

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Future Earth Observation Systems (2)

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MISSION DEVELOPMENT OF THE SURFACE WATER AND OCEAN TOPOGRAPHY PROJECT
FOR OCEANOGRAPHY AND HYDROLOGY**Abstract**

A new satellite mission for oceanography and hydrology science called Surface Water and Ocean Topography (SWOT) is being developed jointly by the U.S. National Aeronautics and Space Administration and France's Centre National d'Etudes Spatiales. Using state-of-the-art "radar interferometry" technology to measure the elevation of water, SWOT will observe major lakes, rivers and wetlands while detecting ocean features with unprecedented resolution. SWOT data will provide critical information that is needed to assess water resources on land, track regional sea level changes, monitor coastal processes, and observe small-scale ocean currents and eddies.

SWOT will revolutionize oceanography by detecting ocean features with 10 times better resolution than present technologies. The higher resolution will reveal small-scale ocean features that contribute to the ocean-atmosphere exchange of heat and carbon. These are major components in global climate change, and will improve the understanding of the ocean environment including motion of life-sustaining nutrients and harmful pollutants. SWOT data will be used to improve ocean circulation forecasts, benefiting ship and offshore commercial operations, along with coastal planning activities such as flood prediction and sea level rise.

Surface water storage, flow rates and discharge in rivers, lakes, reservoirs and wetlands are currently poorly observed at the global scale. SWOT will provide the very first comprehensive view of Earth's freshwater bodies from space and will allow scientists to determine changing volumes of fresh water across the globe. These measurements are key to understanding surface water availability and in preparing for important water-related hazards such as floods and droughts. SWOT will contribute to a fundamental understanding of the terrestrial branch of the global water cycle.

SWOT is expected to achieve 1 cm precision at 1 km x 1 km pixels over the ocean and 10 cm precision over 50 m x 50 m pixels over land waters. Other payloads of the mission include a conventional dual-frequency altimeter for calibration to large-scale ocean topography, a water-vapor radiometer for correcting range delay caused by water vapor over the ocean, and precision orbit determination package (GPS, DORIS, and laser retroreflector). SWOT is currently being developed for a planned launch in 2022.

The purpose of this presentation is to present the current SWOT mission status, including technical development challenges regarding the Payload Instruments, Spacecraft, ground data system and calibration/validation plans