

# Overview of Passive Microwave Missions at EUMETSAT for Precipitation Monitoring

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The EUMETSAT Polar System is entering a new phase with the deployment of its Second Generation (EPS-SG) satellites, forming a part of Europe's contribution to the Joint Polar System with NOAA, and the preparation of the EPS-Sterna constellation.

EPS-SG includes three passive microwave radiometers: the Microwave Sounder (MWS) on Metop-SG-A, and the Microwave Imager (MWI) and the Ice Cloud Imager (ICI) on Metop-SG-B. MWS, a cross-track scanning radiometer with 24 channels between 23.8 and 229 GHz, primarily provides temperature and humidity sounding but also includes channels with sensitivity to cloud ice and precipitation. MWI, by contrast, is mainly a precipitation mission, featuring 18 channels from 18 to 183 GHz, including innovative channels near 50–60 GHz and 118 GHz that enhance the detection of light precipitation and snowfall. ICI complements MWI by extending coverage into the millimetre and sub-millimetre range (183–664 GHz), enabling unprecedented operational observations of cloud-ice properties and ice-hydrometeor microphysics, providing valuable context for snowfall-related observations.

EPS-Sterna is envisioned as a complementary small-satellite constellation to enhance the temporal sampling and overall coverage of the EUMETSAT Polar System. The Microwave Radiometer (MWR) embarked on the Sterna satellites is a cross-track scanner featuring 19 channels between 50 and 325 GHz, a frequency range that supports the retrieval of liquid and solid precipitation, among others.

An overview of the EPS microwave missions will be provided, outlining their scientific goals and relevance to precipitation. Third-party missions, such as the Copernicus Imaging Microwave Radiometer (CIMR), will also be considered given their planned contribution to L2 precipitation products.