

Topics (T)

Earth Observing Missions and Systems to Address Climate Change and Its Impacts [1] (3A)

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THE ARCTIC OBSERVING MISSION (AOM): IMPROVING METEOROLOGICAL, GREENHOUSE GASES AND AIR QUALITY DATA TO BETTER UNDERSTAND AND MITIGATE CLIMATE CHANGE

Abstract

The Arctic region, often viewed as an early indication system for many aspects of climate change, has been recently undergoing alarmingly increasing temperatures, retreating sea ice cover and record low ozone concentrations in the winter. Mapping greenhouse gases as well as important air quality and meteorological variables over this region is crucial to better understand and mitigate the Arctic-specific phenomena such as the thawing of permafrost and changes to the boreal forest, which affect not only the Arctic but the planet as a whole. Current and planned Earth observing missions in polar orbits only offer sparse spatial and temporal coverage of the polar regions, while geostationary satellites cannot effectively observe the polar regions. The proposed Arctic Observing Mission (AOM) will address this current data gap by using two satellites in a Highly Elliptical Orbit.

Each satellite will carry four payloads. First, a meteorological imager will support global numerical weather and environmental prediction. Second, a greenhouse gases imaging spectrometer will improve our ability to detect and monitor changes in the carbon and methane cycles. Third, an air quality imaging spectrometer will enhance our ability to monitor anthropogenic emissions and mid-latitude pollution transport to improve air quality forecasts. Fourth, a space weather observation suite will support operational space weather forecasting to protect valuable space-based assets and improve our scientific

understanding of solar-terrestrial interactions.

The AOM is currently undergoing a 2-year pre-formulation study (PFS) with several important activities planned for completion by mid-2024. The PFS will refine the options for the mission architecture, such as the number of satellites, orbits and other technical and design aspects. In parallel to the technical studies, a socio-economic benefit study of the mission is also underway and the roles and contributions of international partners are being refined. International collaboration and partnership is vital to AOM's success. Improved meteorological and space weather observations of the North are of interest to the US and Europe, with NOAA, NASA and EUMETSAT participating in ongoing partnership discussions with Canada.

This presentation will provide an overview of the AOM mission, including its mission timeline and its planned capabilities with respect to climate change research, monitoring and mitigation.