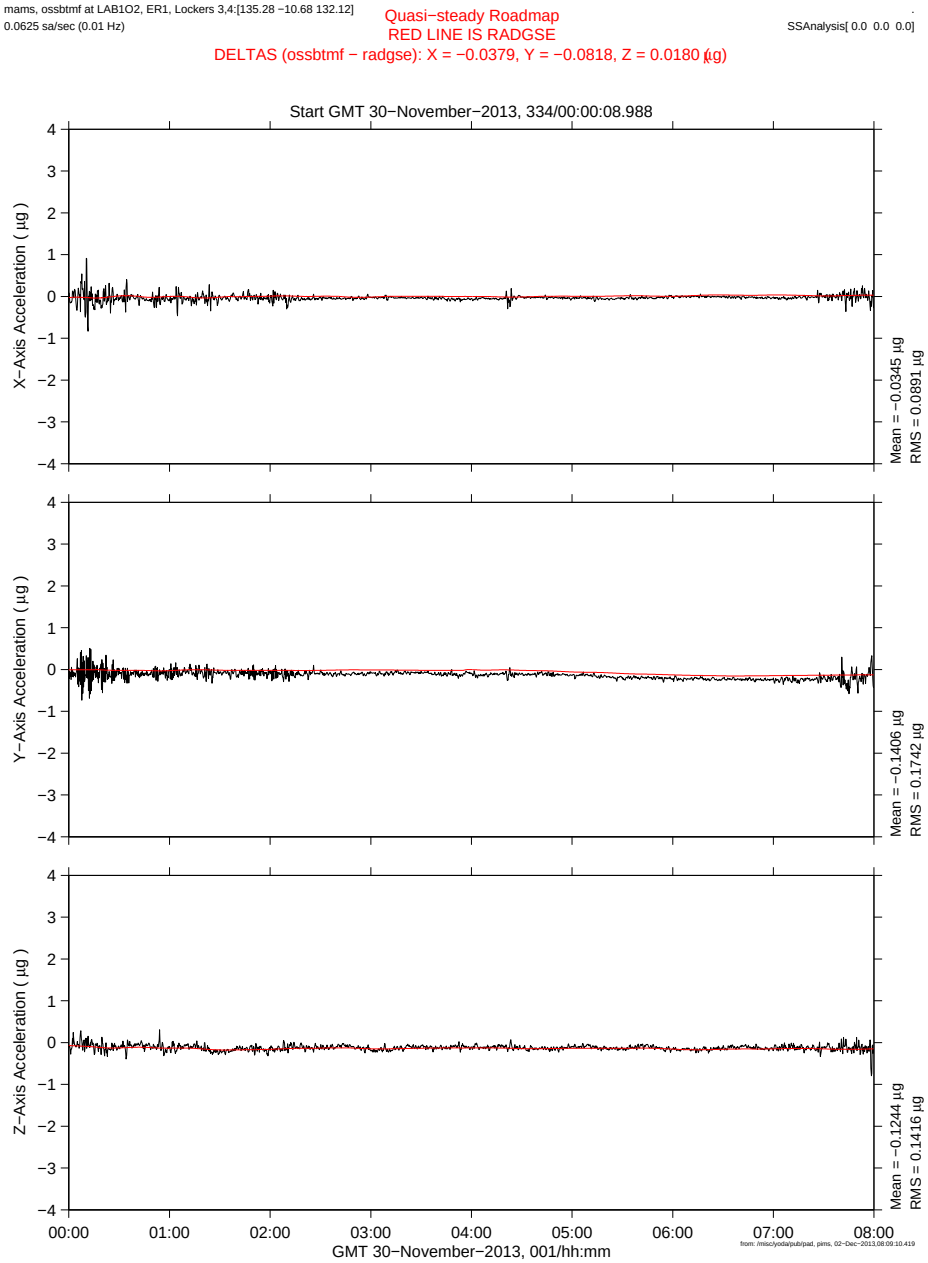
Momentum Management Maneuver From TEA to Yaw-Biased Solar Attitude Quantify



Description	
Sensor	MAMS ossbtmf 0.0625 sa/sec, 0.01 Hz
Location	LAB1O2, ER1, Lockers 3,4
Plot Type	Acceleration vs. Time

Notes:

- This plot of all 3 orthogonal axis measurements made by MAMS during the maneuver does not clearly show signs of start or end of the maneuver.
- The red trace on each subplot is the quasi-steady acceleration derived from ISS rates and angles data. The black trace represents the MAMS measurements.
- When comparing these plots to those on the next page take note of the vertical axis limits.
- The fluctuations seen in MAMS measurements near the beginning and end of this 8-hour period are before and after crew sleep, respectively.

Regime:	Quasi-Steady
Category:	Vehicle
Source:	Momentum Management Maneuver From TEA to Yaw-Biased Solar Attitude

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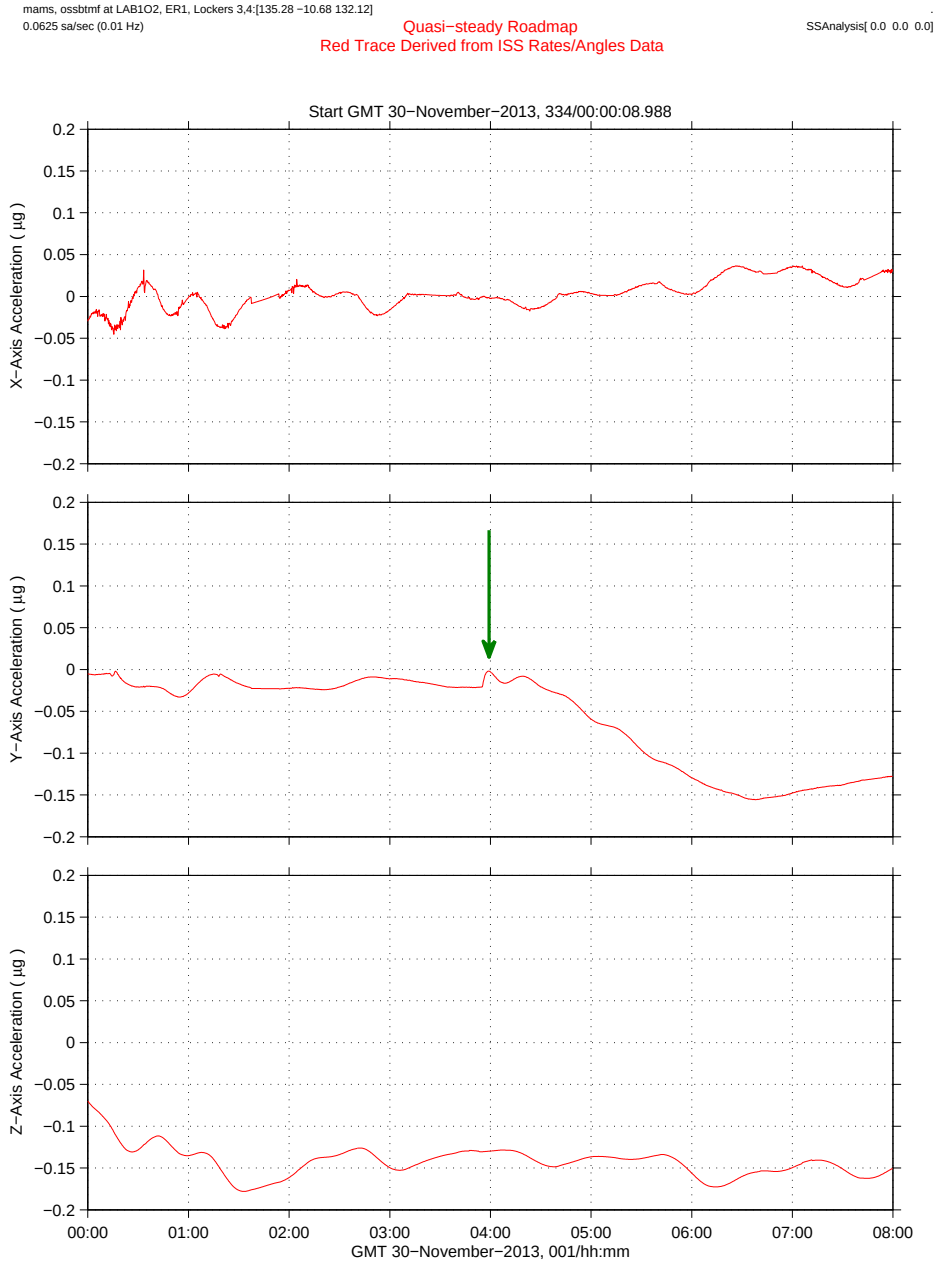

Description	
Sensor	MAMS ossbtmf 0.0625 sa/sec, 0.01 Hz
Location	LAB1O2, ER1, Lockers 3,4
Plot Type	Acceleration vs. Time

Notes:

- These plots are identical to those on previous page except we have zoomed in here and we have removed the black traces of MAMS measurements.
- This zoom-in on the quasi-steady acceleration vector highlights the changes that happened during this maneuver between 04:00 and 06:06.
- The primary impact is seen starting at the green arrow when the maneuver began, that is, the Y-axis exhibits a slow transition to a new quasi-steady value.
- The table of values on the next page quantifies what happened on all 3 axes in terms of quasi-steady shift due to the attitude maneuver.

Regime:	Quasi-Steady
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Momentum Management Maneuver From TEA to Yaw-Biased Solar Attitude

A momentum management approach was used to maneuver and change the ISS attitude from its nominal Torque Equilibrium Attitude (TEA) to a yaw-biased Solar Attitude. NASA and the ISS partners approved this specific attitude, called the "SOLAR Attitude", to enable the bridging of 2 solar viewing opportunities. This provides quasi-continuous observations during a full solar rotation. The studies that exploit this attitude have implications with respect to space climate.

The momentum management approach is a Control Moment Gyro (CMG) only maneuver developed at Draper Lab. This approach is significantly slower than a maneuver using Russian Segment thrusters to change the space station's attitude. The MAMS plots on the previous pages and the values in the table below help quantify and otherwise characterize this slowly evolving microgravity event. The images below the table convey some interesting sun-related info.

Axis (SSA*)	Quasi-Steady Level (ug)		
	Before Maneuver	After Maneuver	|Δ|
X	-0.0094	0.0265	0.0359
Y	-0.0153	-0.1277	0.1123
Z	-0.1376	-0.1496	0.0120