THE HARP (HYPERANGULAR IMAGING POLARIMETER) AND USE OF NANOSATELLITES FOR THE MEASUREMENT OF AEROSOLS, CLOUDS AND THE OCEAN SURFACE PROPERTIES [C]

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The HARP (HyperAngular Rainbow Polarimeter) is a 3U CubeSat sensor designed for the measurement of aerosol, clouds and surface properties with a wide FOV that enables nearly global coverage from multiple wavelengths and tens of different along track viewing angles. HARP's science focuses on the measurement of detailed properties of aerosol and cloud particles in suspension in Earth's atmosphere and their potential effect on climate. Understanding and predicting climate change is the world's number one Earth Science and environmental priority. Accurate multi-angle polarization measurements over a broad spectral range (UV to SWIR) are the next frontier in measuring aerosols from space. The French POLDER instrument has pioneered the use of polarization in multiple viewing angles for the retrieval of aerosol and cloud microphysical parameters, followed by the HARP (Hyperangular Rainbow Polarimeter) CubeSat that is currently in preparation for launch in 2018. HARP is a technology demonstration funded by NASA that intends to show how nanosatellites can measure the detailed microphysical properties of aerosol, cloud particles, and surface angular properties.

The HARP CubeSat satellite will carry a VNIR version of the HARP sensor with four wavelengths (440, 550, 670 and 870nm) and up to 60 along track viewing angles. HARP's capability includes the hability to measure aerosol and cloud microphysics as well as to characterize the surface BRDF properties. In particular, over the ocean, HARP provides information simultaneously maximizing the glint and off glint geometries. At the same time, the detailed aerosol characterization provided by HARP can provide important parameters to support the atmospheric correction needed for a more accurate retrieval of the ocean properties. Data from the aircraft simulator for HARP will be presented and discussed here.

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