

**Multi-Angle Imager for Aerosols (MAIA): Observations, measurements, and science**

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Aerosols are associated with uncertainty in climate prediction and cardiovascular and respiratory disease. The complexity of aerosol impacts is largely due to their heterogeneity in composition and variability in space and time. The past two decades have witnessed major advances in our ability to map aerosol abundances and their radiative impacts from space. Instruments such as the Multi-angle Imaging SpectroRadiometer (MISR) and Moderate resolution Imaging Spectroradiometer (MODIS) have also been used to estimate human exposure to near-surface particulate matter (PM) concentrations.

Current efforts in aerosol remote sensing are aimed at improving our ability to characterize particle type. Recent technology advances enable integrating passive multispectral, multiangular, and high-accuracy polarimetric measurement methodologies into a single sensor. Previous experience with MISR, other satellite instruments (e.g., Polarization and Directionality of Earth's Reflectances, POLDER), and airborne sensors such as JPL's Airborne Multiangle SpectroPolarimetric Imager (AirMSPI), demonstrate the value of spatially resolved multiangular imaging. As part of the Earth Venture Instrument program, NASA selected the Multi-Angle Imager for Aerosols (MAIA) investigation in 2016. The MAIA instrument extends MISR's multiangular visible and near-infrared (VNIR) spectral coverage to 14 bands between the ultraviolet to shortwave infrared; three of the bands are polarimetric to enhance sensitivity to aerosol size and composition.

Unlike MISR, MAIA is a targeting instrument. Its primary focus is on investigating the health impacts of different types of airborne PM, including sulfates, nitrates, organic carbon, black carbon, and dust. Primary targets for epidemiological studies include major cities around the world. Secondary target areas would also be observed for a variety of scientific purposes, including studies of air quality, climate, and the interactions between aerosols and clouds.

MAIA launch is expected to occur no earlier than mid-2021. The decision to implement MAIA will not be finalized until NASA completes the National Environmental Policy Act process.