

MetOp Second Generation: a joint ESA/EUMETSAT mission for weather forecast and climate monitoring with an imaging radiometer

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Metop Second Generation (MetOp-SG) is a mission that will ensure the delivery of continuous, high-quality global meteorological data starting from 2020 onwards, providing weather data services for monitoring the climate and improving weather forecasts. The program is a continuation of current EUMETSAT Polar System (EPS), and is jointly funded by the EUMETSAT and ESA. MetOp-SG forms the space segment of EPS

On MetOp-SG two conical scanning imaging radiometers will be dedicated to the weather forecast and climate monitoring: Microwave Imaging Radiometer (MWI) and Ice Cloud Imaging radiometer (ICI). MWI is a multi-spectral microwave imager, working in a spectral bands ranging between 18 GHz and 183 GHz. MWI measures precipitation (liquid and frozen; total column and gross profile), total column water vapor and atmospheric water vapor. ICI is a submillimeter microwave imager, working in a spectral bands ranging between 183 and 664 GHz. ICI measures water vapour profile, cloud ice water path retrieval, ice and cirrus clouds.

During the Phase 0 of the MetOp-SG study, the instruments concept of the MWI and ICI have been developed. In this framework, Corista developed an instrument performance model in Matlab language. Starting from input parameters which identify the radiometer configuration the software calculates MWI/ICI key parameters such sensitivity and accuracy. A trade-off analysis of radiometer geometric, radiometric, scanning and sampling requirements allowed to define the concept of the instruments.

During the Phase A the feasibility of the instruments has been studied and the performances of the instruments in terms of calibration accuracy and sensitivity and were deeply investigated. Now the phase B is ongoing where the design of the instruments has been discussed both in terms of hardware that of analysis data

In this paper both MWI and ICI radiometers will be described. The performances of the instruments will be discussed focusing the attention on the accuracy and the method of calibration of the instruments.