RS Attitude Control + Reboost

This color spectrogram shows time and frequency context for an 8-hour period around the Progress 61P reboost event.

- Note the main feature is the excitation you see below about 5 Hz between about 03:30 and about 05:00.
- During this ~90-minute span, the reboost event itself plus Russian Segment (RS) attitude control were the primary disturbers with impulsive accelerations driving structural excitation below 5 Hz.
Regime: Quasi-Steady
Category: Vehicle
Source: Progress 61P Reboost 2016-03-05
PIMS ISS Acceleration Handbook
Date last modified 2016-03-21

**Description**

<table>
<thead>
<tr>
<th>Sensor</th>
<th>SAMS 121f05</th>
<th>500.0 sa/sec, 200.0 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>COL, Starboard Endcone, Adapter Bracket</td>
<td></td>
</tr>
<tr>
<td>Plot Type</td>
<td>Spectrogram</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- This color spectrogram focuses on the acceleration spectrum below 1 Hz during the same 8-hour period as on the previous page and for the same SAMS sensor.
- This plot shows more clearly the structural vibrations below 1 Hz (actually, we'd see similar up to about 5 Hz or so).
- Note that the top 2 subplots in this figure are intended to quantify structural vibrations of the main truss of the ISS near 0.1 Hz, so-called "mode one" of the station.
- During the quiet periods before and after the reboost event and RS attitude control, the baseline for "mode one" is about 0.5 ugRMS at 0.102 Hz.
- During the reboost event and the thruster firings associated with RS attitude control, we see "mode one" peak at well over 10 ugRMS.
Regime: Quasi-Steady
Category: Vehicle
Source: Progress 61P Reboost 2016-03-05
PIMS ISS Acceleration Handbook
Date last modified 2016-03-21

**Description**

- **Sensor**: SAMS 121f05
  - 500.0 sa/sec, 200.0 Hz

- **Location**: COL, Starboard Endcone, Adapter Bracket

- **Plot Type**: Int. Avg. Accel. vs. Time

**Notes:**

- These 3 subplots show SAMS measurements that have been interval averaged (10-second average every 10 seconds) over a 90-minute span surrounding the reboost event.
- A reboost is an acceleration in the +XA-direction, the flight direction, to increase tangential velocity and thereby increase the orbital altitude.
- This plot shows a step in the negative XA direction owing to the inverted polarity of SAMS sensors.
Sensor: SAMS 121f03
Location: LAB1O1, ER2, Lower Z Panel
Plot Type: Int. Avg. Accel. vs. Time

Notes:
- This plot is identical to that on the previous page except here we show data from a SAMS sensor (121f03) mounted on EXPRESS rack 2 in the US Lab.
- The previous page used data from a SAMS sensor mounted on the Columbus Starboard Endcone.
- At these relatively low-frequencies, the data from the 2 sensors look quite similar.
Progress 61P Reboost 2016-03-05
Quantify

<table>
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<th>Sensor</th>
<th>SAMS 121f05 500.0 sa/sec, 200.0 Hz</th>
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<tbody>
<tr>
<td>Location</td>
<td>COL, Starboard Endcone, Adapter Bracket</td>
<td></td>
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<tr>
<td>Plot Type</td>
<td>XYZ Power Spectral Density</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- These plots shows power spectral density plots for the 3 orthogonal Space Station Analysis (SSA) axes.
- These data were measured on the Columbus Starboard Endcone by a SAMS sensor mounted there.
- The dominant spectral component during the 90-minute period from 03:35 to 05:05 (covered by this plot) was at about 54 Hz on the ZA-axis.
Quantify

Description

Sensor: SAMS 121f05
500.0 sa/sec, 200.0 Hz

Location: COL, Starboard Endcone, Adapter Bracket

Plot Type: XYZ Accel. vs. Time

Notes:
- This 3-panel plot of acceleration versus time at the SAMS SE-F05 sensor location shows the reboost period is dominated by relatively high-frequency vibrations.
- Several, sporadic impulsive accelerations appear as seen, for example, indicated by the time tick marks between 04:54:55 and 05:02:11.