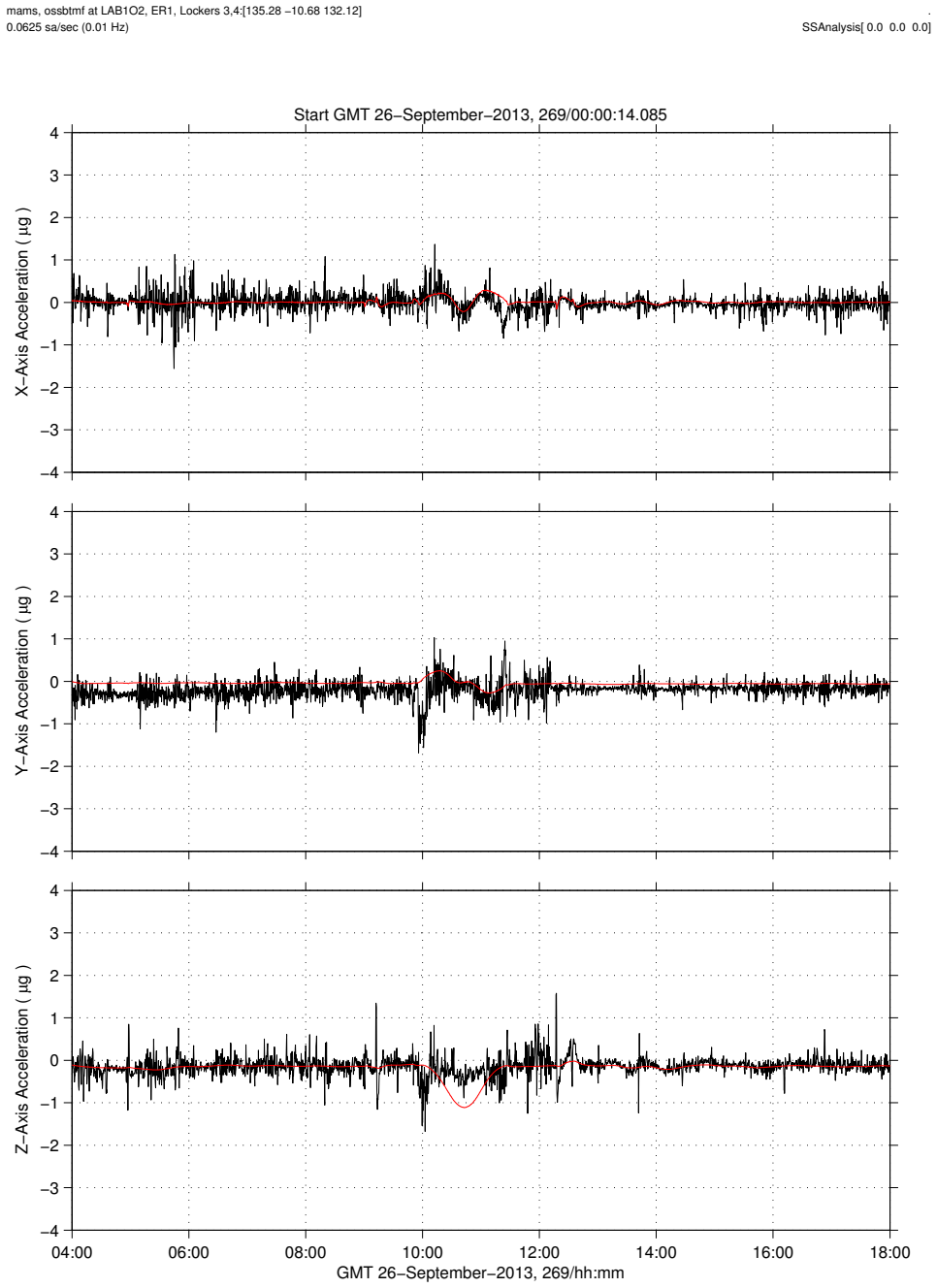
Optimal Propellant Maneuver (OPM) to +XVV Attitude Quantify



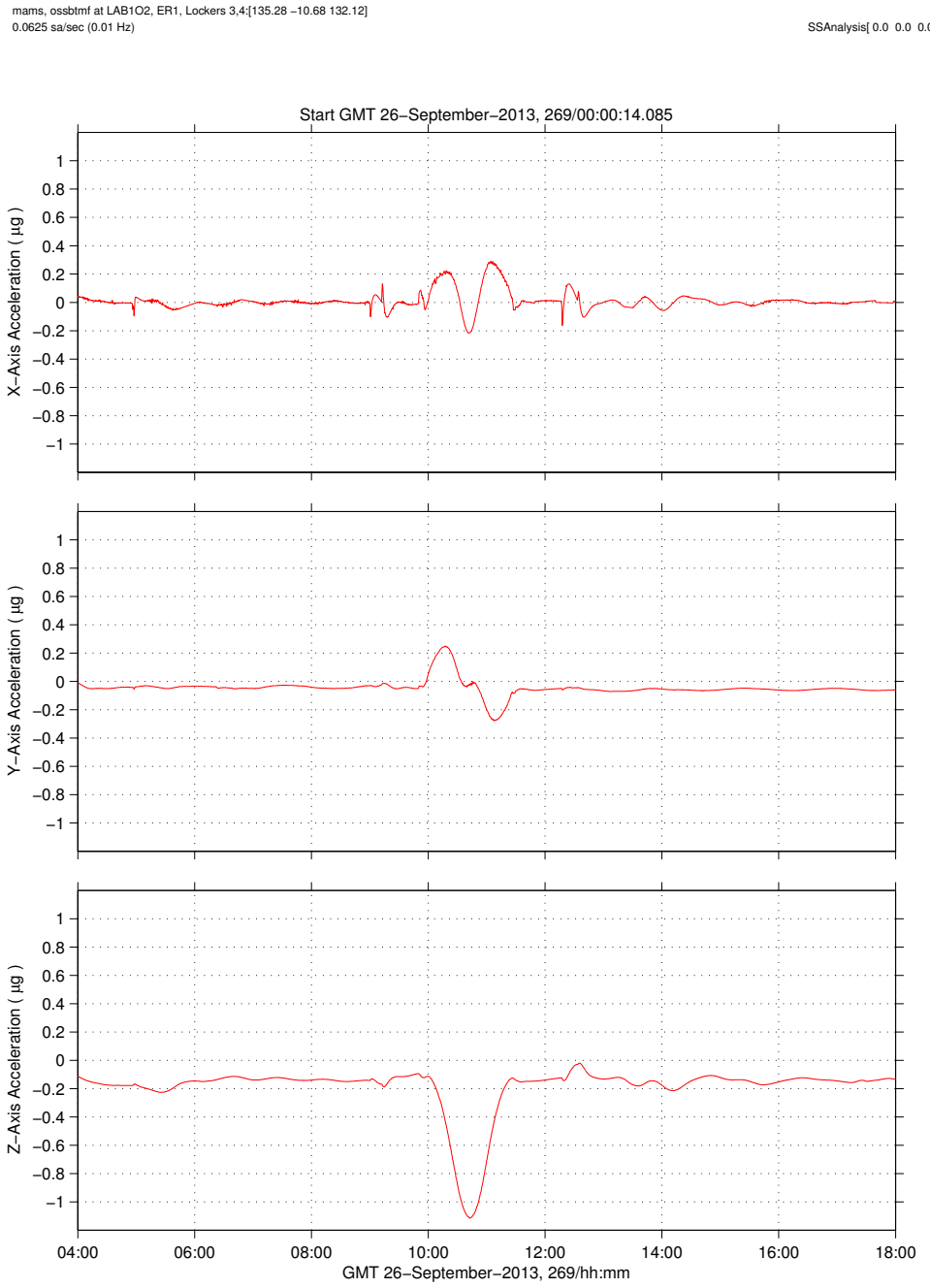
Description	
Sensor	MAMS, OSSBTMF 0.0625 sa/sec (0.01 Hz)
Location	LAB1O2, ER1, Lockers 3,4
Plot Type	Acceleration versus time

Notes:

- The sequence shown on the last page in conjunction with the MAMS measurements shown here indicate that the primary quasi-steady disturbance during the OPM was on the Z-axis.

Regime:	Vibratory
Category:	Vehicle
Source:	Optimal Propellant Maneuver

Optimal Propellant Maneuver (OPM) to +XVV Attitude Quantify



Description	
	ISS Rates/Angles Data
Plot Type	Acceleration versus time

Notes:

- The sequence shown on the last page in conjunction with the ISS rates/angles derived data shown here clearly show the quasi-steady effects during the OPM.

GMT	Accel Peak (ug)	Remarks
9/25/2013 15:19:00	-	**OPM to -XVV begins**
9/25/2013 15:43:01	0.31	y-axis positive peak
9/25/2013 15:49:29	0.29	x-axis peak #1
9/25/2013 16:07:16	0.86	**z-axis POSITIVE peak**
9/25/2013 16:28:16	0.32	x-axis peak #2
9/25/2013 16:33:07	-0.28	y-axis negative peak
9/25/2013 16:51:00	-	**OPM to -XVV ends**
9/26/2013 9:54:00	-	**OPM to +XVV begins**
9/26/2013 10:16:34	0.24	y-axis positive peak
9/26/2013 10:18:00	0.21	x-axis peak #1
9/26/2013 10:42:12	-1.12	**z-axis NEGATIVE peak**
9/26/2013 11:04:58	0.28	x-axis peak #2
9/26/2013 11:09:15	-0.27	y-axis negative peak
9/26/2013 11:26:00	-	**OPM to +XVV ends**

Regime:	Vibratory
Category:	Vehicle
Source:	Optimal Propellant Maneuver

OPM to +XVV
Ancillary Information

Maneuver Start-Stop GMT	Beta Angle	Attitude Name	Ref. Frame	YPR	F/T Cfg.	Event	Remarks
						OPM to +XVV (M13_269_B_10.UAF)	9/26/2013
269/09:49	27	-XVV	LVLH	175	MMT	Transition to USTO	
—		+ZLV		358.2	UST		
		TEA		0.6			
269/09:54	27	+XVV	LVLH	354	UST	Mnvr to +XVV using OPM	Not a pure Eigen axis rotation
269/11:26		+ZLV		358.2	UST		reference chit 11703 for attitude profile
				0.6			
269/11:26	27	+XVV	LVLH	354	UST	Mnvr to TEA on USTO	
269/11:31		+ZLV		357.7	UST		
		TEA		0.6			
269/11:37	27	+XVV	LVLH	354	UST	Transition to Momentum	TEA for VV#3az_N2neze, PSARJ auto, SSARJ auto
—		+ZLV		357.7	MMT	Management using USTO	
		TEA		0.6			

After the Soyuz 36S vehicle was safely docked, the space station maneuvered back from the docking attitude to its nominal operations attitude. Such maneuvers are typical for dockings, and usually occur in pairs before and after such vehicle dockings. An Optimal Propellant Maneuver was used to accomplish the return to nominal attitude and was executed using a sophisticated algorithm that takes into account all the various forces that affect how the station moves. It exploits those forces to effectively steer the ISS along an optimal path in terms of fuel consumption. This fuel savings comes at the cost of maneuver duration. Performing this maneuver took about 90 minutes. This is much longer than it would take using the less fuel-efficient, but simpler calculations that ultimately get the job done via controlled thruster firings.*

*http://spectrum.ieee.org/tech-talk/aerospace/satellites/nasa-saves-big-on-fuel-in-iss-rotation