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The telescope of the multispectral instrument

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THE TELESCOPE OF THE MULTISPECTRAL INSTRUMENT

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The presentation provides a synthesis of the alignment and the measured performance of the PFM telescope of the Multispectral Instrument.

GMES is a joint initiative of the European Commission and the European Space Agency. The key mission objectives for Sentinel-2 are : (1) to provide a systematic global acquisitions of high resolution multi spectral imagery with a high revisit frequency, (2) to provide enhanced continuity of the present in orbit multi-spectral imagery, and (3) to provide observations for the next generation of operational products such as land-cover maps, land change detection maps and geophysical variables. Sentinel-2 will thus directly contribute to the Land Monitoring, Emergency response and Security services.

In the Sentinel-2 mission programme, Astrium in Friedrichshafen is responsible for the satellite's system design and platform, as well as for satellite integration and testing. Astrium Toulouse supplies the MultiSpectral Instrument (MSI). In particular Astrium is in charge of the design, integration and validation of the telescope, Boostec is manufacturing all silicon carbide hardware and AMOS is polishing the mirrors.

The Sentinel-2 Multi Spectral Instrument is a filter based push-broom imager. It provides imagery in 13 spectral channels with spatial resolutions ranging from 10 to 60 m. The instrument features an optical telescope providing a wide field of view to achieve the required swath width of 290 km. An oblong pupil equivalent to 15 cm diameter, has been selected to achieve a compact design and optimised optical performance. The instrument is required to operate over a wide spectral range extending from the Visible Near-Infra-Red (VNIR, 400-1100 nm) to the Short-Wave-Infra-Red (SWIR, 1100-2500 nm).

The development of the telescope of the Sentinel-2 Instrument now comes to an end. The design phase has been completed in November 2010. The presentation recalls the design of this innovative Three Mirror Anastigmat ceramic telescope. The polishing and coating of the aspherical mirrors is completed since end of 2011. Following the alignment of the three mirrors inside the whole silicon carbide structure, the telescope has been characterized in 2012. The presentation compares the results to the expected performance.