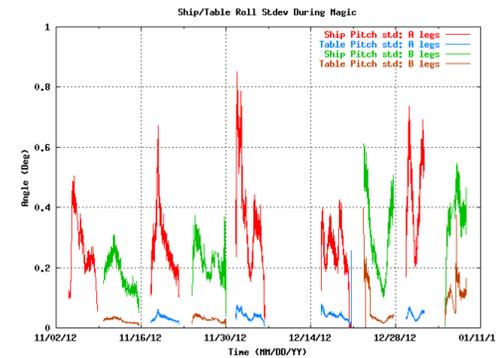
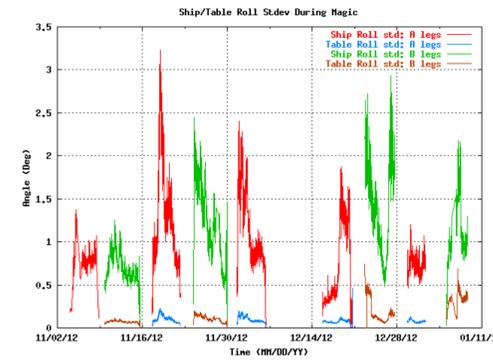
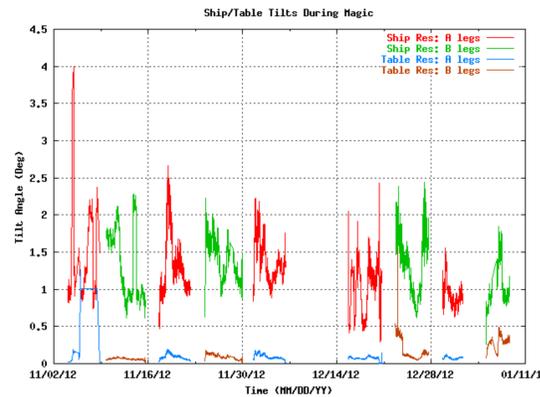


# Update, Status and Characteristics of the AMF2 RPH Stable Platform

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## INITIAL RESULTS

Thus far the table mounted tilt sensor has been used in a Proportional-Integral-Derivative (PID) controller to control roll and pitch independently. The tilt  $([r^2 + p^2]^{1/2})$  of the table and the ship is a venient parameter for inter-comparisons. Fifteen min averages, shown above, and cumulative probability distributions, shown below, from cruises 5-9 indicate that the RPH tilt was within 0.15 deg of vertical 90% of the time. Note that on voyage 5, the table was oriented to point at roll of 1 deg for several days.

## PLATFORM DESCRIPTION

The Roll, Pitch Heave (RPH) stable platform is hydraulically controlled, designed to orient the MWACR vertically at sea. Three legs control roll, pitch and vertical motion in response to table based measurements and ship disposition values in real time (20 Hz). Two legs moving in opposition control roll while those same two legs moving in opposition to the third leg control pitch. Hydraulic control enables payloads up to 1000 lb with minimal exposure to the elements.

The standard deviation of roll and pitch over 15 min time periods from cruises 5-9, shown above illustrate the effectiveness of the RPH table operation with the basic PID approach. The MWACR was not available during cruises 2-4 and a mechanical failure occurred during cruise 7B. Summary statistics (below) confirm that roll and pitch standard deviations of the table are about one tenth thoses of the ship. Incorporation of ship disposition data into the enhanced PID is expected to further improve performance.

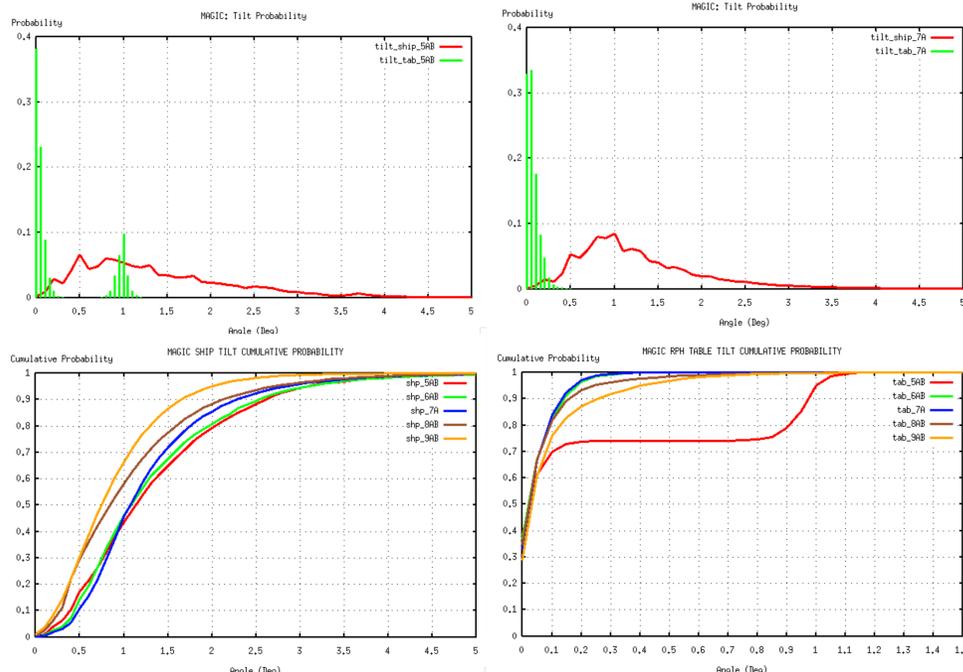


Table II Statistics from Magic Cruise 5-9

Cruise	Roll	Roll std	Roll Ratio	Pitch	Pitch std	Pitch Ratio
5A	-0.72	0.060	0.085	0.05	0.032	0.130
5B	0.00	0.069	0.101	0	0.024	0.137
6A	0.00	0.101	0.082	0	0.031	0.116
6B	0.00	0.106	0.087	0	0.029	0.131
7A	0.00	0.098	0.088	0	0.041	0.117
8A	0.00	0.070	0.134	0	0.039	0.255
8B	0.00	0.118	0.093	0	0.029	0.126
9A	0.00	0.075	0.101	0	0.042	0.097
9B	0.00	0.121	0.091	0	0.052	0.125

## IN SUMMARY

The RPH table response appears to be adequate for maintaining the MWACR in a near vertical alignment. Further improvement is anticipated with the new ship disposition data. Further work needs to be done to improve the accuracy of the tilt sensor and the relative alignment of the MWACR and table.