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CHANGING THE ISS ATTITUDE TO MAXIMIZE SCIENCE RETURN OF THE SOLAR PAYLOAD

Abstract

Since February 2008, the Belgian User Support and Operations Centre (B.USOC) operates SOLAR, an optical payload measuring the sun spectral irradiance in space from the ESA COLUMBUS module on the International Space Station (ISS). SOLAR is a 2-axis rotating platform accommodating three instruments: SOVIM a total solar irradiance instrument, SOLSPEC a UV-visible-infrared spectrometer, and SolACES a far UV instrument. SOVIM stopped operations due to an electrical problem but today the two other instruments are still operating successfully. Moreover, although originally foreseen for an 18 month experiment, ESA now plans on supporting the SOLAR operations until 2017.

Due to the specificities of the ISS orbit and mechanical limitation of the SOLAR moving platform, a continuous operation is not possible. Periods of Sun observation, called Sun Visibility Windows (SVW), are limited to approximately 12 days per month.

In December 2012, ISS took a specific attitude, a small deviation from its standard TEA +XVV attitude, called the “SOLAR Attitude”. This temporary change of attitude resulted in the bridging of two SVWs, the gap of several days between two SVWs was covered allowing sun observation for a long period of more than 35 days, and scientists could thus gather spectra during a full solar rotation.

The change of ISS attitude was obtained for the first time in the sole objective of increasing the science return. From the idea to the execution, it took about 2 years of coordination involving all International Partners, and external payloads teams impacted by the manoeuvre. After describing the added value for solar physics and climate studies, the article will present the coordination process required to get to the implementation and the future utilization of the SOLAR attitude will be discussed.