ELS Data Report Covering ELS Data Taken June 23 and July 9

Report Date: July 13, 2003
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The ASPERA-3 ELS instrument commissioning which occurred between June 23 and July 9, 2003 showed that ELS is functioning to the degree that it was tested. There were three periods that produced significant ELS result. The first occurred on June 24 (time scales are only estimates). Here, ELS deflection high voltage was exercised along with its sensor high voltage. This can be seen in the plot below (Figure 1).

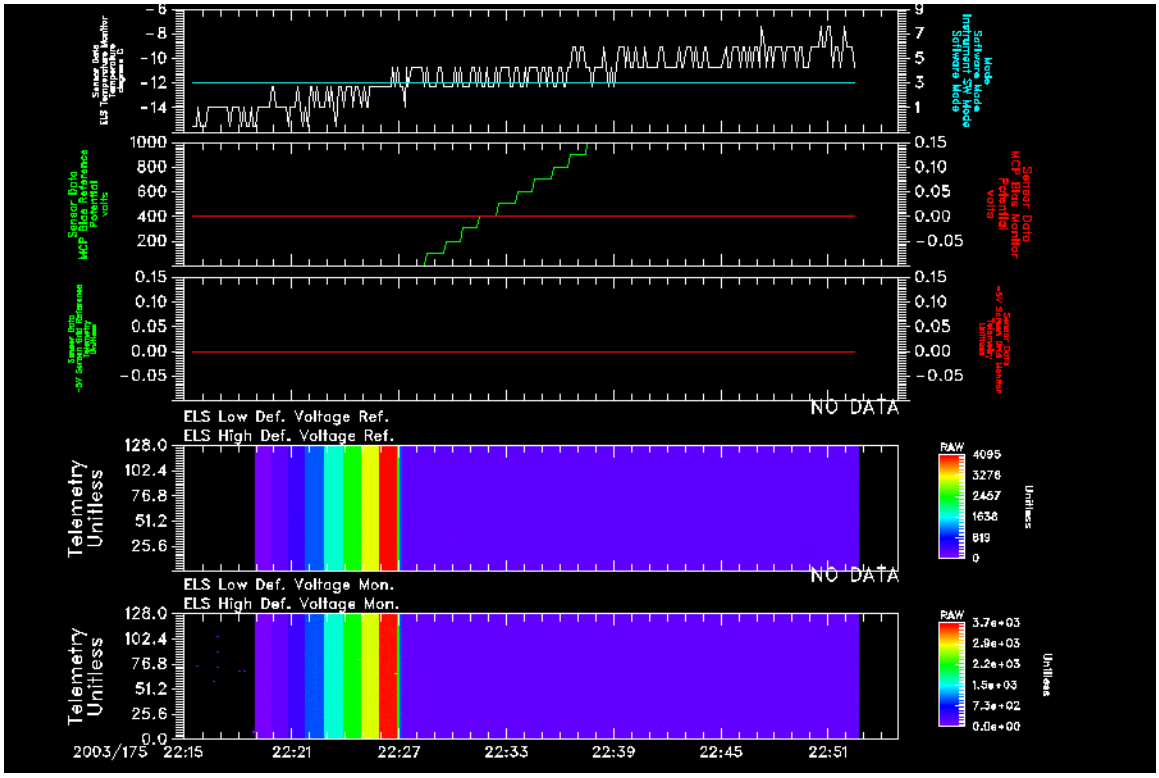

Figure 1.

The bottom two plots show the commanded ELS deflection and the instrument's response. In the second panel from the top, the green plot shows the commanded ELS sensor high voltage. The red monitor value reads zero (onboard software problem) in the science telemetry, but the response was confirmed with housekeeping telemetry. ELS high voltage was not high enough to activate the sensor.

ELS sensor activation occurred on July 1. ELS sensor high voltage was ramped to its activation level while the deflection voltage was commanded to a non-zero value. In the same format as previous, Figure 2 shows the green voltage ramp in the second panel and plagued by the same software problem, zero response that needed to be confirmed through the housekeeping telemetry. The bottom two panels confirm ELS fixed deflection voltages.

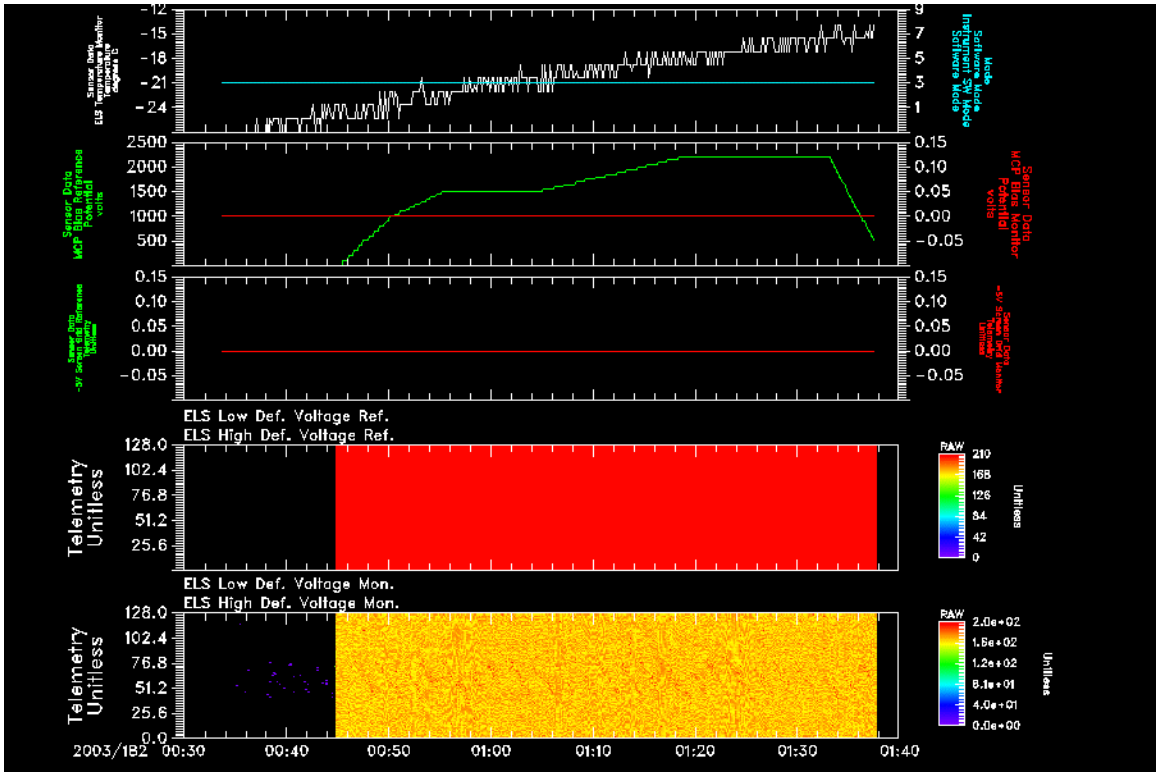

Figure 2.

Since ELS was fully active, its operation is confirmed in the science data as single lines in all ELS sectors as seen in Figure 3.

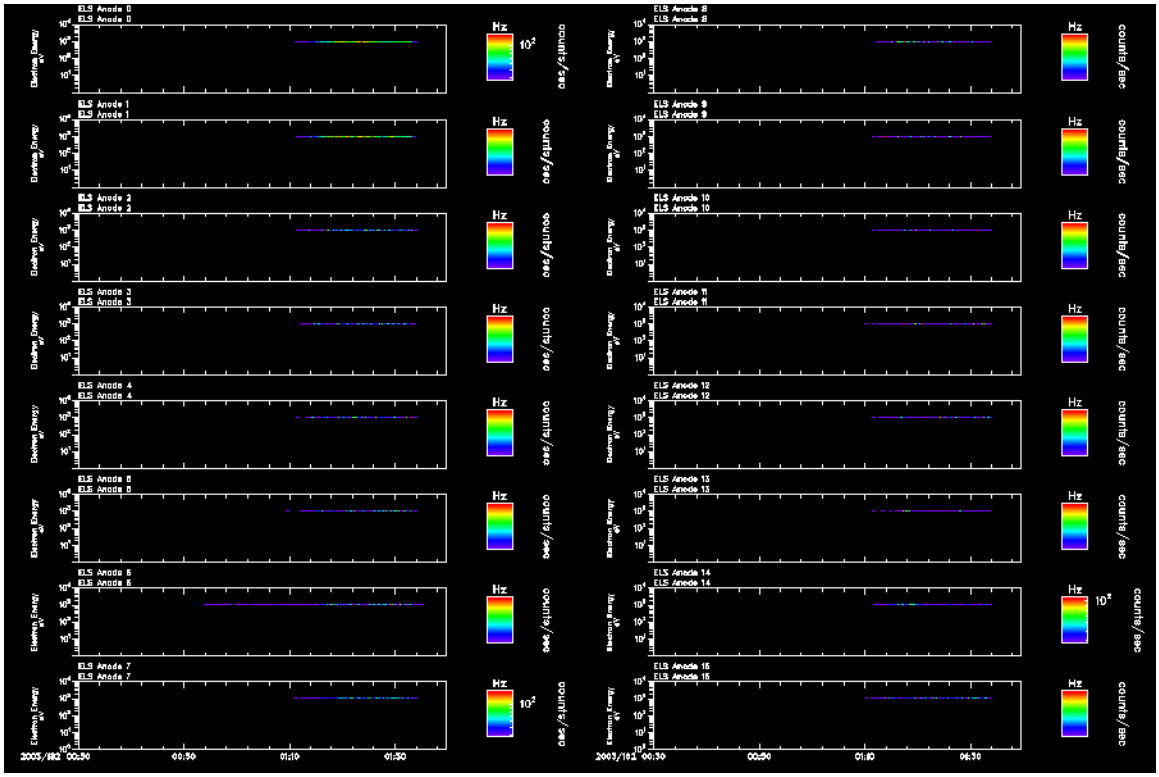

Figure 3.

ELS instrument sweeping occurred on July 8, making ELS fully operational. A sweeping ELS unit is confirmed in Figure 4.

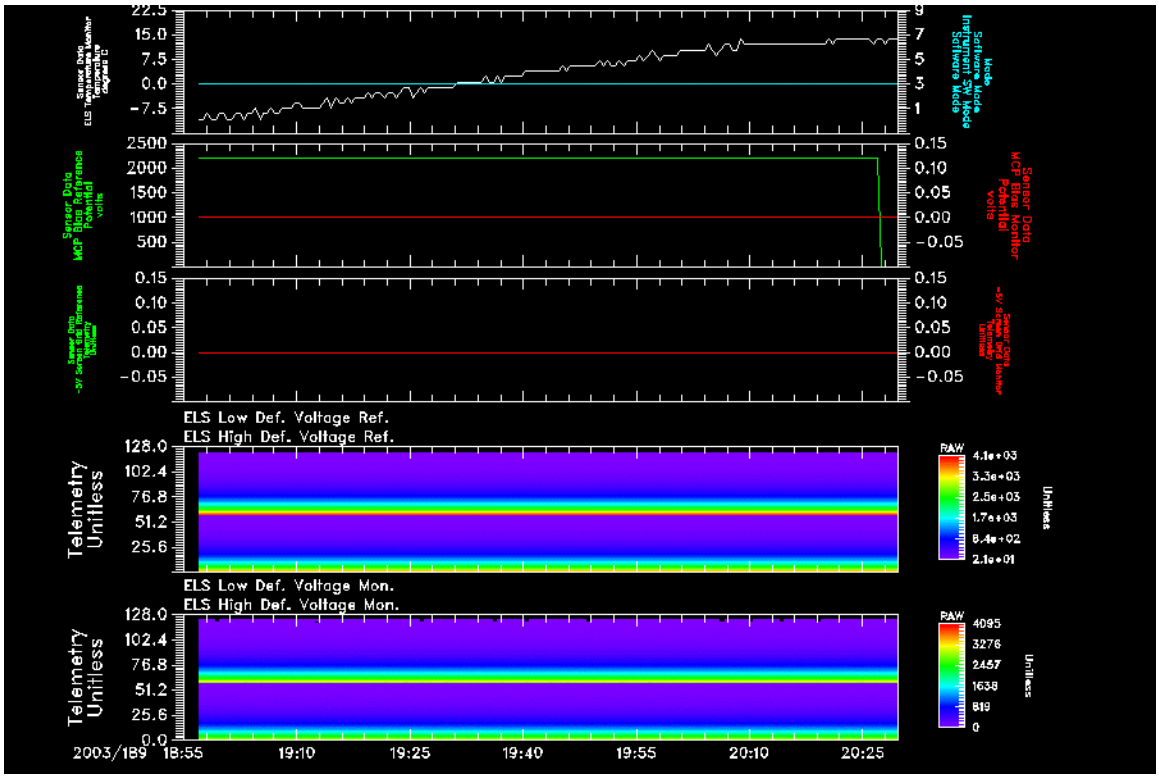

Figure 4.

This plot shows an operational high voltage sensor command and it was confirmed by the housekeeping telemetry. The sweeping deflection commands and responses are shown in the bottom two panels. The corresponding science data fully determines electron spectra as shown in Figure 5.

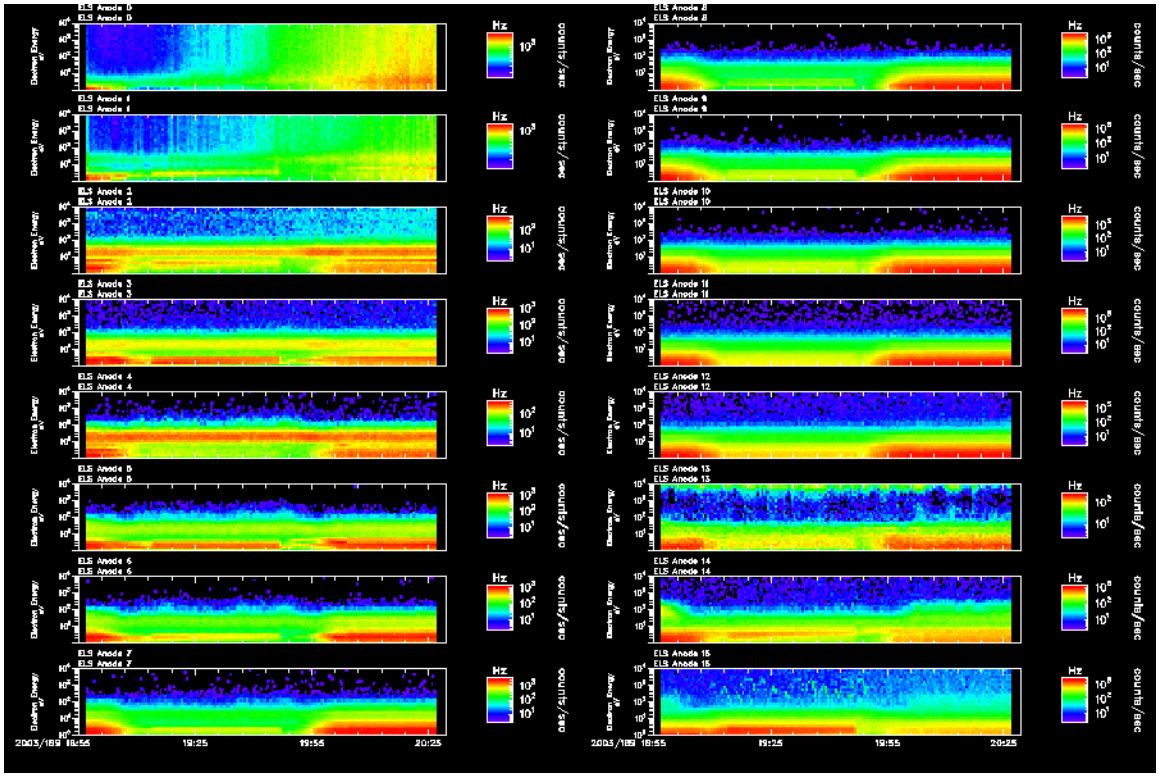

Figure 5.

Here, all 16 ELS sectors show measured electrons, where the solar wind can be seen in the fourth anode (fifth graph from the top on the left hand side of the page) as the upper bright red line.

ELS Items That Should be Done During the Next Activity Period

Below is a list of ELS tasks to be tested during the next activation period. This is not an exhaustive list since all telemetry has yet to be examined from the current commissioning period. This list includes a software update needed to fix a software error in the ASPERA-3 Main Unit (item #1).

1. Fix the software so that the high voltage ELS sensor response is seen in science telemetry.
2. Activate the ELS deflection grid at the -1V and -5V levels. Fix this level at -5V on confirmation.
3. Test different ELS energy tables in 128 energy step mode (note that time summation modes can be used to reduce ELS telemetry).
4. Test Rice Compression.
5. Investigate high count rates seen in sectors 0 and 1. Best accomplished by instrument or spacecraft rotation about an axis perpendicular to the ecliptic plane.