



Airborne Ocean Topography Measurements in Support of the SWOT Mission Nick Statom (<u>nstatom@ucsd.edu</u>), Luc Lenain (<u>llenain@ucsd.edu</u>) & Ken Melville Scripps Institution of Oceanography, UCSD

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With the growing interest in understanding air-sea interaction, upper ocean dynamics, increasing emphasis has been placed on submesoscale ocean processes. As the remote sensing community moves to higher spatial resolution (e.g. the Surface Water and Ocean Topography, or SWOT, mission), the surface wave field will become more significant for both the dynamics and the sea-state bias corrections since the wave field correlates with the submesoscale dynamics through wave-current interaction. In this regime of ocean dynamics, some of these needs can be met by the use of airborne lidar for the measurement of ocean surface topography from mesoscales of O(100) km to gravity waves of wavelengths O(10) cm. Here we present results from a series of experiments conducted over the past 7 years using the Modular Aerial Sensing System (MASS), an airborne instrument package developed at the Scripps Institution of Oceanography. Airborne lidar measurements of sea surface topography ranging from submeter- to meso- scales, synchronized with satellite altimeter overflights off the coast of California and in the Gulf of Mexico are analyzed, along with coincident airborne hyperspectral and infrared imagery to characterize the changes in sea surface topography and surface wave variables.

The Modular Aerial Sensing System (MASS)





Sea Surface Height Spectrum

Airborne Lidar Topography in **Support of SWOT Ocean CalVal**

The overall goals of the Surface Water & Ocean Topography (SWOT) mission are to conduct global surveys of Earth's surface water, observe the fine details of the ocean's surface topography, and measure how water bodies change over time. As part of the SWOT validation activities (CalVal), the satellite will be placed into a daily repeat cycle orbit shortly after launch (three-month period) to ensure that the onboard instrumentation is operating to specification and

