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METIS CORONOGRAPH - A SYSTEM ENGINEERING APPROACH

Abstract

METIS (Multi Element Telescope for Imaging and Spectroscopy) is one of the remote sensing instruments of the Solar Orbiter mission of the European Space Agency (ESA), currently undergoing Critical Design Review under ASI contract awarded to the Italian industry. The objective of Solar Orbiter is the exploration of the Sun heliosphere by means of remote sensing and in-situ instruments from a minimum distance of 0.28 AU and from solar latitudes up to 34 degrees. METIS is an inverted-occultation coronagraph specifically designed to acquire simultaneous images of the solar corona in two different wavelengths (visible light between 580 nm and 640 nm, and the Lyman-alpha lines of the Hydrogen at 121.6 nm). The visible channel also includes a polarimeter to observe the linearly polarized component of the K corona. METIS is designed with sophisticated technological solutions and innovative material in order to meet from one side the very stringent scientific requirements and on the other side the challenging technical and programmatic interfaces with the Solar Orbiter spacecraft. To this end, the Italian Space Agency, the leading funding agency of the project under the PI-ship of Prof. E. Antonucci of INAF, Turin, awarded the phase C/D industrial contract to the Compagnia Generale per lo Spazio, CGS an OHB company and Thales Alenia Space Italia for the realization and qualification of the instrument. A strong scientific and technical collaboration is in place with the Max Planck Institute for Solar System Research (Goettingen, Germany) and Astronomical Institute of the Academy of Sciences of the Czech Republic, for the provision respectively of the light visible and ultraviolet detector assemblies and the mirrors of the telescope. Finally, in order to be compliant with the very stringent and challenging contamination requirements, ESA has awarded an ad-hoc contract to SENER Company for the design and realization of a sealing protection cap to be placed on top of the telescope.