

EARTH OBSERVATION SYMPOSIUM (B1)
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OSCMS: OCEAN SURFACE CURRENT MISSION STUDY RESULTS

Abstract

One of the main observational gaps to understand the dynamics of ocean processes and ocean-atmosphere interactions is the direct measurement of ocean currents at sub-mesoscale resolutions. In order to close this gap, ESA has initiated a number of studies to develop a mission concept, currently designed as single-platform dual-beam along-track SAR interferometer. One conceptual result of these pre-development efforts has been the Wavemill concept. As a distinct evolution from Wavemill, the team OHB System (Germany/Bremen), DLR (Microwaves and Radar Institute, Germany/Oberpfaffenhofen), MDA (Satellite Systems Unit, Canada/Montreal), and NERSC (Mohn-Sverdrup Center, Norway/Bergen), has been awarded to carry out the Ocean Surface Current Mission Study (OSCMS). This study is to re-assess system feasibility and to define a mission and overall system concept for the measurement of the Total Ocean Surface Current Vector (TOSCV), including consolidation of the observation and instrument concepts.

Special attention has been paid, to confront the scientific requirements with technological and even fundamental physical limitations. The combination of short baselines (necessarily associated to a single-platform system) and the huge dynamic range of the ocean backscattering (in particular its fast decay with increasing incident angles) makes it challenging to design a system that provides the desired performance (total error in the range of 5 cm/s) for scientifically required swath widths above 100 km.

The paper will provide insight into study results concerning the technical realisation of the system. It will discuss the main relevant requirements, design challenges and characteristics, as well as a description of the system architecture and required technological advancements.