SECCHI Calibration Activities

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Scope of Discussion

- **Only discuss activities involving spacecraft maneuvers (offpoint and/or roll)**
- **Will not discuss functional tests, mechanism calibrations, door activities, etc (internal SECCHI calibrations)**

GT Calibration (1 of 2)

- **Initial Sun Acquisition on Day 17 (Ahead) and Day 19 (Behind)**
  - **First use of GT signal by spacecraft G&C system**
  - **Requires increased SECCHI RT telemetry (93 kbps) for 1.5 hours**
  - **Both the S/C and SECCHI collect high rate S/C attitude and GT data during this initial sun acquisition.**
  - **SECCHI will analyze the data from the initial sun acquisition to improve the GT gain calibration for both primary and redundant diodes.**

GT Calibration (2 of 2)

- **Subsequently, while in sun fine pointing mode, SECCHI will induce small amplitude offpoints that are initiated by changing the GT offpoint bias in the SEB.**
  - **Offpoints are scheduled for Days 38 and 39 (Ahead) and Days 43 and 44 (Behind).**
  - **Calibration is carried out in real time for Ahead, requiring increased SECCHI RT telemetry for 1.5 hours.**
  - **Calibration is carried out as a scheduled event lasting 1.5 hours outside of contact for Behind.**
  - **Both the S/C and SECCHI collect high rate S/C attitude and GT data during the offpoints.**
  - **Offpoints are nominally $\pm$ 20 and $\pm$ 40 arc seconds in both axes.**
  - **SECCHI will analyze the data from the offpoints to further improve the GT gain calibration.**

Stepped Calibration Roll

- **Roll spacecraft through 360 degrees with dwells at selected roll angles (steps between dwell positions are either 30 or 60 degrees).**
- **Carried out as a scheduled event lasting 2 hours outside of contact on Day 73 (Ahead) and Day 104 (Behind).**
- **Obtain images from coronagraphs (COR1 and COR2) at each dwell position, and from EUVI and HI at selected dwell positions.**
- **Objective is to calibrate the polarization measurements and determine the instrumental stray light.**
  - **Assumption is that the coronal scene does not change during the roll, hence the dwell times are kept as short as possible consistent with obtaining the necessary observations.**

EUVI Flat Field (1 of 2)

- **Offpoint up to ± 12 arc minutes in both axes driven by spacecraft G&C system with dwells of 30 – 45 minutes at each of five positions as outlined in the table below. The sixth position returns the pointing to nominal.**
- **Images obtained at each position allow derivation of the EUVI vignetting and large-scale flat field pattern using the Kuhn technique.**
- **Offpoint carried out as a scheduled event lasting 4 hours outside of contact on Day 72 (Ahead) and Day 103 (Behind) [after EUVI door has been opened].**

Position #	Ry (degrees)	Rz (degrees)
1	-0.20	-0.05
2	-0.10	+0.10
3	+0.05	+0.20
4	+0.20	-0.05
5	+0.05	-0.20
6	0.00	0.00

EUVI Flat Field (2 of 2)

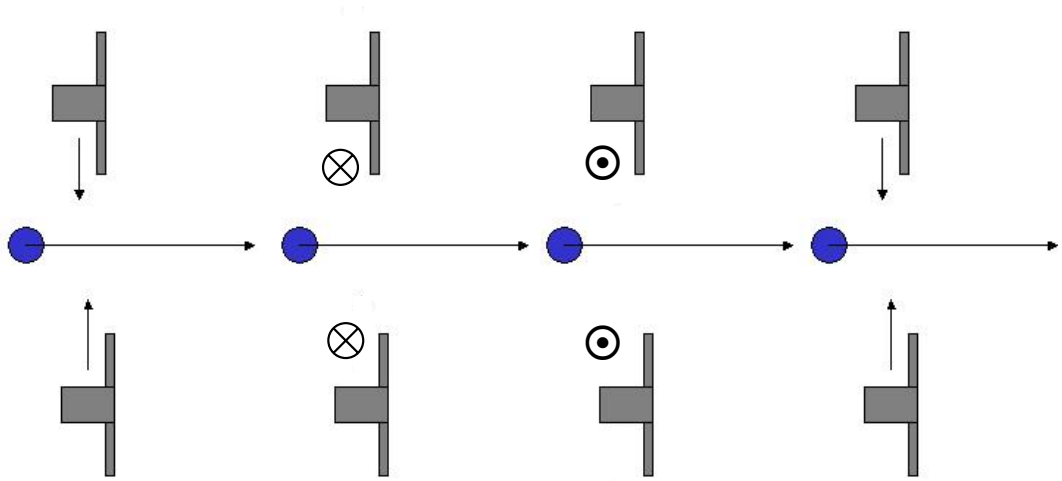
- **Offpoint up to ± 35 arc seconds in both axes driven by SECCHI with dwells of 10 minutes at each of eight positions. The ninth position returns the pointing to nominal.**
- **Images obtained at each position allow derivation of the EUVI small-scale flat field pattern using the Kuhn technique.**
- **Offpoint carried out as a scheduled event lasting 1.5 hours outside of contact on Day 70 and 71(Ahead) and Day 101 and 102 (Behind) [after EUVI door has been opened].**
- **This calibration consists of two near-identical runs that are executed on separate days: Run #1 takes images in 171 Å and 304 Å, Run #2 takes images in 195 Å and 284 Å.**

Sun-Pointing Calibration

- **Offpoint up to ± 40 arc seconds (nominal) in both axes driven by SECCHI with dwells of 10 minutes at each of eight positions. The ninth position returns the pointing to nominal.**
  - **Offpoint positions may be adjusted within the linear range of the GT to find the best GT bias for the coronagraphs.**
  - **Carried out over two days, with the first day providing a coarse calibration, and the second day providing a fine-tuning of the optimum pointing based on the results of the coarse calibration.**
- **Offpoint is carried out as a scheduled event lasting 1.5 hours outside of contact on Days 60 and 62 (Ahead) and Days 90 and 92 (Behind) [after the SCIP telescope doors have been opened].**

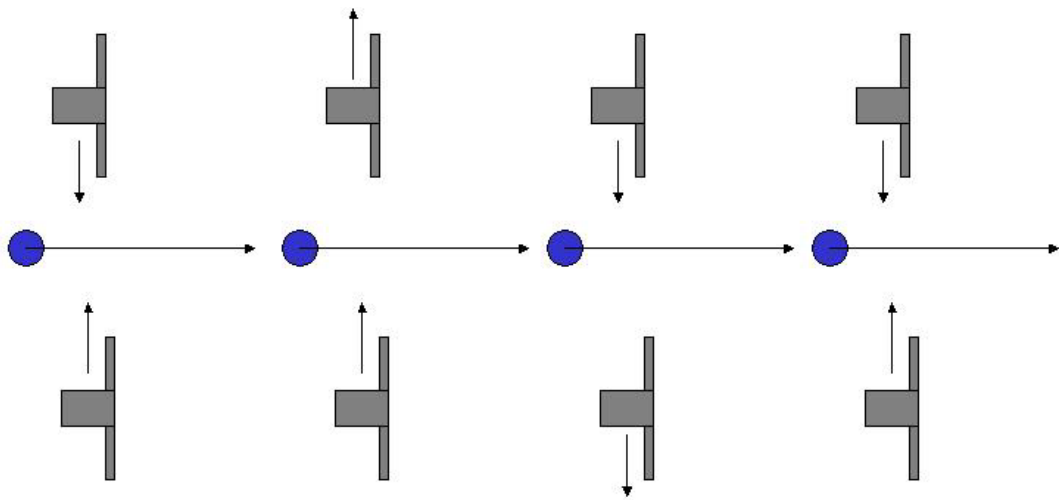
HI Calibrations (1 of 3)

- **HI Cross Calibration – Coincident 90° and 270° rolls on both spacecraft**
  - **Allows observation of the same portion of the sky perpendicular to the ecliptic plane in both HI instruments, without significant stray light from the bright Earth.**
  - **Calibration needs to be carried out early in the mission, while there is significant overlap between the fields of view of HI-A and HI-B.**
  - **Requested that this calibration be carried out in early March 2007, when the spacecraft roll angles are well aligned to the ecliptic plane.**



HI Calibrations (2 of 3)

- **HI Cross Calibration – Consecutive 180° rolls on both spacecraft.**
  - **Allows the HI instruments on both spacecraft to view the same portion of sky in the ecliptic plane by rolling one spacecraft at a time through 180 degrees.**
  - **One HI instrument will view past the bright Earth whilst the other will have the Earth behind it.**
  - **Calibration needs to be carried out early in the mission, when the fields of view of the two HI instruments are approximately at 180°.**
  - **Requested that this calibration be carried out in early March 2007, when the spacecraft roll angles are well aligned to the ecliptic plane.**



HI Calibrations (3 of 3)

- **Requested that the spacecraft should be offpointed in the HI pitch direction (spacecraft yaw), with dwells of 10 minutes at the following offpoint positions: -0.25 degree, -0.50 degree, -0.75 degree, -1.0 degree, -1.5 degrees, +0.50 degree, +1.0 degree.**
  - **Negative pitch is downwards towards the Sun; positive pitch is away from the Sun.**
- **Allows characterization of the stray light response.**
- **Requested that this calibration be carried out within six months of the S1 maneuver, and again close to perihelion during 2007, when the angular size of the Sun is at its maximum value.**