Atmospheric Science Data Center (ASDC) Suborbital Data Ingest and Curation

Megan E. Buzanowicz[1,2], Morgan L. Silverman[1,3], Abraham Porter[1,2], Sean Leavor[1,2], Gabriel Mojica[1,2], Laramie Plott[1,3]

[1]NASA Langley Research Center, Hampton, VA, [2]ADNET Systems, Inc., Bethesda, MD, [3]Analytical Mechanics Associates, Inc., Hampton, VA

ASDC Overview

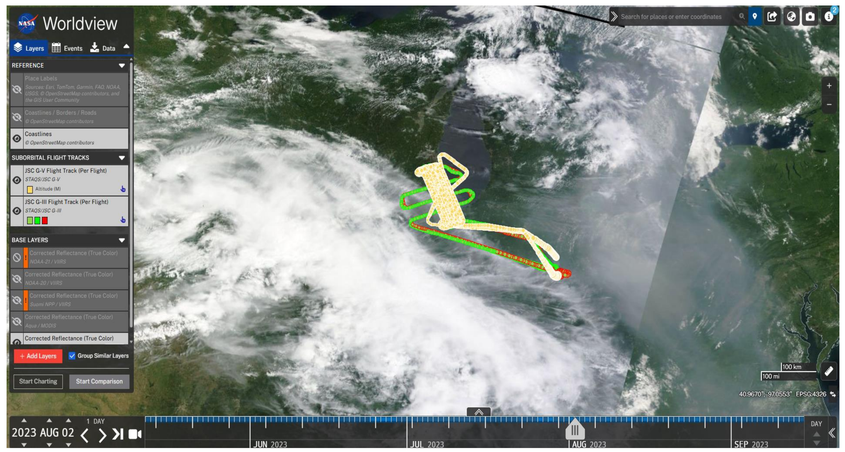
- One of eleven active Distributed Active Archive Centers (DAACs) in the NASA Earth Observing System Data and Information System (EOSDIS)
- Located at NASA's Langley Research Center
- Four focus areas: Radiation Budget, Clouds, Aerosols, and Tropospheric Composition
- Supports over 60 projects and provides access to 1000+ archived collections

Suborbital Field Campaigns

- The ASDC supports a team, the Suborbital Support (SUBS) team, that specializes in the ingest, archive, and distribution of data from suborbital missions.
- Suborbital missions can be described as follows:
  - Also defined as **field investigations (campaigns)**, which are observational studies during which individuals, programs, agencies, and/or institutions utilize pre-selected, specific sensors or sets of sensors to acquire targeted observations in support of common, clearly defined, science or research objectives
  - Typically utilize instrument payloads aboard aircraft, boats, mobile labs, and/or ground stations
  - Usually occur over a designated geographical region and/or period of time
  - Can include in-situ and/or remote sensing instrumentation
- Data ingest and curation of suborbital data are critical steps to make data FAIR (Findable, Accessible, Interoperable, Reusable)
- SUBS team has developed a set of guidelines to handle the complex data products from suborbital field studies

Standards and Guidelines

- The ASDC has supported the creation of standards and guidelines approved by the Earth Science Data and Information Systems (ESDIS) Project Standards Coordination Office (ESCO):
  - **Atmospheric Composition Variable Standard Names Convention (ACVSNC)** (https://www.earthdata.nasa.gov/about/esdis/esco/standards-practices/atmospheric-composition-variable-standard-names)
    - Provides a convention for creating standard variable names for atmospheric composition and chemistry measurements acquired during suborbital field campaigns (required in ICARTT V2.0)
  - **WIGOS (World Meteorological Organization (WMO) Integrated Global Observing System) Measurement Unit Code List Notation Standard (link coming soon!)**
    - Standardized unit notations are required to facilitate data usability and interoperability



Synergistic TEMPO Air Quality Science (STAQS) Flight Tracks in NASA Worldview.

Ingest and Curation Overview

- **Collection (Data Product) Definition:** The SUBS team has developed a process to define collections based on measurement theme. Consultation with the science team has proven to be valuable, especially to accommodate the particularity of the instrument payload and fill any gaps in the collection-level metadata.
- **Metadata Extraction for Data Files:** The SUBS team has developed a Python-based metadata extraction pipeline for automated metadata extraction from data files. Over 80% of the required metadata can be retrieved using the pipeline and science teams are often contacted to assist with missing metadata. This ensures high quality metadata at both the collection-level and granule-level.
- **DOIs and Landing Pages:** Project-level and collection-level DOIs are minted for each suborbital project. Each DOI links to the respective collection landing page. DOIs are reserved after the preliminary data is submitted, which enables the science team to embed the DOIs in publication quality data.
- **Documentation:** The SUBS team provides applicable ReadMe files and contextual information, along with generating user guides and outreach materials.
- **Distribution:** All suborbital data products are distributed through Earthdata Search and are ideal candidates for variable search capabilities; the team has begun the process of adding ASDC suborbital data to NASA Worldview.
- **Data Revisions:** As post-project data revisions are relatively common to suborbital field studies, the ASDC has developed a tool and mechanism to monitor data submissions at the field data repository.

Gabriel Mojica
Scientific Analyst

gabriel.mojica@nassa.gov

For information regarding the ACVSNC and WIGOS Units Standards, please contact:
Morgan Silverman: morgan.l.silverman@nasa.gov

EARTHDATA