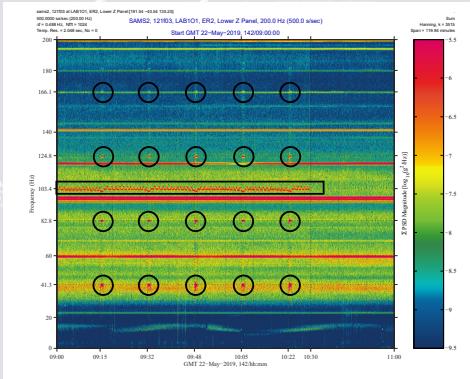
Thermal Amine Equipment

Space Acceleration Measurement System (SAMS) Data Analysis

Introduction

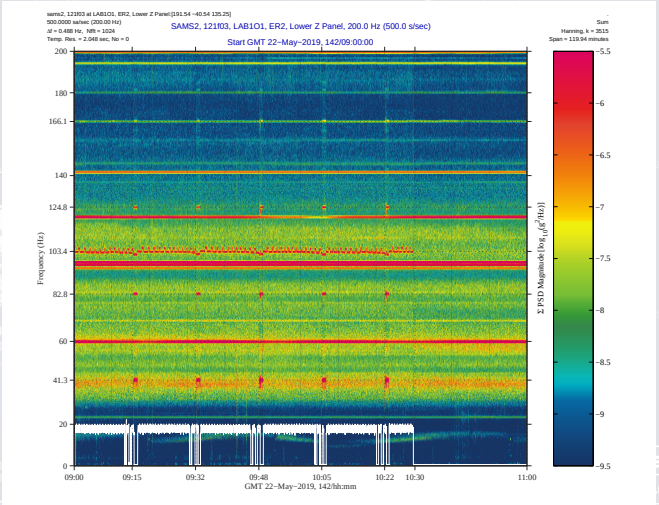


On Wednesday, GMT 2019-05-22 (Day 142), the Thermal Amine equipment, located in EXPRESS Rack 2 (ER2), LAB1O1, was deactivated due to reports that the equipment experienced an issue. This may have then required spin up of the US Lab Carbon Dioxide Removal. Assembly (CDRA) to take over that duty. A quick look at applicable current draw data from ER2 around that time show LAB1O1 (ER2) Locker 7 current dropped from 16-19 A range down to zero. Drawer 1 current dropped from 7-16 A range down to zero, and no change in Locker 4 current draw. A spectrogram computed from a nearby Space Acceleration Measurement System (SAMS) sensor is shown here with black annotations identifying vibratory signatures of the Thermal Amine equipment and a sudden transition when turned off.

ER2 Locker 7 Current

This spectrogram was computed using measurements from a SAMS sensor mounted on ER2. Note the strong narrowband vibrations that start at times indicated by the tick marks, vibrating at about 41.3, 82.8, 103.4, 124.8 and 166.1 Hz. We also show an overlay trace in white of ER2 Locker 7 current that perhaps is indicative of correlation at the distinctive current drop/transition times.

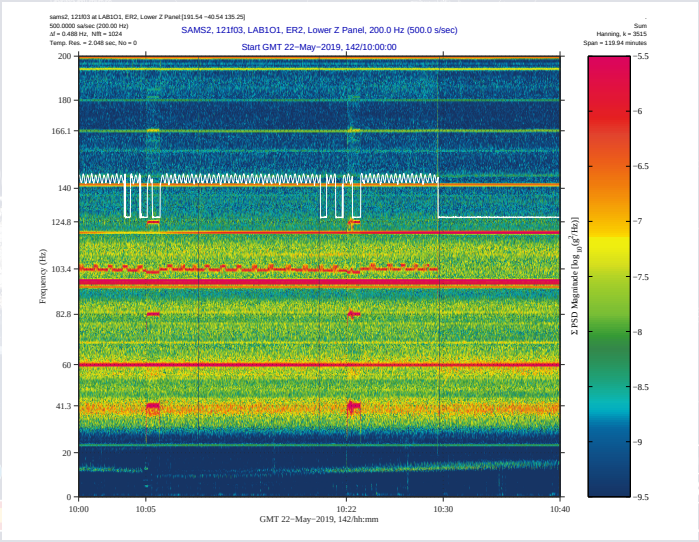
Note: vertical axis is (A)mps for white trace.



ER2 Locker 7 Current Zoom-In

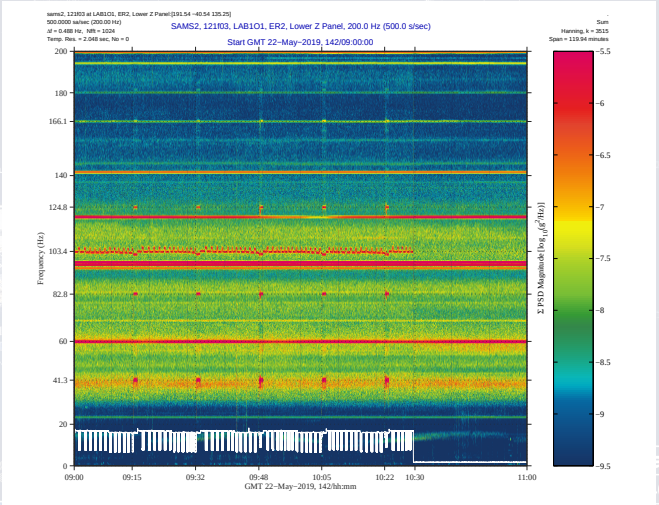
This plot shows a zoom-in of a time span taken from the previous page. It better shows the correlation between transitions, comparing the white ER2 Locker 7 current trace and, for example, the bright red horizontal streak (spectral peak) at 124.8 Hz.

Note: white trace translated up and no longer shows true baseline current as it did on previous page.



ER2 Drawer 1 Current

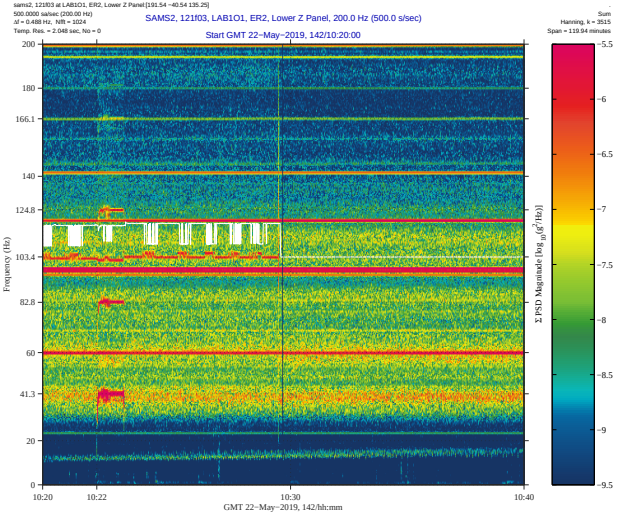
This spectrogram was computed using measurements from a SAMS sensor mounted on ER2. Note the strong narrowband vibrations that start at times indicated by the tick marks, vibrating at about 41.3, 82.8, 103.4, 124.8 and 166.1 Hz. We also show an overlay trace in white of ER2 Drawer 1 current that perhaps is indicative of correlation at the distinctive current drop/transition times.



ER2 Drawer 1 Current Zoom-In

This plot shows a zoom-in of a time span taken from the previous page. It better shows the correlation between transitions, comparing the white ER2 Drawer 1 current trace and the fluctuations seen in the red spectral peak at about 103.4 Hz.

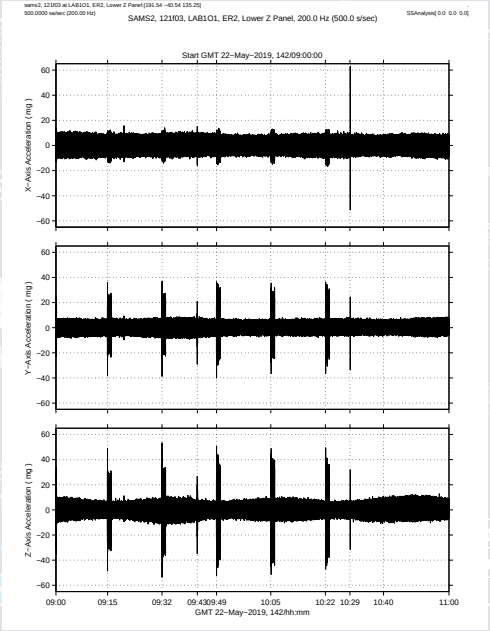
Note: white trace translated up and no longer shows true baseline current as it did on previous page.



GMT 2019-05-22 Accel. vs. Time

This 3-panel plot shows X-, Y- and Z-axis acceleration measurements versus time from the SAMS sensor mounted near the Thermal Amine equipment on GMT 2019-05-22.

Note the large, impulsive accelerations primarily aligned with the YZ-plane. These peaks top out at over 100 mg peak-to-peak on the Z-axis.



GMT 2019-05-22 Accel. vs. Time Zoom

This zoomed 3-panel plot shows X-, Y- and Z-axis acceleration measurements versus time from the SAMS sensor mounted near the Thermal Amine equipment on GMT 2019-05-22.

Note the relative strength in favor of the YZ-plane for this equipment suggestive of primary motion alignment. Z-axis peaks top out above 40 mg.