

SAMPEX Spacecraft & Instrument Operations Overview

This overview is intended to give a general overview of operations and status for the SAMPEX spacecraft and instruments from launch in July 1992 through June 30, 2004. For additional details, see Appendix G of the [SAMPEX New Goddard Data File \(NGDF\) Data File Description](#) on the SAMPEX Data center web site. For information on the pointing modes, see the [SAMPEX Pointing modes overview](#) at the SAMPEX data center web site.

SPACECRAFT

Comments: Safeholds and RPP restarts required a day or two to bring spacecraft and instruments back to their normal operating states.

- 8/12/92 Instruments off due to DPU reboots
- 9/19/92 Spacecraft safehold
- 6/1/94 RPP Warm restart
- 8/10/94 RPP Warm restart
- 4/30/95 RPP Warm restart
- 10/24/95 Spacecraft enters analog safehold
- 8/19/96 Spacecraft commanded into safehold after signal acquisition problem
- 12/5/99 Spacecraft safehold due to watchdog timeout
- 12/25/99 Spacecraft safehold
- 1/16/02 RPP Warm restart

DATA LOSSES

Comments: The spacecraft memory stored ~12 hours of data, and after dumping to a ground station, the memory was cleared. A few years into the mission, as spacecraft monitoring was automated, the dumps and memory clearing was set by prior command load, and so if a scheduled pass had a ground station problem most of all of the data from a pass could be lost, resulting in a data gap of up to 12 hours. This happened rarely early in the mission, but beginning in 1999, each year has ~10-15 such events, often coming in clusters due to an ongoing equipment problem at the tracking station.

LICA

Comments: LICA HVPS was observed to move to maximum HV voltage, overbiasing the MCP plates. Turning off the instrument allowed recovery, and it was found that a daily turn off lessened the frequency of the problem. Actions taken: (a) the SEDS was programmed to monitor the LICA HV and turn off (and restart) the instrument automatically if the HV went beyond its normal operating value, and (b) the instrument was commanded off for 15 minutes each day at noon (GMT) and automatically restarted. Adjustment of MCP bias was to compensate for gain loss due to repeated passage through radiation belts.

- 7/22/92 out of calibration through 9/29/92 due to HVPS control problem
- 10/7/92 automated power cycling of LICA begins (starts if HV out of cal)
- 11/25/92 daily turn off (12:00-12:15 UT) begins (continues throughout mission)
- 9/27/94 routine adjustment of LICA START MCP HV bias begins

HILT

Comments: although commanded open shortly after launch, the HILT door did not fully open until 8/19/92. Because the door appeared liable to become stuck, it was cycled every 8 weeks. HILT was launched with a ~1000 day supply of isobutane for the proportional counter; as it reached the end of its supply, the supply was shut down to conserve gas in order to cover more of the solar cycle. After exhaustion of the gas, the instrument was commanded into a "high-energy" mode for operation without the proportional counter.

- 8/19/92 HILT door fully opened; in-calibration operations begin
- 10/6/92 HILT cover cycles begin, repeated every ~8 weeks through mission
- 3/1/94 HILT gas off for conservation (back on 5/17/94)
- 6/17/94 HILT gas regulation disabled (back on 7/19/94)
- 1/3/95 HILT off -- back on 1/23/95
- 2/9/95 HILT gas off for conservation (back on 3/17/95)
- 7/31/95 HILT gas off for conservation (back on 11/12/95)
- 11/15/95 HILT gas pressure out of regulation; HV disabled
- 3/4/96 HILT switched to high energy mode

MAST

Comments: some of the MAST Matrix detectors showed episodes of noise postlaunch, reducing instrument livetime. Removing detector bias (by shutting of the instrument) tended to lower the noise level. This was done for 12-24 hour periods at first, and later the instrument was commanded off near the equator for each orbit, unless the spacecraft was in the SAA, where trapped Anomalous Cosmic Rays were observed. Since PET shared the power supply with MAST, it was also turned off (~60,000 cycles through end of mission).

- 9/14/92 MAST (and PET) turned OFF from ~12 or 24 hours to control detector noise, at weekly intervals with some variation. Continues through 9/27/94, after which shorter turnoffs are done near equator (see below). NOTE: 2 longer turn offs were also done from April 4-April 8, 1994, and July 12-July 16, 1994.
- 9/27/94 begin routine turn off of MAST (and PET) near the equator on each orbit
- 8/14/98 power cycling near equator suspended for test
- 9/4/98 power cycling near equator resumes

PET

Comments: Since PET shared its power supply with MAST, it was turned off along with MAST in order to control MAST detector noise. See MAST notes above.

- 7/5/92 crosstalk in P3 suppresses 28-65 MeV protons and 28-86 MeV/n alphas; logic changes restore 28-65 MeV protons and alphas after 12/2/92, 65-86 MeV/n alphas restored after 1/14/1999.
- 5/18/93 PET HRR memory allocation increased to allow 100% hi-res coverage
- 9/23/93 PET logic switched to allow P1 only events, so default calibration is not valid; switched back to require P1 events on 3/5/94, so have about 163 day period out of calibration, and PET counts and intensities set to FILL.

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