

Development of Cloud Profiling Radar (CPR) for Earth Clouds, Aerosols and Radiation Explorer (EarthCARE) mission

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Earth Clouds, Aerosols and Radiation Explorer (EarthCARE) is a Japanese-European collaborative Earth observation satellite mission aimed to deepen understanding of the interaction process between clouds and aerosols and its effects on the Earth's radiation. The outcome of this mission is expected to improve accuracy of the Global Climate Change prediction.

The EarthCARE spacecraft, which weighs approximately 2,250kg and goes along a Sun-Synchronous 400km-high orbit around the Earth, accommodates four instruments which are to observe the Earth's clouds, aerosols and radiation. The observation data acquired simultaneously by the four sensors will be processed into a variety of synergy products including vertical profiles of clouds and aerosols, microscopic cloud parameters, radiation fluxes and so on. As one of those observatories, the Cloud Profiling Radar (CPR), which has a 2.5m-diameter main reflector and W-band 1.5kW transmitter and receiver, is the world's first space-borne Doppler cloud radar jointly developed by the Japan Aerospace Exploration Agency (JAXA) and the National Institute of Information and Communications Technology (NICT), which provides vertical velocity as well as vertical structure inside clouds. The other payloads on the satellite are the Atmospheric Lidar (ATLID) for vertical structure measurement of clouds and aerosols, the Multi-Spectral Imager (MSI) for horizontal distribution measurement of clouds and aerosols, and the Broad-Band Radiometer (BBR) for measurement of radiation fluxes at top of the atmosphere. ATLID, MSI, BBR and the base-platform of the spacecraft are developed by the European Space Agency (ESA).

In Japan, the critical design review of the CPR has been completed in 2013 and CPR proto-flight model is currently being manufactured, integrated, and tested. After handed-over to ESA, the CPR will be installed onto the EarthCARE satellite together with the other instruments, tested, transported to Guiana Space Center in Kourou, French Guiana and launched by a Soyuz launcher in JFY2016.

Keywords: Cloud, Aerosol, Radiation, EarthCARE, CPR, Cloud Profiling Radar