PLASTIC Operations Status

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UNH

STEREO Science Team Meeting, March 2007

Status of Operations

- All commanding is now done from the UNH POC, through the MOC at APL.
  - Commanding is real-time, during passes
  - Most future commands will be sent as time-tag events before a pass begins.
    - Exception: HV and table loads/readbacks.
- FM1 and FM2 are in stable states:
  - 20 kV PAC (acceleration between entrance system and carbon foils)
  - ~2700V MCP
- Entrance system is in full operation, sweeping:
  - Deflectors (steer ions from above or below horizontal plane)
  - ESA (concentric domes)
  - Small geometrical factor aperture (for high intensity solar wind H+)
  - Sweeping began January 18 (A) and January 19 (B), 2007.

Status

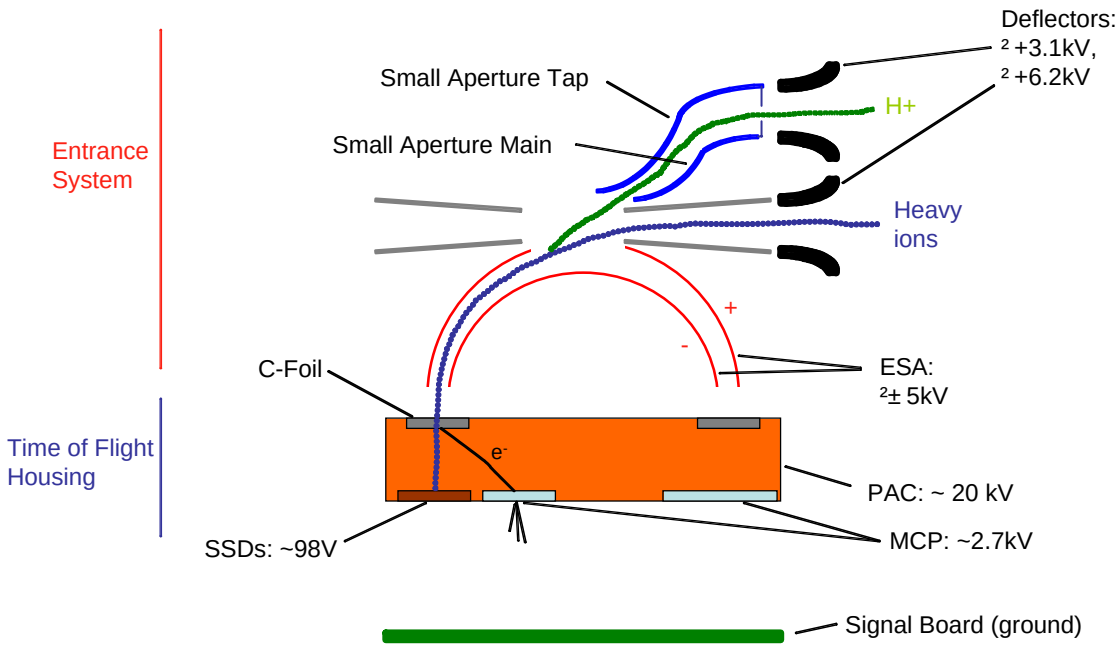
- Pulse height validity test
  - PLASTIC measures:
    - Time of flight
    - Energy (pixellated SSDs)
    - Azimuthal direction (position from resistive anode & discrete anodes)
  - Valid event condition:
    - (2) A non-SSD side pulse height event is valid if it has **time-of-flight**. Multiple and absent positions are allowed.
    - (3) An SSD-side pulse height event is valid if it has **time-of-flight,** and **no multi-energy** measurements.
- Full resolution rate in science mode: RA_Trig
  - Azimuthal direction rate
  - Fastest counter, with average deadtime of ~2 microseconds
  - Cadence:
    - One minute cycle - entrance system voltage sweep
    - Rate is reported on every deflection step for half of a sweep - 12.8 mS/step

Planned Changes

- Approve and upload latest version of IDPU software:
  - Enables commandable starting step for full resolution rates
  - Enables auto-latchup recovery
  - Updates autonomous procedures for safing and restoration of entrance system for off-pointing and thruster operations
  - Adds sequence counters that were missing in some data products
  - Updates to Beacon mode software
  - Improves monitoring of high voltage ramps
  - Change sweeptable for IDPU moment calculations
- Modify the azimuth table to capture events whose positions are just outside the defined solar wind sector.

Operations History

- PLASTIC startup went well after launch and outgassing period.
- PAC, MCP and SSD supplies operated without incident.
- Fixed ESA voltages were used initially to detect ions with energies >6 keV/e.
  - Prior to December 2006 SWT meeting

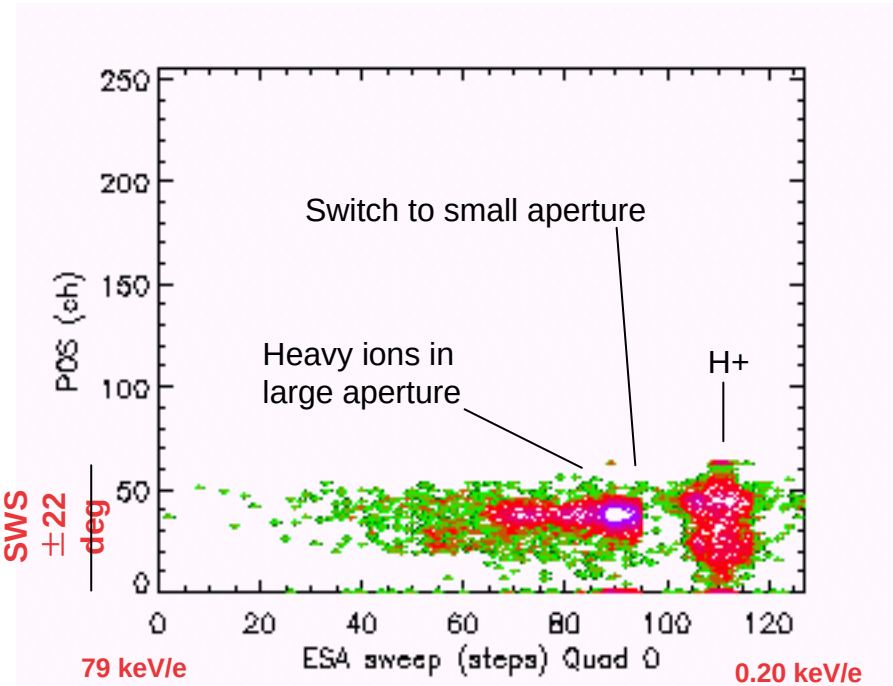


Operations History

- First attempts at full entrance system operation brought down *all* high voltages.
  - The high voltage control board was getting reset to zero setpoints.
  - Testing in flight and on the EM resulted in a procedural workaround.
  - All procedural changes moderate voltage increases at the beginning of a sweep:
    - ESA voltage is increased in two steps at retrace, instead of one.
    - Deflector setpoints are explicitly set to zero during the entrance system high voltage enabling procedure.
    - The maximum deflector voltage is limited to 2 kV in the first ESA step.
- The PAC was increased from 17kV to 20kV after sweeping was established.
- MCP voltages were adjusted to the present values.

Azimuthal Determination: Bifurcation in Small Aperture

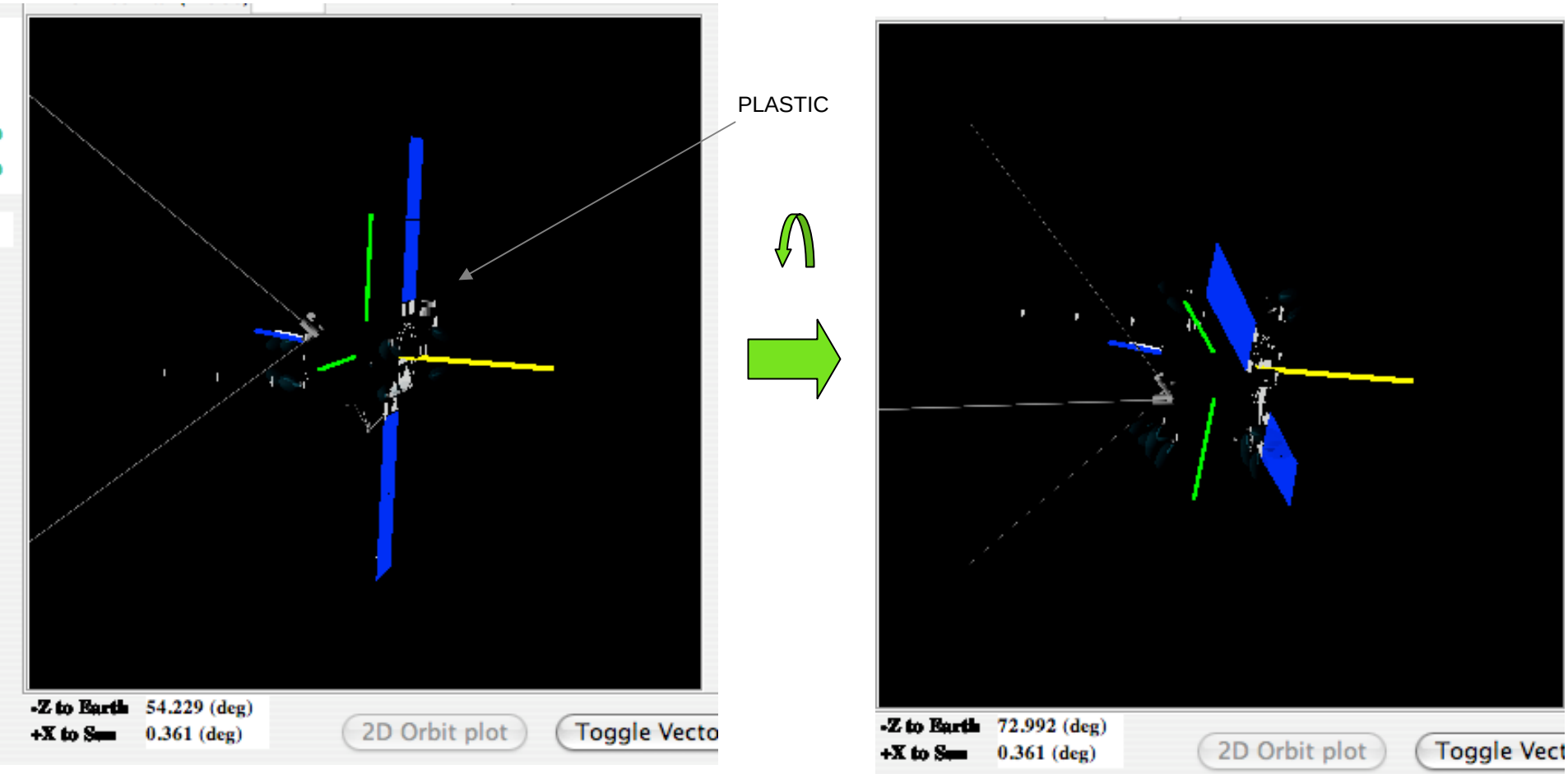
- Azimuthal position with the small aperture is double-peaked
- Pre-launch calibration data was single-peaked.
- Roll test demonstrates that azimuth may be derived from the *average* position.



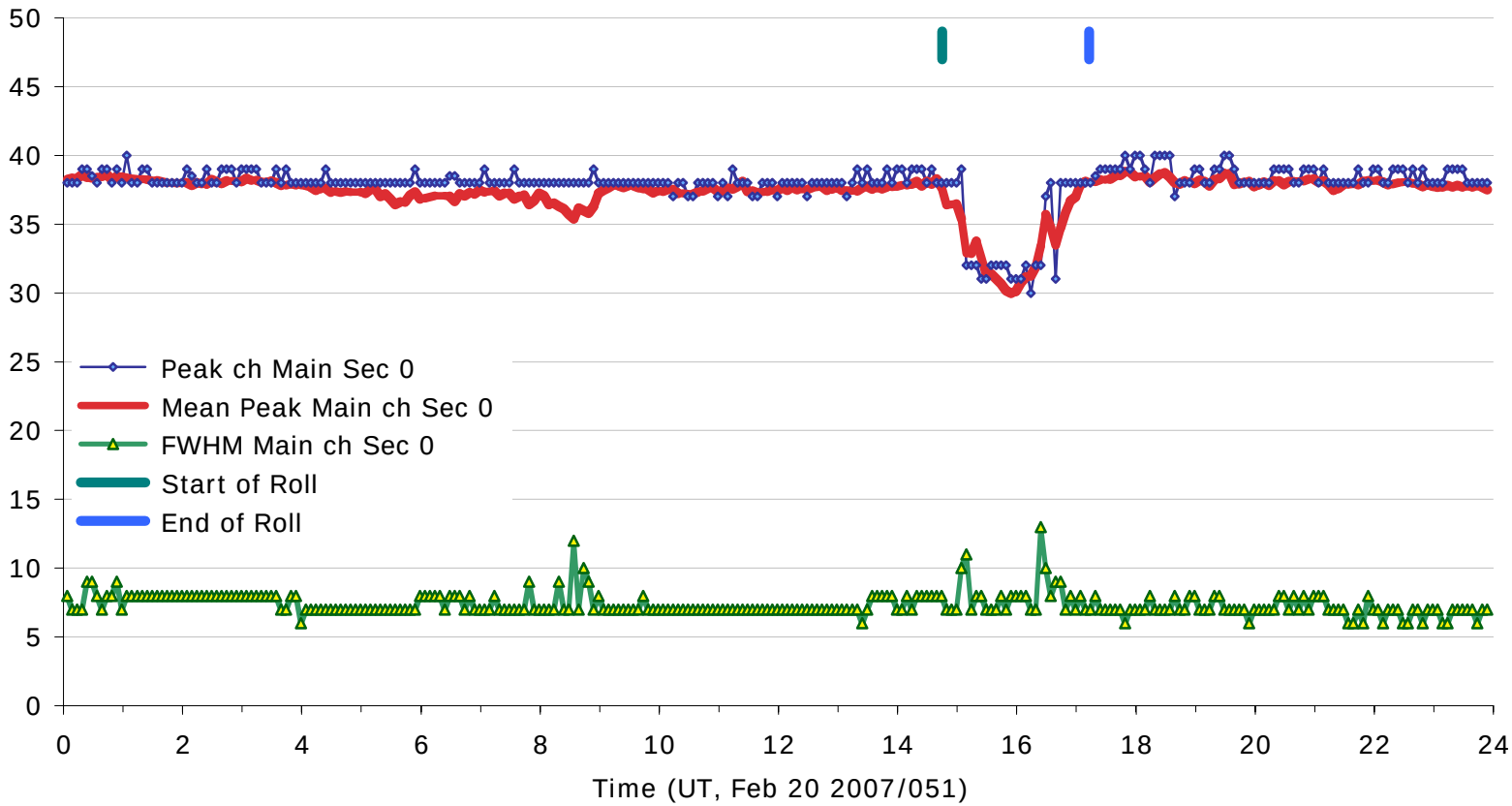
FM1 20070212 minutes 50-74
Apid315_0_127_STA_L1_PLA_20070212_043_V07

Direction Finding Test

SECCHI S/C A Roll: Feb. 20, 2007: 2.5 hours, Stepped Roll



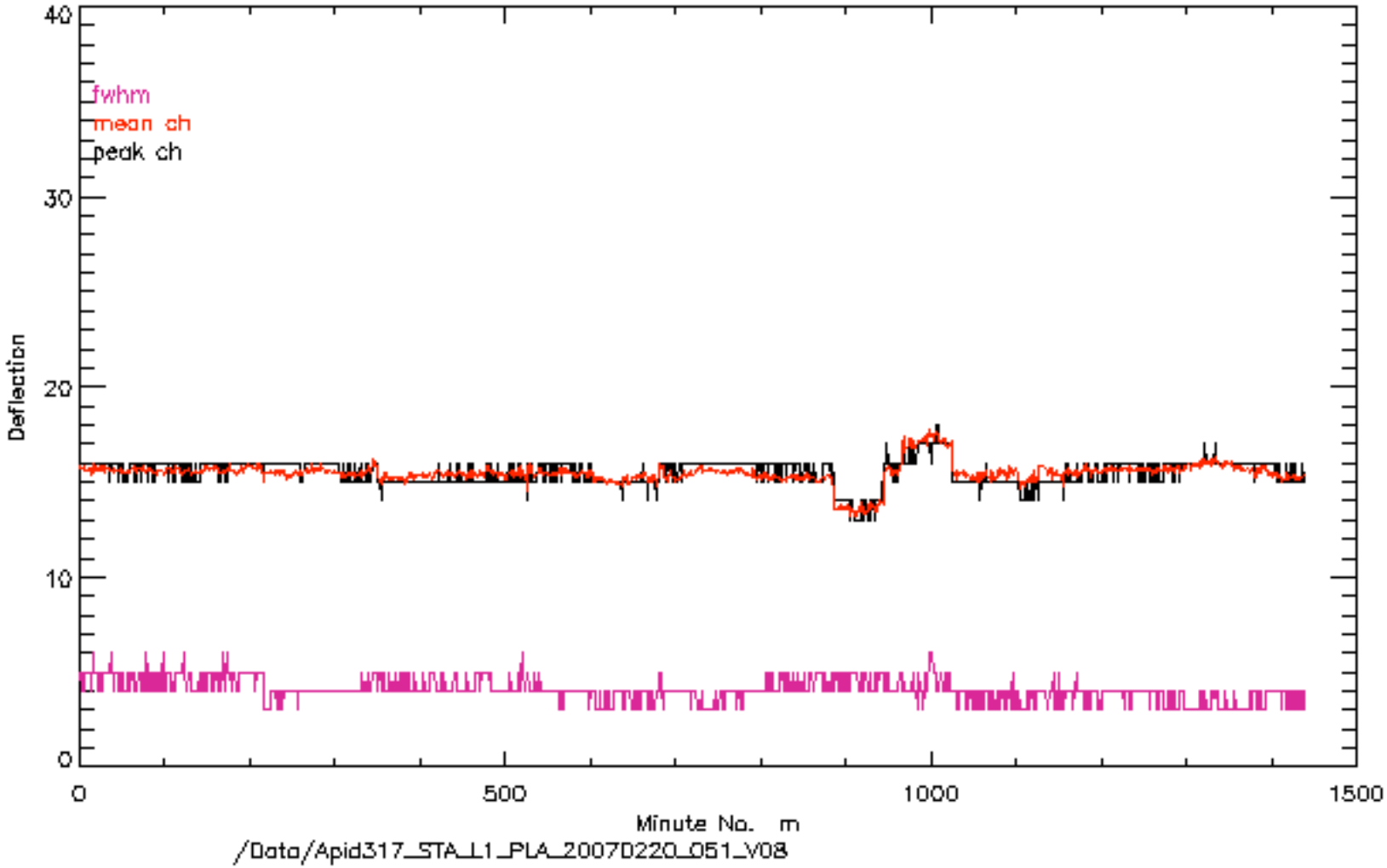
SECCHI S/C A Roll: RA Position, Main Channel

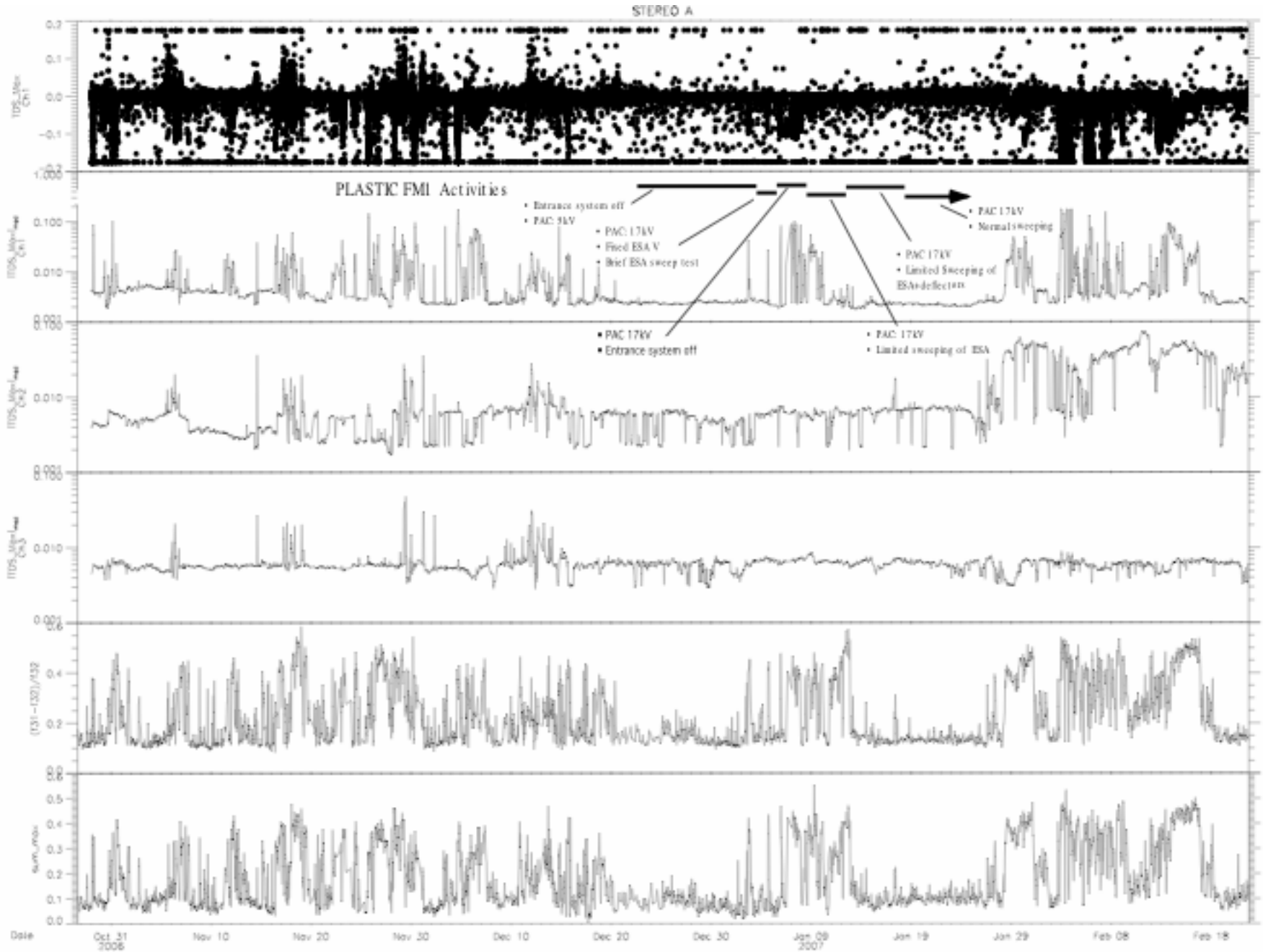


Secchi Stepped Roll on A

Apid315_0_127_STA_L1_PLA_20070220_051_V08 roll.posstat

SECCHI S/C A Roll: Deflection, Main Channel




STEREO A
PLASTIC FM1 Activities
• Entrance system off
• PAC: 5kV
• PAC: 17kV
• Fixed ESA V
• Brief ESA sweep test
• PAC 17kV
• Limited Sweeping of ESA deflectors
• PAC 17kV
• Normal sweeping
• PAC 17kV
• Entrance system off
• PAC: 17kV
• Limited sweeping of ESA
(131 – 132)/132
Oct 31 2006
Nov 10
Nov 20
Nov 30
Dec 10
Dec 20
Dec 30
Jan 09 2007
Jan 19
Jan 29
Feb 08
Feb 18
Date

PLASTIC Activities During SWAVES “Noise: Periods