

The NASA Cyclone Global Navigation Satellite System (CYGNSS)

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The CYGNSS constellation of eight satellites was successfully launched on 15 December 2016 into a low inclination (tropical) Earth orbit. Each satellite carries a four-channel bi-static radar receiver that measures GPS signals scattered by the ocean, from which ocean surface roughness, near surface wind speed, and air-sea latent heat flux are estimated. The measurements are unique in several respects, most notably in their ability to penetrate through all levels of precipitation, made possible by the low frequency at which GPS operates, and in the frequent sampling of tropical cyclone intensification and of the diurnal cycle of winds, made possible by the large number of satellites. Engineering commissioning of the constellation was successfully completed in March 2017 and the mission is currently in the early phase of science operations.

Level 2 science data products have been developed for near surface (10 m referenced) ocean wind speed, ocean surface roughness (mean square slope) and latent heat flux. Level 3 gridded versions of the L2 products have also been developed. A set of Level 4 products have also been developed specifically for direct tropical cyclone overpasses. These include the storm intensity (peak sustained winds) and size (radius of maximum winds), its extent (34, 50 and 64 knot wind radii), and its integrated kinetic energy. Assimilation of CYGNSS L2 wind speed data into the HWRF hurricane weather prediction model has also been developed.

An overview and the current status of the mission will be presented, together with highlights of early on-orbit performance and scientific results.

Keywords: Ocean Surface Wind Speed, Small Satellite Constellation

