PLASTIC Operations Status

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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.

Switch to small aperture

Heavy ions in large aperture

H+

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 S/C A Roll: Deflection, Main Channel

/Data/Apid317_STA_L1_PLA_20070220_051_Y08
PLASTIC Activities During SWAVES "Noise: Periods"