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The Global Precipitation Measurement (GPM) Mission: U.S. Program and Science Status

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The Global Precipitation Measurement (GPM) Mission is an international satellite mission designed to unify and advance precipitation measurements from a constellation of research and operational microwave sensors to provide next-generation precipitation data products for scientific research and societal applications. NASA and JAXA will deploy the GPM Core Observatory carrying an advanced radar-radiometer system to serve as a physics observatory and calibration reference for constellation radiometers. NASA will deploy the GPM Low-Inclination Observatory to enhance the near real-time monitoring of hurricanes and mid-latitude storms, and JAXA will contribute data from the Global Change Observation Mission-Water (GCOM-W) satellite. Partnerships are under development to include additional conical-scanning microwave imagers on the French-Indian Megha-Tropiques satellite and U.S. Defense Meteorological Satellite Program (DMSP) satellites, as well as cross-track scanning humidity sounders on operational satellites such as the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP), POES, NPOESS, and European MetOp satellites, which are used to improve the precipitation sampling over land. In addition, Brazil has in its national space plan for a GPM low-inclination radiometer, and data from Chinese and Russian microwave radiometers could potentially become available through international collaboration under the auspices of the Committee on Earth Observation Satellites (CEOS) and Group on Earth Observations (GEO).

As a science mission with integrated application goals, GPM is expected to (1) provide new measurement standards for precipitation estimation from space, (2) improve understanding of precipitation physics, the global water cycle variability, and freshwater availability, and (3) advance weather/climate/hydrological prediction capabilities to directly benefit the society. An overview of the GPM mission concept, program status, and science activities in the United States will be presented with a special emphasis on how the international community can contribute to joint ventures in radiometer inter-calibration, retrieval algorithm development, and ground validation activities.