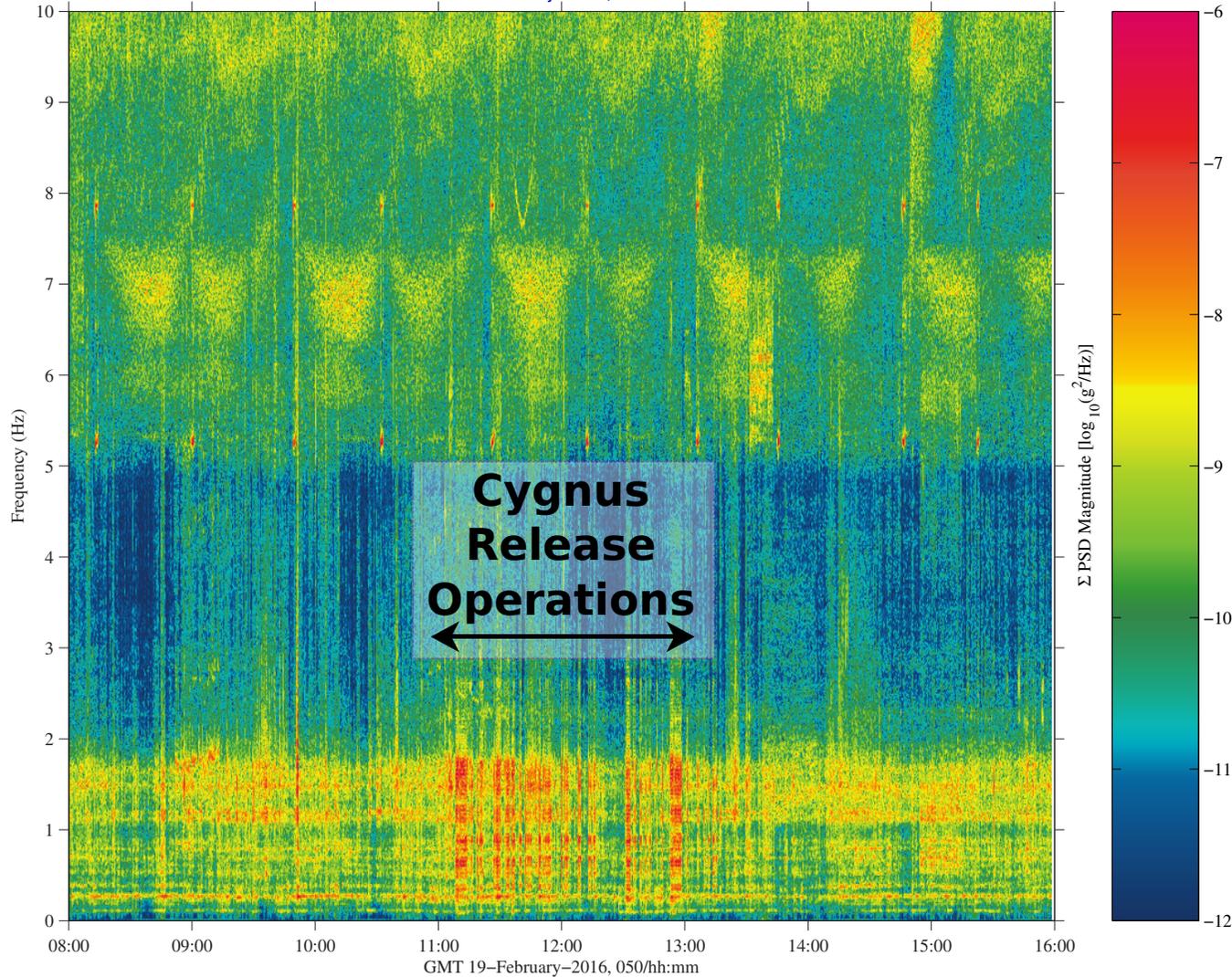


# 19-Feb-2016 Cygnus OA-4 Release Qualify

sams2, 121f05 at COL, Starboard Endcone, Adapter Bracket:[378.90 320.60 233.90]  
 500.0000 sa/sec (200.00 Hz)  
 $\Delta f = 0.015$  Hz, Nfft = 32768  
 Temp. Res. = 32.768 sec, No = 16384

sams2, 121f05

Start GMT 19-February-2016, 050/08:00:00.002



Sum  
 Hanning, k = 877  
 Span = 7.97 hours

Description	
Sensor	SAMS 121f05 500.0 sa/sec, 200.0 Hz
Location	COL, Starboard Endcone, Adapter Bracket
Plot Type	Spectrogram

### Notes:

- This spectrogram shows a broad overview in time and frequency for context around Cygnus release operations on GMT 19-Feb-2106.
- This plot focuses us below 10 Hz for an 8-hour span around release of the Cygnus vehicle.
- The main features we see here are: (1) Ku-band antenna activity above about 5 Hz, (2) a wide, quiet zone between about 2 and 5 Hz, and (3) vehicle structural modes (horizontal red streaks) below about 2 Hz.
- Notice the excitation (more red below 2 Hz) during the ~two-hour span associated with Cygnus release operations.

Regime:	Vibratory
Category:	Vehicle
Source:	19-Feb-2016 Cygnus OA-4 Release

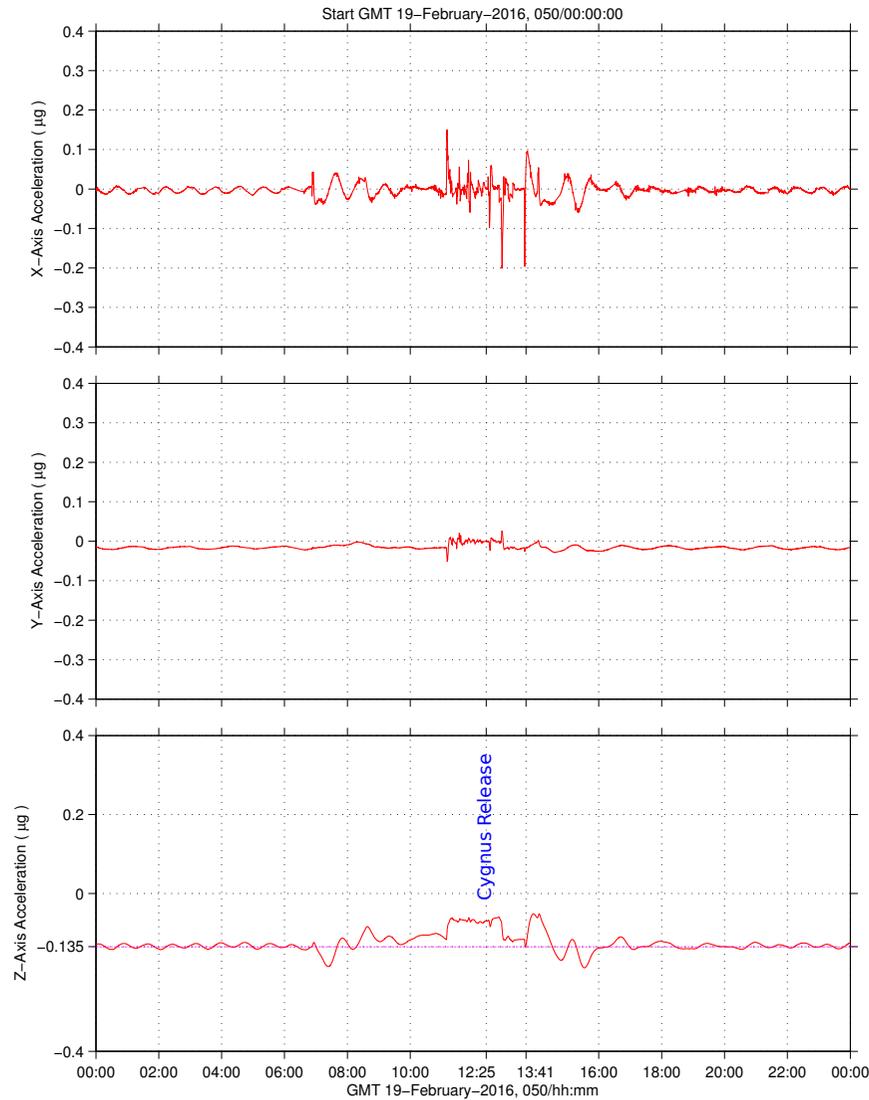


# 19-Feb-2016 Cygnus OA-4 Release Quantify

mams, ossbmf at LAB1O2, ER1, Lockers 3,4 [135.28 -10.68 132.12]  
0.0625 sa/sec (0.01 Hz)

SSAnalysis[ 0.0 0.0 0.0]

## ISS Rates/Angles Data

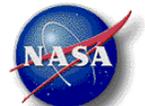


Description	
Sensor	ISS radgse 0.0625 sa/sec, 1.0 Hz
Location	ISS radgse PAD archive support
Plot Type	XYZ Accel. vs. Time

### Notes:

- This 3-panel plot of space station rates and angles derived acceleration data shows the temporary shift in the center of mass, primarily on the Z-axis that is associated with the Cygnus release operations.
- Note especially on the bottom plot how the shift in mass during these operations is manifest as a shift in the very low frequency acceleration on this Z-axis.
- The baseline line moves by much less than a micro-g, but this is an effect that was measurable and may be the only real concern for some investigators.

Regime:	Vibratory
Category:	Vehicle
Source:	19-Feb-2016 Cygnus OA-4 Release

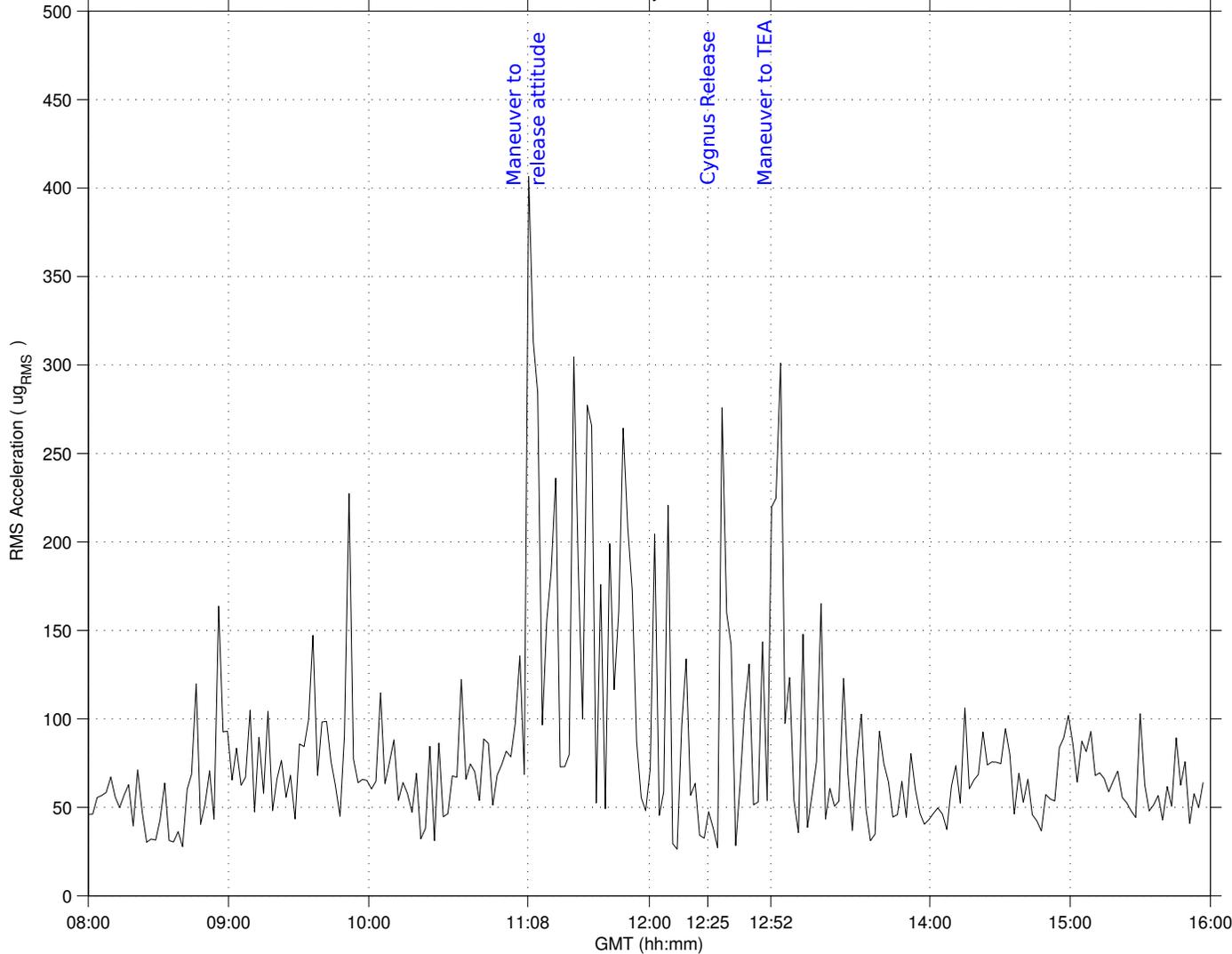


# 19-Feb-2016 Cygnus OA-4 Release Quantify

sams2, 121f0506 at COL, Starboard Endcone, Adapter Bracket:[378.90 320.60 233.90]  
 142.0000 sa/sec (6.00 Hz)  
 Δf: 0.009 Hz, Range: 0.01 – 3 Hz  
 Temp. Resolution: 115.380 sec

SSAnalysis[ 0.0 0.0 0.0]  
 Hanning, k = 1

Cygnus OA-4 Release  
 Start GMT 19-February-2016, 050/08:00:00



Description	
Sensor	SAMS 121f05 142.0 sa/sec, 6.0 Hz
Location	COL, Starboard Endcone, Adapter Bracket
Plot Type	rvts

### Notes:

- This plot of RMS acceleration below 3 Hz versus time serves to highlight another feature of vehicle release operations.
- Thruster firings for maneuvers around the time of the actual release event tend to give rise to structural vibrations as the giant space station shakes and shimmies to the pings of these impulsive acceleratory inputs.
- Note from this plot of SAMS SE-F05 data that the RMS level before and after the release operations has a baseline value below 100 ug.
- During release operations, the RMS level can peak up over 400 ug.

Regime:	Vibratory
Category:	Vehicle
Source:	19-Feb-2016 Cygnus OA-4 Release

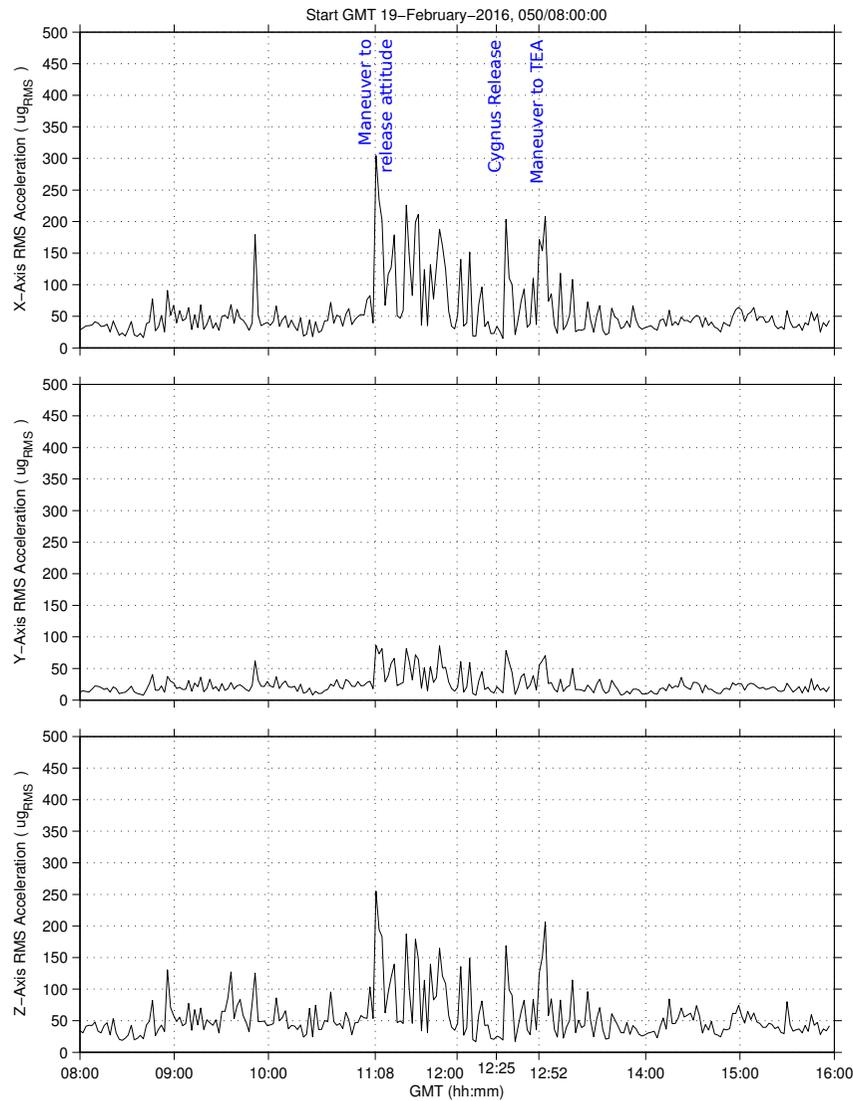


# 19-Feb-2016 Cygnus OA-4 Release Quantify

sams2, 121f05006 at COL, Starboard Endcone, Adapter Bracket:[378.90 320.60 233.90]  
 142.0000 sa/sec (6.00 Hz)  
 Δf: 0.009 Hz, Range: 0.01 – 3 Hz  
 Temp. Resolution: 115.380 sec

Cygnus OA-4 Release

SSAnalysis[ 0.0 0.0 0.0]  
 Hanning, k = 3



Description	
Sensor	SAMS 121f05 142.0 sa/sec, 6.0 Hz
Location	COL, Starboard Endcone, Adapter Bracket
Plot Type	rvt3

**Notes:**

- This 3-panel plot is the per-axis version of that shown on the previous page.
- It is clear here that most of the structural vibrations during the release operations were aligned with the XZ-plane.
- On both the X- and Z-axis, baseline levels were about 50 ug and peaks were 250 to 300 ug (RMS below 3 Hz).

Regime:	Vibratory
Category:	Vehicle
Source:	19-Feb-2016 Cygnus OA-4 Release

