EARTH OBSERVATION SYMPOSIUM (B1)
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Author: Mr. Mattia Marenco
Airbus DS GmbH, Germany

SENTINEL-6 (JASON – CS) OCEAN TOPOGRAPHY MISSION

Abstract

Since 1992, TOPEX-Poseidon/Jason family satellites have accumulated an exceptional data record on ocean topography, enabling scientists to track the peaks and troughs generated by ocean currents and to precisely determine sea level rise. For science community, it is of paramount importance extending the time-series and improving the resolution of these data, crucial to improve our understanding of the mechanisms driving global warming. To accomplish this goal two new Sentinel satellites: Sentinel-6/Jason-CS A and B have been added to the European Copernicus program.

Sentinel-6/Jason-CS is a cooperative mission with contribution from NASA, NOAA, ESA, EUMETSAT, CNES and the European Union. The European Space Agency, has selected Airbus DS, the world's second largest space company, as the prime contractor to develop and construct the two new satellites in Friedrichshafen, Germany. The development is well advanced and it is undergoing the Critical Design Review.

Sentinel-6/Jason-CS satellites are designed to orbit for minimum 5.5 years each and will ensure measurements carried out on a continuous basis from 2020 on, with better performances in respect to earlier Jason series. The satellites will measure their distance to the ocean surface with an accuracy of a few centimetres, from an altitude of 1,336kilometres.

To achieve this accuracy, a two-band radar-altimeter (Ku/C-band) will be used as main instrument. The path delay, due to atmospheric water vapour, will be corrected by a radiometer. Precise orbit determination (POD) will be computed using ground-based radiopositioning, GNSS-POD and laser retroreflector. The radar altimeter will feature a new "InterLeaved Mode". It combines the heritage Low Resolution Modes (LRM) with high resolution measurements (SAR) taken at the same time. The LRM will ensure continuity and comparability with previously acquired data.

Observing changes in sea-surface height using such a high level of accuracy provides insights into global sea levels, speed and direction of ocean currents, and ocean heat storage. These measurements are vital for modelling the oceans and predicting sea levels rising. The data are also used to calculate the transport of heat, water mass, nutrients, and salt by the oceans and to estimate wave heights and wind speeds. This improves the understanding about general ocean circulation changes through time. As a result, forecasts of climatic events like El Niño/La Niña and of global climate evolution is improved.

Understanding the ocean dynamics and developing a global view of Earth's oceans is essential to understand climate change that impacts social and economic life around the World.