

Enabling a Science Support Structure for NASA's Global Hawk UASs

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In this paper we describe the information technologies developed by NASA for the Winter/Spring 2013/2014, and Fall 2014, NASA Earth Venture Campaigns, Hurricane and Severe Storm Sentinel (HS3) and Airborne Tropical Tropopause EXperiment (ATTREX).

These campaigns utilized Global Hawk UAS vehicles equipped at the NASA Armstrong (previously Dryden) Flight Research Facility (AFRC), Edwards Air Force Base, California, and operated from there, the NASA Wallops Flight Facility (WFF), Virginia, and Anderson Air Force Base (AAFB), Guam.

Part of this enabling infrastructure utilized a layer 2 encrypted terrestrial Virtual Local Area Network (VLAN) that, at times, spanned greater than ten thousand miles (AAFB <-> AFRC <-> WFF) and was routed over geosynchronous Ku band communication Satellites directly to the aircraft sensor network.

This infrastructure enabled seamless hand off between Satellites, and Satellite ground stations in Guam, California and Virginia, so allowing simultaneous Aircraft Command and Control and Science operations from remote locations.

Additionally, we will describe the other elements of this infrastructure, from on-board geo-enabled databases, to real time communications directly from the instruments (in some cases, more than twelve were carried, and simultaneously operated, on one aircraft) to the researchers and other interested parties, world wide.