The National Science Foundation (NSF) provides the National Center for Atmospheric Research (NCAR) Earth Observing Laboratory (EOL) funding for the operation, maintenance and upgrade of two research aircraft: the NSF/NCAR High-performance Instrumented Airborne Platform for Environmental Research (HIAPER) Gulfstream V and the NSF/NCAR Hercules C-130. A suite of in-situ and remote sensing airborne instruments housed at the EOL Research Observing Laboratory (EOL) funding for the operation, maintenance and upgrade of two research aircraft: the NSF/NCAR HIAPER (GV) and NSF/NCAR C-130 at the National Center for Atmospheric Research (NCAR) Earth Observing Laboratory (EOL).

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Field Phase Data Collection

- EOL provides Field Catalog, Catalog Maps, and Mission Coordinator work tools for in-field and in-flight management of imagery & reports.
- A common time base and standard data product (IWG1) of frequently acquired navigational and state parameters, plus other parameters on request, standardize connecting PI instruments to the aircraft.
- Real-time data access allows real-time quality checking for participants aboard the aircraft and on the ground.
- In-situ data collected aboard the aircraft are fed into the standard data path or separate PI instrument files.
- EOL supports sharing of aircraft data files in the field immediately after a flight, and after a thorough quality assurance check by RHF Project Managers, enabling PIs to perform quality assurance on their instrument data and find problems prior to the next flight. This also supports in-field flight decision making.

Data collected are an important legacy of field campaigns.

A comprehensive metadata database and integrated cyber-infrastructure hosted by the EOL Computing, Data and Software Facility (CDS), along with a robust data workflow that begins during the field phase and extends to long-term archival, assures that:
- all data, metadata, and associated software are safeguarded throughout the data handling process,
- community standards of practice for data stewardship and software version control are followed,
- simple and timely community access to collected data and associated software tools are provided,
- and the quality of the collected data is preserved, with the ultimate goal of supporting research and the reproducibility of published results.

Public Data Access

Public data access via the CDS-hosted EOL data archive includes:
- Robust, searchable access to data holdings via metadata (project, date/time, flight number, etc).
- Access to supplemental data and documentation within a single archive (one stop shopping). Links are made to other data archives as needed.

Sustainability and Obsolete Data Formats

- EOL hosts an aircraft data archive going back to 1967. All data since 1983 are available in netCDF format.
- Work to convert 1967-1982 data from GENPRO to netCDF or NASA Ames/ICARTT format.

Data Archival & Documentation

- CDS-hosted web-based tools and scripts facilitate efficient creation, maintenance and update of data holdings (See poster IN31C-3731 “NCAR Earth Observing Laboratory’s Data Tracking System”)
- Automated metrics generation allows accurate reporting of statistics.
- Detailed instrument descriptions, and review & documentation of processing & quality control algorithms, ensure reproducibility.
- Comprehensive metadata allows interpretation of data in unique ways in the future.
- The EOL data audit tracks the path of all EOL instrument data from collection through long-term stewardship.

Next Steps (in progress)

- Standardize how software are handled – limit repositories, implement documentation standards.
- Create a common back-end database – there is currently redundant metadata between tools.
- Implement Digital Object Identifiers (DOIs) for EOL Lower Atmosphere Observing Facilities (LAOF) & datasets.

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