Solar Orbiter's Science Activity Plan: Translating Questions into Action

Anik De Groof, Andrew Walsh, David Williams (Science Operations Centre), Daniel Mueller, Yannis Zouganelis (Project Scientists)

Solar Orbiter is the next ESA mission dedicated to Solar and Heliospheric Physics and preparations for this challenging mission are well underway. Solar Orbiter is scheduled for launch in February 2019, with as main goal to observe solar activity from distances between Mercury's and Earth's orbit and to link it to the solar wind as sensed in the neighbourhood of the spacecraft. Also, the orbit will slowly climb out of the plane of the planets which will allow unprecedented views of the solar poles.
The satellite carries 10 instrument suites, ranging from full-Sun and high-resolution cameras, over spectrometers (measures light as a rainbow), plasma and magnetic field sensors to particle detectors. And all these instruments will have to coordinate their operations in order to address the main science questions: how does the Sun create and control its surrounding (in which the Earth is embedded) and why does solar activity change with time?

The planning of all instruments' science operations is one of the big challenges: one has to consider that each orbit around the Sun has different characteristics, including the relative positions of the Earth and spacecraft (affecting data downlink rates), trajectory events such as gravitational assist manoeuvres, and the phase of the solar activity cycle. Furthermore, each orbit's science data will be downloaded during the next, so orbits cannot be planned individually. Therefore Solar Orbiter needs a plan: a strategic, top-level view of the optimal opportunities for science observations across the 10-years mission lifetime, allowing all mission objectives to be addressed.
During ESPM-15 we will introduce Solar Orbiter's Science Activity Plan (SAP), explain how a first draft has been built and which strategy is being followed to coordinate all 10 instruments' science operations.

Contact: Anik De Groof (anik.degroof@sciops.esa.int)