

Aviation Safety Program

Technical Accomplishment



Initial Airborne Weather Reporting Datalink Concept Flight

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Relevant Milestone: Initial TAMDAR Datalink Concept Flight (Level III MS 2.4.2-8)

Shown: Equipment used during TAMDAR datalink flights.

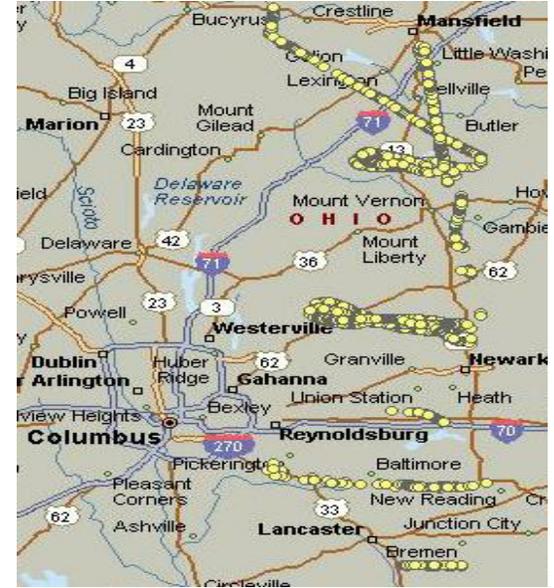
Accomplishment / Relation to Milestone and ETO: A key challenge in realizing TAMDAR (Tropospheric Airborne Meteorological Data Reporting) is the movement of sensor data off the aircraft. In January 2002, an Optical Data Systems (ODS) TAMDAR sensor was mounted on the NASA GRC Twin Otter aircraft. This sensor was flown on seven flights, collecting data for subsequent transmission off the aircraft. The sensor reported nineteen parameters, including temperature measurements, pitot and static pressures, humidity, and average turbulence energy dissipation. Two separate datalink systems were flown in these initial concept flights. The first datalink flown was the EchoFlight system, which utilizes a number of mid-earth orbit satellites for transmission of data. In these system tests, TAMDAR data was transmitted once per minute as e-mail messages. The e-mail messages were automatically forwarded to NASA GRC, through the Internet, from the EchoFlight network operations center. The EchoFlight system performed very well, only losing five messages over the six hours it was tested. The second datalink system flown was the Universal Access Transceiver (UAT), which is both an air-to-air and air-to-ground link, primarily intended for surveillance messages. The TAMDAR messages were sent as an extended version of the surveillance message every five seconds, and recorded at the GRC UAT ground station based in Mansfield, Ohio. For these tests, a series of arcs were flown at different altitudes and ranges from the ground station. The system performed very well, losing messages only when out of range from the ground station. These tests proved TAMDAR messages can be transmitted off an aircraft using multiple datalinks. However, until the TAMDAR system requirements are completed, no conclusions can be drawn on the ability of the two tested links to meet system-level requirements. These initial tests prove feasibility and the need to continue development.

Future Plans: Finalize architecture guidelines (1Q03); Initial evaluation of air-to-ground and air-air technologies (3Q04) with final completion & demo (3Q05).

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Flight Equipment Racks



Flight Tracks, 1/25/02



TAMDAR Sensor



Twin Otter