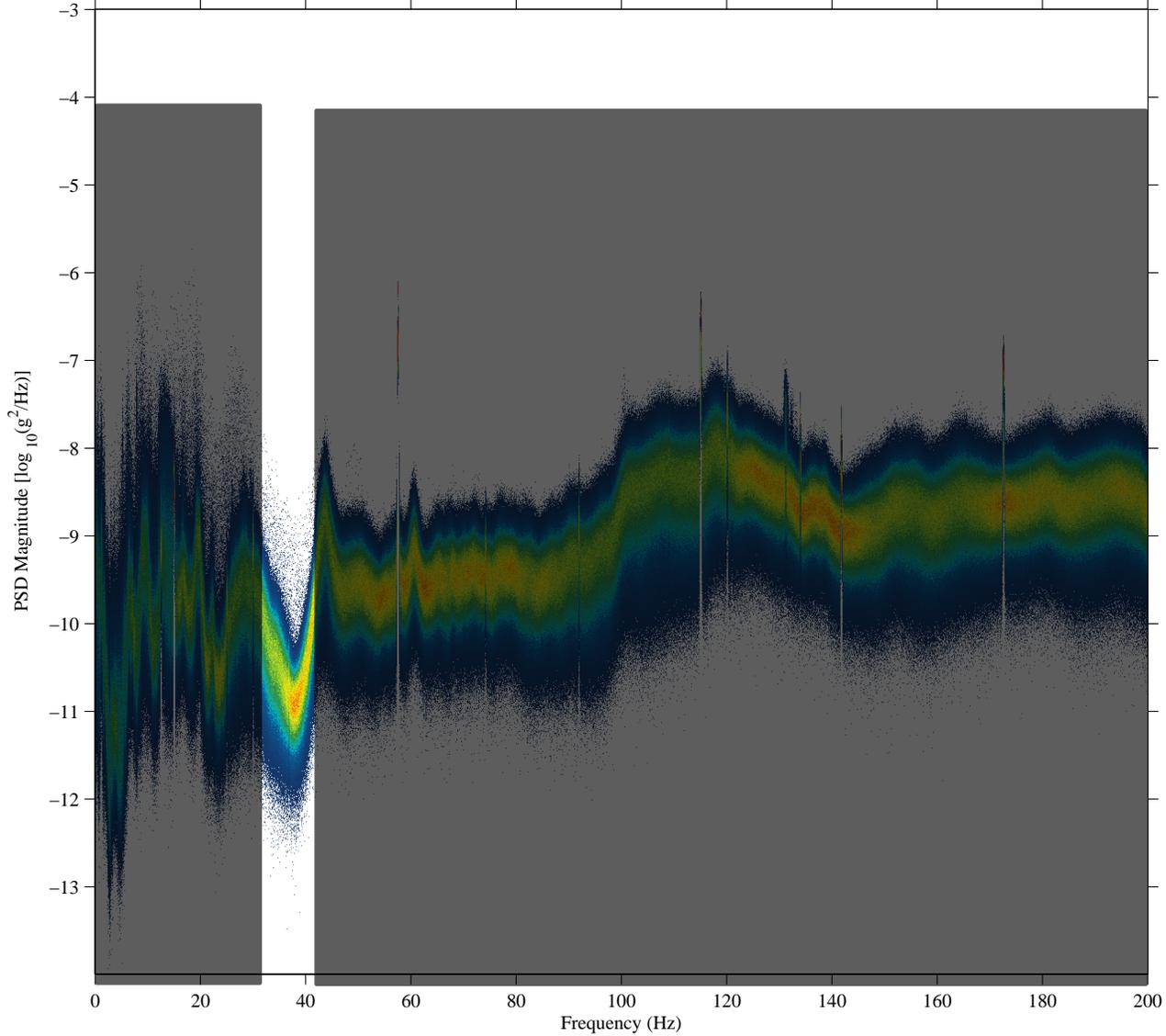


# Cygnus Fan Quality

sams2, 121f05 at JPM1F5, ER4, Drawer 2:[466.8 -292.06 214.58]  
 500.00 sa/sec (200.00 Hz)  
 $\Delta f = 0.122$  Hz, Nfft = 4096  
 Temp. Res. = 8.192 sec, No = 0

sams2, 121f05  
 GMT 274/01-Oct-2013



sum  
 Hanning, k = 10341  
 23.5 hours

Description	
Sensor	SAMS 121f05 500.0 sa/sec, 200.0 Hz
Location	JPM1F5, ER4, Drawer 2
Plot Type	PCSA

- Notes:**
- This is a Principal Component Spectral Analysis (PCSA) plot during Cygnus berthed operations to summarize the acceleration spectrum for an entire day.
  - The black boxes are intended to help emphasize a portion of the spectrum where a narrow band fan signature would appear between 31.7 Hz and 41.7 Hz for the operating characteristics of the Cygnus fan.
  - No clear or distinct narrowband signature for the Cygnus fan is seen in this frequency range, so it's not a disturber in the JEM.
  - The unobstructed PCSA plot can be seen at the link seen near the bottom of this page.

Regime:	Vibratory
Category:	Equipment
Source:	Cygnus Fan

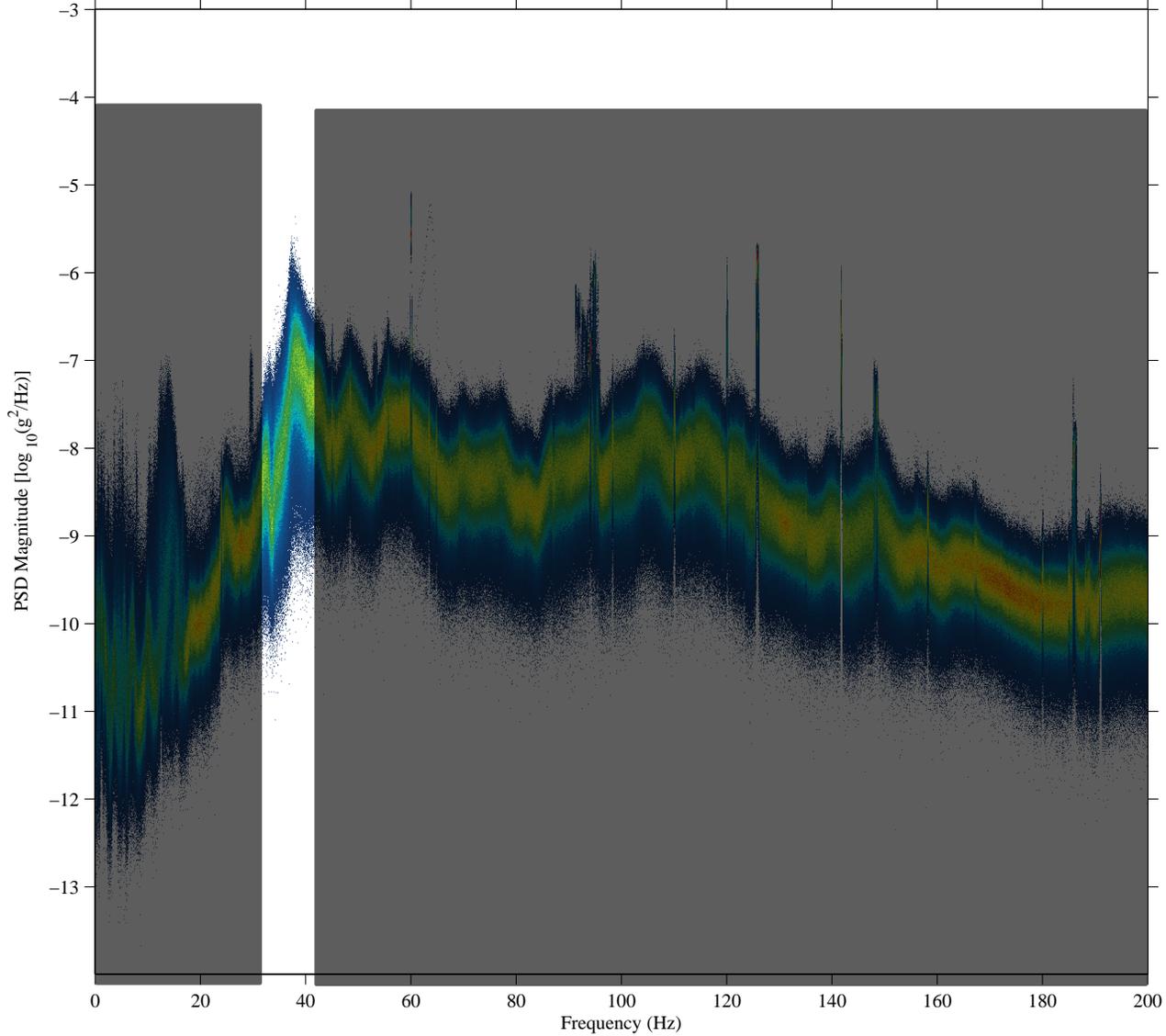
[http://pims.grc.nasa.gov/plots/batch/year2013/month10/day01/2013\\_10\\_01\\_00\\_00\\_00.000\\_121f05\\_pcsc\\_roadmaps500.pdf](http://pims.grc.nasa.gov/plots/batch/year2013/month10/day01/2013_10_01_00_00_00.000_121f05_pcsc_roadmaps500.pdf)



# Cygnus Fan Quality

sams2, 121f03 at LAB1O1, ER2, Lower Z Panel:[191.54 -40.54 135.25]  
 500.00 sa/sec (200.00 Hz)  
 $\Delta f = 0.122$  Hz, Nfft = 4096  
 Temp. Res. = 8.192 sec, No = 0

sams2, 121f03  
 GMT 274/01-Oct-2013



sum  
 Hanning, k = 10330  
 23.5 hours

Description	
Sensor	SAMS 121f03 500.0 sa/sec, 200.0 Hz
Location	LAB1O1, ER2, Lower Z Panel
Plot Type	PCSA

- Notes:**
- This is a Principal Component Spectral Analysis (PCSA) plot during Cygnus berthed operations to summarize the acceleration spectrum for an entire day in the USL during these docked ops.
  - There is no clear or distinct narrow band signature for the Cygnus fan operating range between 31.7 and 41.7 Hz.
  - The unobstructed PCSA plot can be seen at the link shown near the bottom of this page.

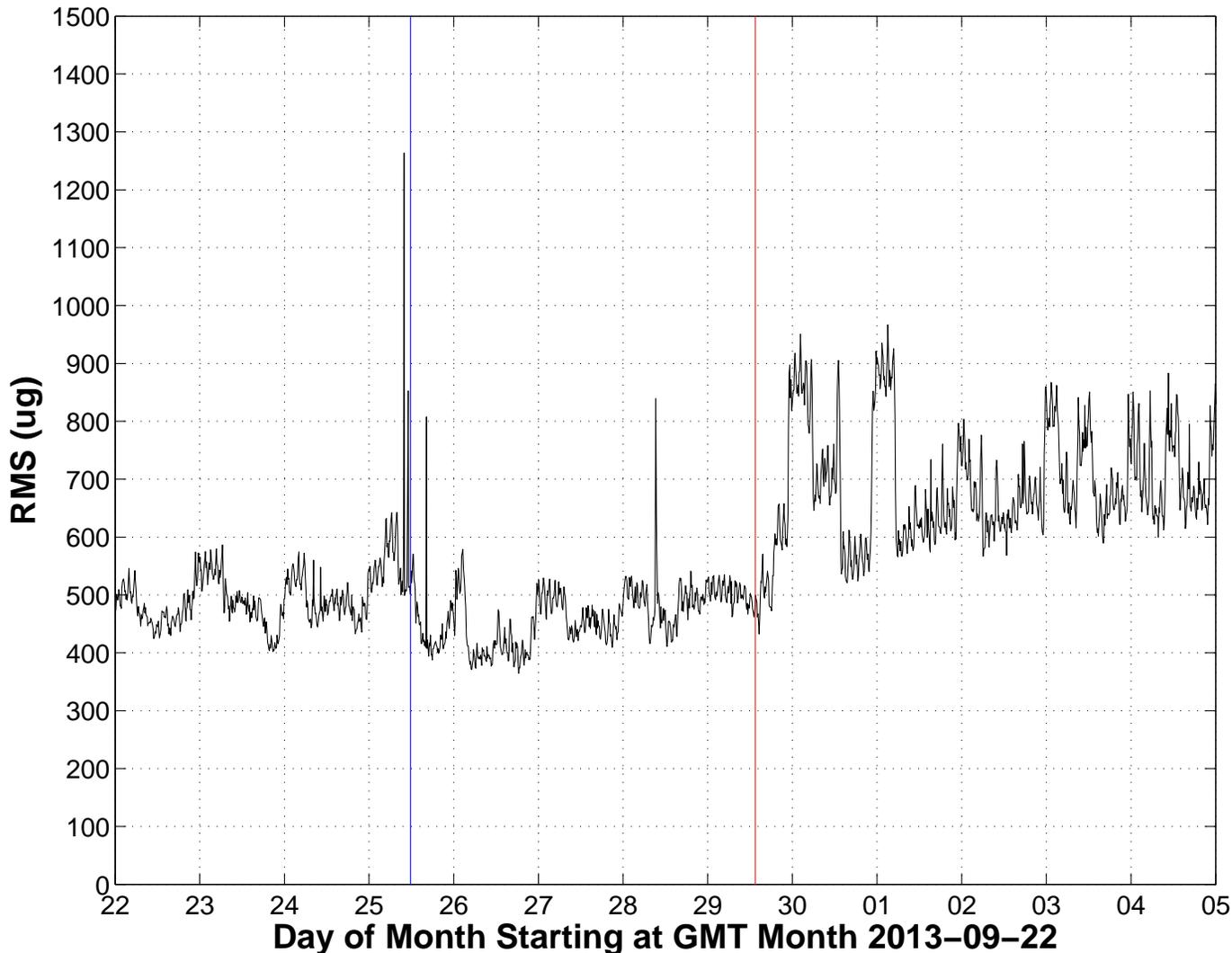
Regime:	Vibratory
Category:	Equipment
Source:	Cygnus Fan

[http://pims.grc.nasa.gov/plots/batch/year2013/month10/day01/2013\\_10\\_01\\_00\\_00\\_00.000\\_121f03\\_pcsc\\_roadmaps500.pdf](http://pims.grc.nasa.gov/plots/batch/year2013/month10/day01/2013_10_01_00_00_00.000_121f03_pcsc_roadmaps500.pdf)



## Cygnus Fan Quantify

sams121f03, S-Axis  
10-Min. Interval RMS for  $31.7 < f < 41.7$  Hz



### Description

Sensor	SAMS 121f03 500.0 sa/sec, 200.0 Hz
Location	LAB1O1, ER2, Lower Z Panel
Plot Type	10-Minute Interval RMS

### Notes:

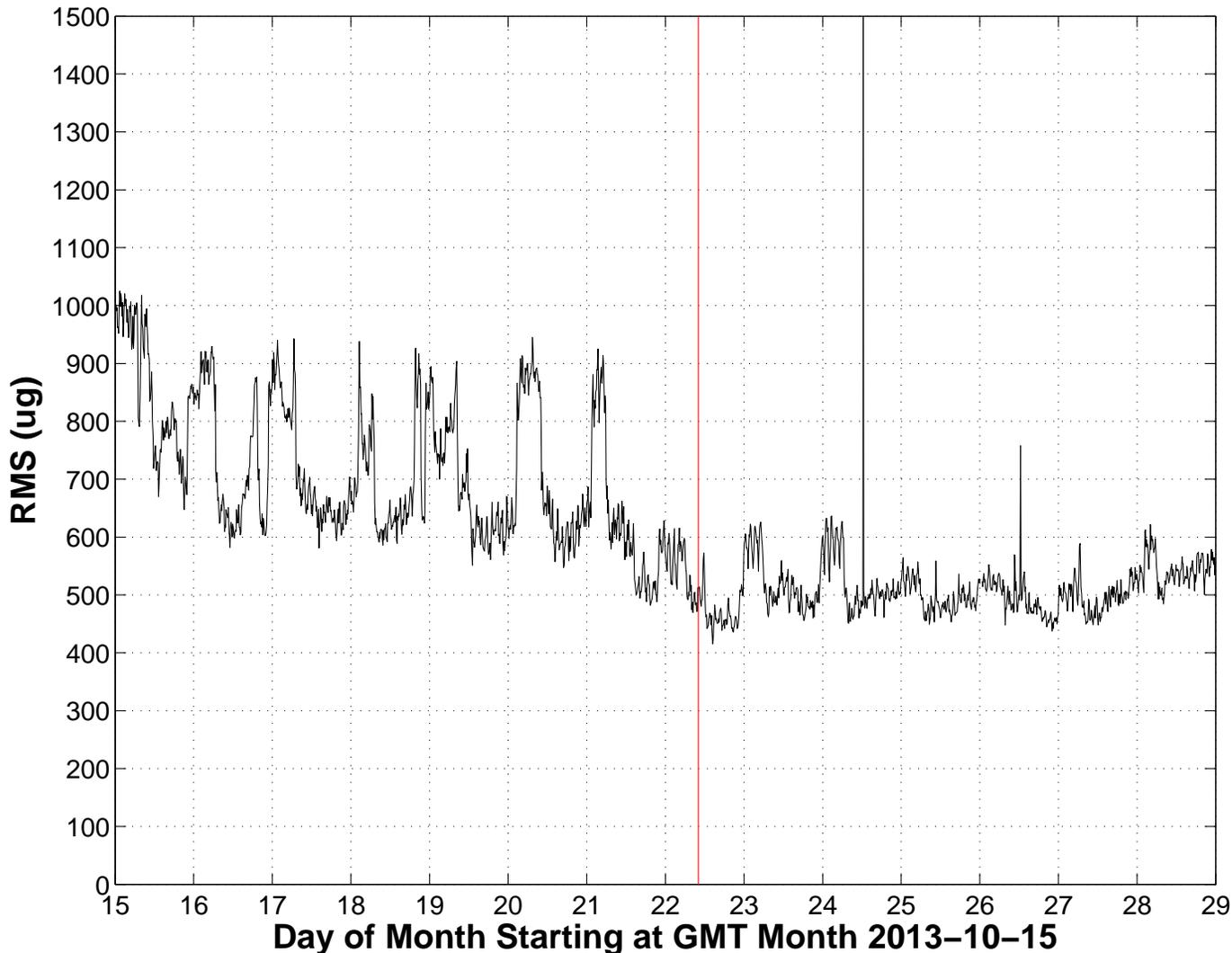
- This is a 10-minute interval RMS plot for the SAMS sensor mounted on ER2 in the USL. The plot spans 13 days starting on GMT 22-Sep-2013.
- The red vertical line marks the time of Cygnus berthing to the ISS.
- While the previous PCSA plots showed no distinct narrow band signature for the Cygnus fan, this interval RMS plot suggests an elevation in broadband energy (possibly turbulent air flow) that may be a by-product of the Cygnus or other fans needed for increased circulation during berthed operations.

Regime:	Vibratory
Category:	Equipment
Source:	Cygnus Fan



## Cygnus Fan Quantify

sams121f03, S-Axis  
10-Min. Interval RMS for  $31.7 < f < 41.7$  Hz



### Description

Sensor	SAMS 121f03 500.0 sa/sec, 200.0 Hz
Location	LAB101, ER2, Lower Z Panel
Plot Type	10-Minute Interval RMS

### Notes:

- This is a 10-minute interval RMS plot for the SAMS sensor mounted on ER2 in the USL. The plot spans 2 weeks starting on GMT 15-Oct-2013.
- The red vertical line marks the unberth time of the Cygnus from the ISS.
- This interval RMS plot reinforces what was seen starting around time of Cygnus berth. That is, an elevation in broadband energy (possibly turbulent air flow) that may be a by-product of the Cygnus or other fans needed for increased circulation during berthed operations. This plot shows that broadband energy returning to pre-berth levels.

Regime:	Vibratory
Category:	Equipment
Source:	Cygnus Fan



## Cygnus Fan Ancillary Notes

A disturbance source of interest during docked operations of the Cygnus commercial cargo craft was a fan with the following characteristics:

### Speed:

Range 1900-2500 RPM

Actual speed while on berthed on Orb-D1: 2200-2230 RPM

### Rotor:

$I = 6.4 \times 10^{-4} \text{ kg-m}^2$

$H = 0.2 \text{ N-m-s @ (2500 RPM)}$

**Rotation Axis:** PCM (& Cygnus) Z axis (X ISS)

Some key info/milestones for the Cygnus Orb-D1 mission were as follows:

<b>Berthing port</b>	Harmony nadir
<b>RMS capture</b>	GMT 29-Sep-2013, 11:00
<b>Berthing date</b>	GMT 29-Sep-2013, 12:44
<b>Unberthing date</b>	GMT 22-Oct-2013, 10:04
<b>RMS release</b>	GMT 22-Oct-2013, 11:31
<b>Time berthed</b>	22 days, 21 hours, 20 minutes



PIMS ISS Acceleration Handbook  
Date last modified 2013-12-10