



NAST-I Status - NASTER Concept Workshop

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Missions Summary

- [Wallops98 \(June-July, 1998\)](#): Wallops Island, VA; AVIRIS piggyback; NAST-I's first in-flight validation (i.e. with the HIS instrument, ground-based AERI, and radiosondes); dedicated sortie for under-flying the NOAA-15 satellite. **ER-2**
- [CAMEX-3 \(Third Clouds And Moisture EXperiment\) \(Aug – Sept 1998\)](#) PAFB, FL & RAFB, GA. Collected data for research in tropical cyclone development, tracking, intensification, and landfall impacts. Studied Hurricanes Bonnie, Danielle, Earl and Georges. **ER-2**
- [WINTEX \(WINTer EXperiment\) \(Mar-Apr 1999\)](#), Madison, WI. Validated atmospheric soundings observed across polar frontal systems, tested the ability of the imaging and sounding sensors to sense the geometrical and optical properties of clouds. **ER-2**
- [Wallops 99, \(Aug 1999\)](#). Flights in conjunction with AVIRIS (Airborne Visible InfraRed Imaging Spectrometer). **ER-2**

Missions Summary (cont.)

- **C-IOP (Mar 2000)**: Stillwater, OK; Cloud Intensive Operating Period; first science flights on Proteus; CART site overflights to characterize cloud properties and clear air observation validation. **Proteus**
- **WV-IOP (Sept-Oct 2000)**: Stillwater, OK; Water Vapor Intensive Operating Period; CART site overflights to characterize upper tropospheric water vapor and clear air observation validation; underflight of the Terra satellite. **Proteus**
- **AFWEX (Nov-Dec 2000)**: Stillwater, OK; ARM-FIRE Water Vapor Experiment; CART site overflights to characterize upper tropospheric water vapor and clear air observation validation; underflight of the Terra satellite. **Proteus**
- **Asian-Pacific (Feb-Mar 2001)**: (Hawaii, Japan, Alaska); to characterize the impact of chemical composition of the Asian outflow over the western Pacific on satellite-based sounding retrievals; sensor, algorithm, & data product validation, over the Pacific, the Orient, and the north Polar region. **Proteus**

Missions Summary (cont.)

- **CLAMS (July-Aug 2001):** Wallops Island, VA; **Chesapeake Lighthouse and Aircraft Measurements for Satellites**; campaign sponsored by CERES, MISR, MODIS-Atmospheres, and the NASA/GEWEX Global Aerosol Climatology Project (GACP); included NASA ER-2 and NASA Langley OV-10 aircraft; Univ. of Washington Convair 580 participation. **Proteus**
- **IHOP (May-June 2002):** Southern Great Plains; **The International H2O Project** (IHOP_2002) a field experiment with the chief aim of improved characterization of the four-dimensional (4-D) distribution of water vapor and its application to improving the understanding and prediction of convection. The region is an optimal location due to existing experimental and operational facilities, strong variability in moisture, and active convection. **Proteus**
- **Crystal-FACE (July-Aug 2002):** Key West, FL; **CRYSTAL** is a comprehensive scientific study consisting of modeling, observations and integrated analyses designed to address important questions surrounding tropical cirrus cloud systems and their role in both regional and global climates. **Proteus**

Missions Summary (cont.)

- [Texas 2002 \(Nov-Dec 2002\)](#): San Antonio, TX; Texas 2002 was a Terra and AQUA satellites validation mission – **ER-2**
- [THORpex \(Feb-Mar 2003\)](#): – Honolulu, HI; **The Observing System Research and Predictability Experiment**. The 2003 THORPEX experiment was the first in a series of campaigns in support of the World Weather Research Program, with a goal of improving both short- and long-term weather forecasting. **ER-2**

Planned:

- [Atlantic THORpex \(Oct-Nov 2003\)](#): New England/Canadian Atlantic Provinces - **ER-2**

Instrument Changes Summary

- Hot Black Body set temp reduced from 60C to 25C
- Instrument canister temperature regulation - incorporated proportional heater controller
- Proteus adaptations:
 - Power inverters to supply 400Hz ac
 - Avionics strip heaters added
 - GPS/Nav mounting position
- Beamsplitter rotation, replacement
- Dynamic Alignment gain increased to 25% below max

Instrument Problems

Summary

- Interferometer static alignment and DA adjustment
- DA performance under various thermal/ vibration conditions
- Bomem electronics
- Processor boot - intermittent
- Intermittent dropouts of communication between PC and BB controller
- Moisture in canister
- Noise in LW channel
- Loss of LW cooler temperature monitoring diode
- GPS/Nav unit altitude and position errors

Near Term Instrument Upgrade Activities

- Replacement of original removable IBM ruggedized flight hard drives with solid state Microdrives
- Processor replacement with PC104 system
- New GPS/navigation unit
- Addition of network interface to processor and demo of telemetry capability

Looking Forward...

- Some factors to consider in developing an instrument to be sustainable & maintainable for the long term:
 - Plan for obsolescence: lack of replacement parts & loss of technical expertise
 - Complete, configuration managed documentation
 - Modular design
 - Use of standards (such as MS1553) and COTS products where practical
 - Commonality with other (existing instruments) subsystems