



Presentation of 3MI the Multi-Viewing Multi-Channel Multi-Polarisation Imaging Mission of the EUMETSAT Polar System - Second Generation (EPS-SG) dedicated to aerosol characterisation.

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The EUMETSAT Polar System- Second Generation (EPS-SG) is planned to replace the current EUMETSAT Polar System satellite system in the 2020 timeframe and contribute to the Joint Polar System to be jointly set up with NOAA. The satellites will fly, like Metop, in a sun synchronous, low earth orbit at 817 km altitude and 09:30 local time of the descending node, providing observations over the full globe with revisit times of 12 to 24 hours, depending on instrument.

The EPS-SG Multi-Viewing Multi-Channel Multi-Polarisation Imaging mission (3MI) is a high performance radiometer dedicated to aerosol characterisation for air quality, climate monitoring, and atmospheric chemistry. The purpose of the 3MI is to provide multi-spectral (from 388 to 2130 nm), multi-polarisation (-60° , 0° , and $+60^\circ$), and multi-angular (10 to 14 views) images of the Earth outgoing radiance in order to accurately measure the aerosol load and aerosol microphysical properties, and to resolve the directional anisotropy. The 3MI design and heritage comes from the POLDER/PARASOL missions (3 instruments flown since 1996), which are based on a mature technology, with proven reliability fundamental for EUMETSAT operational product policy.

Although aerosol characterisation is the primary application, 3MI will further support observation of cloud microphysical properties, water vapour load, Earth radiation budget, and land-surface characteristics all of which will benefit from the enhanced directional and polarisation measurements.

The 3MI also contributes to artefact correction on other EPS-SG sensors. Some aerosol parameters can be derived from the METimage, S-5, and IASI-NG instruments, however the anisotropy and polarisation effects induced by scattering from aerosols and cirrus clouds requires multi-viewing and multi-polarisation capabilities in order to quantify these effects.