MAIR-E Data Management Plan

Updated: 6 September 2022

Project Description

Field Phase Dates: October 3, 2022 to November 28, 2022

Location: Rocky Mountain Metropolitan Airport (RMMA), Broomfield, CO

Funding: NSF

Participants:

Harvard Group Principal Investigators (PIs): Steve Wofsy, Jonathan Franklin

NCAR/EOL Project Managers: Peisang Tsai (lead), Cory Wolff

NCAR/EOL/Data Management & Services (DMS): Linda Cully

NCAR/EOL/Research Aircraft Facility (RAF) Data Management: Taylor Thomas

Project Pilots: Lee Baker, Doug Stewart

Picarro Instrument: Teresa Campos (NCAR/EOL/RAF)

Instrument Software Support: Chris Webster (NCAR/EOL/RAF)

Operation Center: Mike Paxton (NCAR/EOL)

Documentation & Certification Requirements (Electrical): Kurt Zrubek, John Cowan, Kyle Holden (NCAR/EOL)

Documentation & Certification Requirements (Structural): Rani Bartlett, Kurt Zrubek (NCAR/EOL)

Payload Configuration: Bruce Daube

Mission Design: Maryann Sargent

The MAIR-E (Methane Emissions Quantification at scales from 20 m to 200 km using the MethaneAIR Imaging Spectrometer on the NSF Gulfstream-V) is the 2022 extension to the MethaneAIR field project. MethaneAIR is an airborne imaging spectrometer and is the precursor to the MethaneSAT project. The NSF/NCAR GV HIAPER aircraft will have two, wide-swath, high-resolution imaging spectrometers that generate hundreds of GB of data on each flight (frames are acquired at 10 Hz, each roughly 1000 spatial pixels across track and 800 spectral pixels, for each of two spectrometers). The first scientific goal is to accurately measure emissions of CH4 from oil and gas production and processing facilities across the world, in order to define and track this major contribution to the rise of this greenhouse gas and pollutant in the global atmosphere. A more detailed description of the MAIR-E and the MethaneAIR projects

can be found on the EOL MAIR-E Project website and the EOL MethaneAIR Project website, respectively.

General Data Management

1. All project participants agree to follow the MAIR-E Data Policy and this **MAIR-E Data Management Plan (this document)**.
2. All EOL platform and instrument datasets will follow the EOL Data Policy including timely release of quality controlled EOL data and metadata plus full and open sharing of all EOL datasets with the scientific community and public. No requests for additional restrictions of EOL datasets were submitted to the EOL Directorate for MAIR-E.
3. All datasets submitted to the NCAR EOL **MAIR-E Data Archive** will be accompanied by the required Dataset Documentation and metadata.
4. Any photographs submitted to the NCAR EOL **MAIR-E Data Archive** or that are to be displayed on the EOL MAIR-E project website must include written permission from all people shown in the photographs.

Data Archival

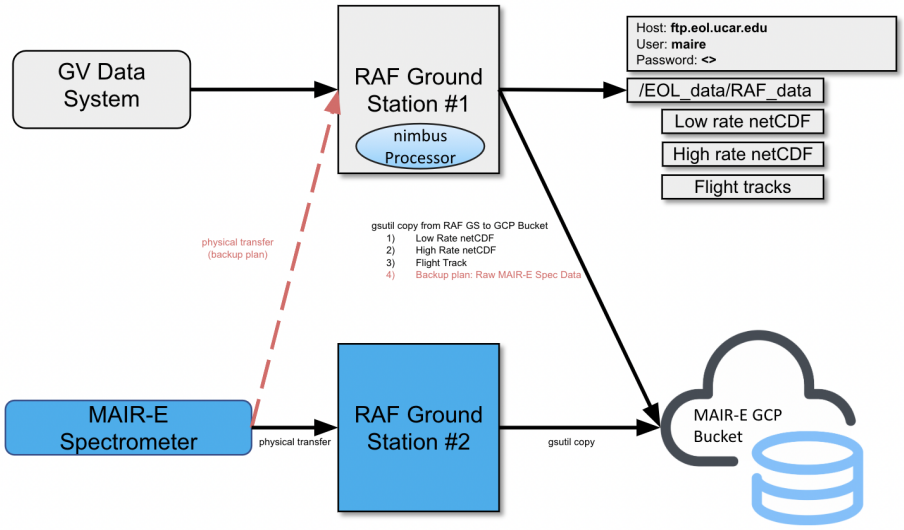
1. Data will be archived in the formats specified by the project PIs.
2. Raw, L0, and L1 airborne imaging spectrometer data will be managed by and only available from the PI Group. Raw, L0, and L1 data **will not** be included in the NCAR EOL MAIR-E Data Archive.
3. NCAR EOL will managed and ensure online ordering via the NCAR EOL MAIR-E Data Archive for the following datasets:
    a. Level 2 and other processed airborne imaging spectrometer datasets, as requested by the project PIs (the availability of Raw, L0, L1 data from the PI Group will be included in the dataset description) (DMS)
    b. RAF platform and instrument datasets (RAF)
    c. PI requested supporting datasets (DMS)

The list of the datasets to be included in the NCAR EOL MAIR-E Data Archive can be found under **Data Access on the MAIR-E Project webpage**. Data submission instructions for the post-field phase can be found on the MAIR-E POST-Field Phase Data Submission Instructions page.

Near Real-Time Data Collection

The near real-time data collection and transmission from the NSF/NCAR GV HIAPER aircraft to the Google Cloud Platform (GCP) storage bucket, the NCAR FTP site and the NCAR EOL MAIR-E Data Archive (i.e., part of the Field Data Archive) are shown in the chart below.

MAIR-E NCAR/RAF Field Data Management



RAF will generate Low Rate (1 Hz) and High Rate (25 Hz) flight level data in netCDF format, as well as flight tracks in KML format immediately following each flight. This data will be generated on the RAF Ground Station, a data processing computer located on the network in the Software Engineering Lab (while operating at NCAR RAF in Broomfield, CO), and in the field locations in Austin, TX and Harrisburg, PA. Data files will be available from the FTP site and will also be copied to the GCP bucket.

A member of the PI group will be responsible for copying raw MAIR-E data from a removable drive to the GCP bucket using a second computer configured with GCP access credentials. Data upload locations while in Austin, TX and Harrisburg, PA will be determined based on availability of acceptable data upload speeds in each location.

RAF will migrate a copy of any data that will be included in the NCAR EOL MAIR-E Data Archive to the NCAR EOL FTP space and/or the NCAR Campaign Storage. RAF will ensure that all EOL generated aircraft datasets are made available in the NCAR EOL MAIR-E Data Archive.

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