THE ROLE OF THE NASA GLOBAL HAWK LINK MODULE AS AN INFORMATION NEXUS FOR ATMOSPHERIC MAPPING MISSIONS

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The Link Module described in this paper was developed for the NASA Uninhabited Aerial System (UAS) Global Hawk Pacific Mission (GloPAC) Airborne Science Campaign; four flights of 30 hour duration, supporting the Aura Validation Experiment (AVE). It was used again during the Genesis and Rapid Intensification Processes (GRIP) experiment, a NASA Earth Science field experiment to better understand how tropical storms form and develop into major hurricanes.

In these missions, the Link Module negotiated all communication over the high bandwidth Ku satellite link, archived all the science data from onboard experiments in a spatially enabled database, routed command and control of the instruments from the Global Hawk Operations Center, and re-transmitted select data sets directly to experimenters control and analysis systems. The availability of aggregated information from collections of sensors, and remote control capabilities, in real-time, is revolutionizing the way Airborne Science is being conducted.

The Link Module NG now being flown in support of the NASA Earth Venture missions, the Hurricane and Severe Storm Sentinel (HS3) mission, and Airborne Tropical Tropopause Experiment (ATTREX) mission, has advanced data fusion technologies that are further advancing the Scientific productivity, flexibility and robustness of these systems. On-the-fly traffic shaping has been developed to allow the high definition video, used for critical flight control segments, to dynamically allocate variable bandwidth on demand.

Historically, the Link Module evolved from the instrument and communication interface controller used by NASA's Pathfinder and Pathfinder plus solar powered UAS's in the late 1990's. It later was expanded for use in the AIRDAS four channel scanner flown on the NASA Altus UAS, and then again to a module in the AMS twelve channel multispectral scanner flying on the NASA (Predator-b) Ikhana UAS. The current system is the answer to the challenges

imposed by extremely long duration UASs, with on-board multi-instrument (>= 12) Sensor Webs.

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