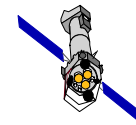


XMM-Newton MOS1 Micrometeorite Event

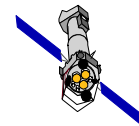
E.Serpell
ESA / ESOC / VEGA
11/10/01



XMM Newton

Event Summary

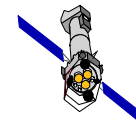
- **On day 2001.260 at 23.31Z an event occurred on the MOS1 camera that caused the internal data buffers to overflow.**
- **There was no indication of any event or anomaly on any of the other x-ray instruments operating at the time (MOS2, RGS1, RGS2).**
- **The event lasted for less than a single frame which puts an upper limit of 2.6 Seconds on the duration.**
- **The event was seen as a diffuse light across the MOS1 focal plane.**
- **Immediately following the event a number of new bad pixels have been observed.**
- **The evidence suggests that a micrometeorite has impacted the camera, the destruction of the particle was seen as an optical flash and the decay products have damaged some pixels.**



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Event Data(1)

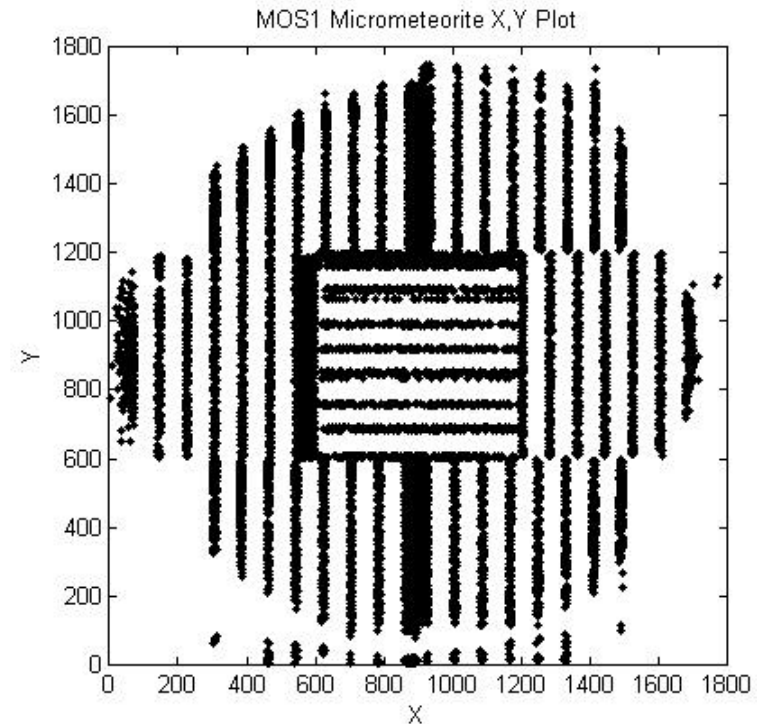
- The EDU's reported the following number of pixels above threshold (25 ADU) and the HBR's reported the number of valid events transmitted, as follows;
 - CCD1: 350076 (95%), 2089
 - CCD2: 248783 (68%), 1803
 - CCD3: 280680 (76%), 1313
 - CCD4: 254604 (69%), 1953
 - CCD5: 239725 (65%), 1909
 - CCD6: 254636 (69%), 2264
 - CCD7: 257409 (70%), 2050



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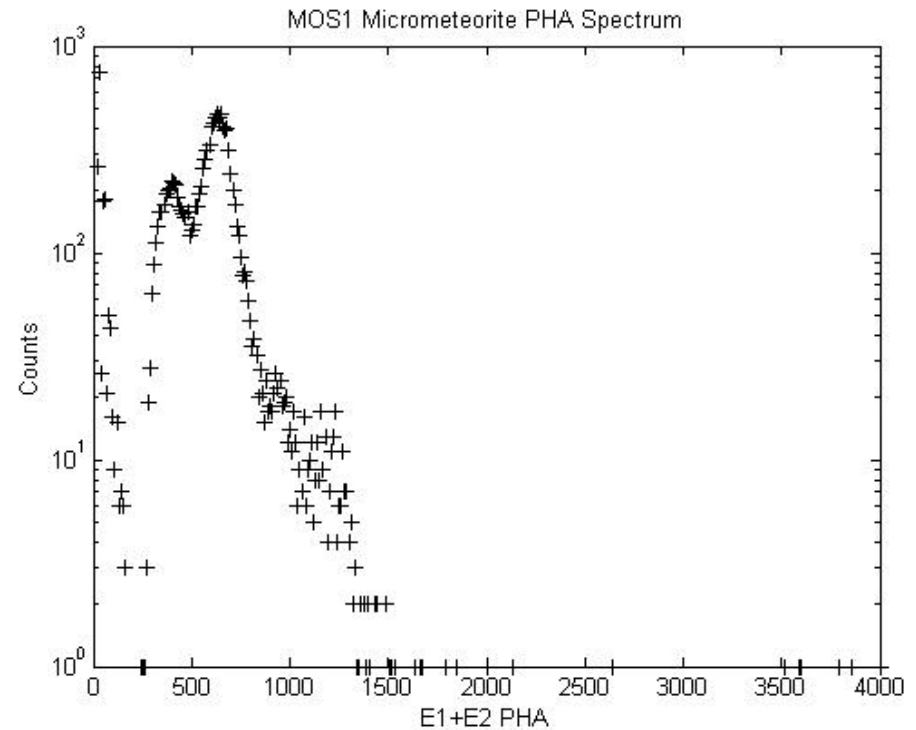
Event Data(2)

- The figure shows the raw X,Y location of all data points extracted from TM.
 - CCD1 is central
 - CCD2 is lower right
 - CCD number increases counter clockwise
- The locations of the event data show the shadow of the focal plane mask.
- The bands that are apparent in the figure are due to the buffer overflows causing loss of data.



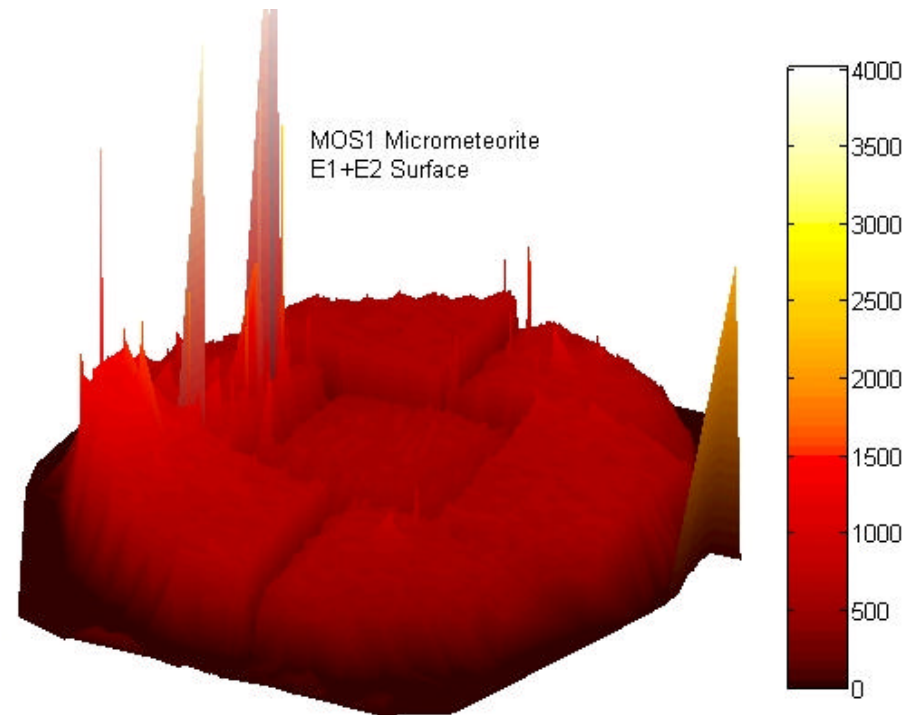
Event Spectrum

- The figure shows the E1+E2 spectrum of the event.
- Essentially all pixels were pattern 31 meaning that the figure shows the sum of 9 pixel values.
- The mean pixel value was 70 ADU.
- The event was seen by MOS1 as an optical flash.



Energy Distribution

- The figure shows a 3d surface of E1+E2 over all CCDs. Data have been interpolated where necessary.
- The intensity was not uniformly distributed but shows a smooth peak on CCD7 and large spikes on CCD6.



CCD Damage

- The figure shows the distribution of new bad pixels overlaid with a contour of $E1+E2$.
- In exposures following the event 27 bad pixels appeared on CCD6 and CCD7.
- The new bad pixels coincide with the location where the energy was greatest.

