

Description		
Sensor	SAMS 121f05 500.0 sa/sec, 200.0 Hz	
Location	COL, Starboard Endcone, Adapter Bracket	
Plot Type	Spectrogram	
Notes:		
• This color	spectrogram shows SAMS	
measureme	ents on the Columbus Starboard	
Endcone for an 8-hour period to give context		
around the Soyuz 46S Docking event.		
 The as-flow 	The as-flown timeline reports that docking	
took place at GMT 03:11:47.		
• The most o	The most obvious impact of docking is clear	
below about 2 Hz or so.		
• The initial impact shows up starting at about		
01:00 when control.	n US handover to RS for attitude	
Between 0	Between 01:04 and 01:20, we see signs of the	
maneuver used to get the space station into		
the desired docking attitude.		
• From 03:09	9 to 03:19, the ISS goes free drift	
for docking	g the Soyuz on MRM-2.	
• From 03:19 to 03:45, there is a follow-up		
maneuver	to post-docking LVLH TEA.	
• At 04:02, t	he final activity for docking is	
handover b control.	ack from RS to US for attitude	

Regime:	Vibratory
Category:	Vehicle
Source:	Soyuz 46S Docking 19-Mar-2016







Description		
Sensor	SAMS 121f05 500.0 sa/sec, 200.0 Hz	
Location	COL, Starboard Endcone, Adapter Bracket	
Plot Type	Spectrogram	
LocationCOL, Starboard Endcone, Adapter BracketPlot TypeSpectrogramNotes:••This plot is identical to that on the previous page, but now we focus below 10 Hz, and particularly better see the impact of the Soyuz docking below about 2 Hz or so.•The as-flown timeline reports that docking took place at GMT 03:11:47.•The initial impact shows up starting at about 01:00 when US handover to RS for attitude 		
 At 04:02, the handover be control. 	back from RS to US for attitude	

Regime:	Vibratory
Category:	Vehicle
Source:	Soyuz 46S Docking 19-Mar-2016





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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 plot s	hows the full pass-band (200 Hz)
of as-measured SAMS data from the	
Columbus Endcone location.	
• The mager	ta time tick mark at 03:12 is the
approximate marker for the time reported as	
docking in the as-flown timeline (03:11:47).	
• Higher-frequency vibrations tend to dominate	
and obscure the actual impetus from the	
docking impulse on MRM-2.	

Regime:	Vibratory
Category:	Vehicle
Source:	Soyuz 46S Docking 19-Mar-2016





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	Description
Sensor	SAMS 121f05 142.0 sa/sec, 6.0 Hz
Location	COL, Starboard Endcone, Adapter Bracket
Plot Type	XYZ Accel. vs. Time
 The plot sl previous fe exception 6 Hz. At lower-f distinctive 	hows the same time span as the or the same data set with the that it was low-pass filtered below requencies, we start to see more
 We would the dockin station's ce 	near the reported docking time. expect a +ZA acceleration since g occurred aft and above the enter-of-mass.
 Note that f would exp acceleration 	for SAMS inverted polarity, we ect a brief, negative ZA on impulse at the time of docking.

Regime:	Vibratory
Category:	Vehicle
Source:	Soyuz 46S Docking 19-Mar-2016



sams2, 121f05006 at COL, Starboard Endcone, Adapter Bracket:[378.90 320.60 233.90] SAMS2, 121f05006, COL, Starboard Endcone, Adapter Bracket, 6.0 Hz (142.0 s/sec) SSAnalysis[0.0 0.0 0.0] 142.0000 sa/sec (6.00 Hz)





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Description		
Sensor	SAMS 121f05 142.0 sa/sec, 6.0 Hz	
Location	COL, Starboard Endcone, Adapter Bracket	
Plot Type	XYZ Accel. vs. Time	
 This plot is exception t axis to see clearer on t It seems we peak at 03: after the as The large h 	otes: This plot is similar to the previous with the exception that we now zoom-in on the time axis to see if the docking impulse shows up clearer on the Z-axis. It seems we do see a somewhat subtle Z-axis peak at 03:12:52, which is about a minute after the as-flown timeline.	
plane betw start of a m for the ISS	een about 03:19 and 03:20 are the naneuver to post-docking attitude .	

Regime:	Vibratory
Category:	Vehicle
Source:	Soyuz 46S Docking 19-Mar-2016



sams2, 121f05006 at COL, Starboard Endcone, Adapter Bracket:[378.90 320.60 233.90] SAMS2, 121f05006, COL, Starboard Endcone, Adapter Bracket, 6.0 Hz (142.0 s/sec) SSAnalysis[0.0 0.0 0.0] 142.0000 sa/sec (6.00 Hz)





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Description		
Sensor	SAMS 121f05 500.0 sa/sec, 200.0 Hz	
Location	COL, Starboard Endcone, Adapter Bracket	
Plot Type	XYZ Power Spectral Density	
Notes:		
 This 3-pan density plo componen was at 54.2 	This 3-panel set of XYZ power spectral density plots show that the dominant spectral component between GMT 00:30 and 04:30 was at 54.28 Hz.	
• This narro primarily v	wband disturbance was aligned with the XZ-plane.	

Regime:	Vibratory
Category:	Vehicle
Source:	Soyuz 46S Docking 19-Mar-2016



sams2, 121f05 at COL, Starboard Endcone, Adapter Bracket;[378.90 320.60 233.90] 500.0000 sa/sec (200.00 Hz)

> f(Hz) = 54.28 PSD(g^2/Hz) = 2.133e-07

f(Hz) = 54.28 PSD(g^2/Hz) = 3.737e-08

f(Hz) = 54.28 PSD(g^2/Hz) = 1.392e-07

Δf = 0.015 Hz, Nfft = 32768

P = 14.6%, No = 4771

10⁻⁸

10⁻¹²

10⁻⁸

10⁻¹²

10⁻⁸

10⁻¹²

0

20

40

60

80

Z-Axis PSD (g²/Hz)

Y-Axis PSD (g²/Hz)

X-Axis PSD (g²/Hz)

SAMS2, 121f05, COL, Starboard Endcone, Adapter Bracket, 200.0 Hz (500.0 s/sec)

Start GMT 18-March-2016, 078/00:30:00.001

f(Hz) = 141.7 PSD(g^2/Hz) = 3.941e-08

f(Hz) = 141.7 PSD(g^2/Hz) = 4.54e-09

> PIMS ISS Acceleration Handbook Date last modified 2016-03-22

200

180

160

SSAnalysis[0.0 0.0 0.0]

f(Hz) = 185.3 PSD(g^2/Hz) = 8.475e-09

f(Hz) = 185.3 PSD(g^2/Hz) = 6.077e-09

Span = 14400.00 sec.

Hanning, k = 257



100

Frequency (Hz)

120

140