differences & Additional Filtering



Summary

- **For the first time we will be able to observe from the Sun to the orbit of Earth**
- **SECCHI is ready to join SWAVES, IMPACT & PLASTIC to fulfill the mission objectives and to make major advances in our understanding of CMEs – their initiation, propagation and related effects**