ARCSIX Field Data Repository www-air Introduction dataID Registration and Data Upload

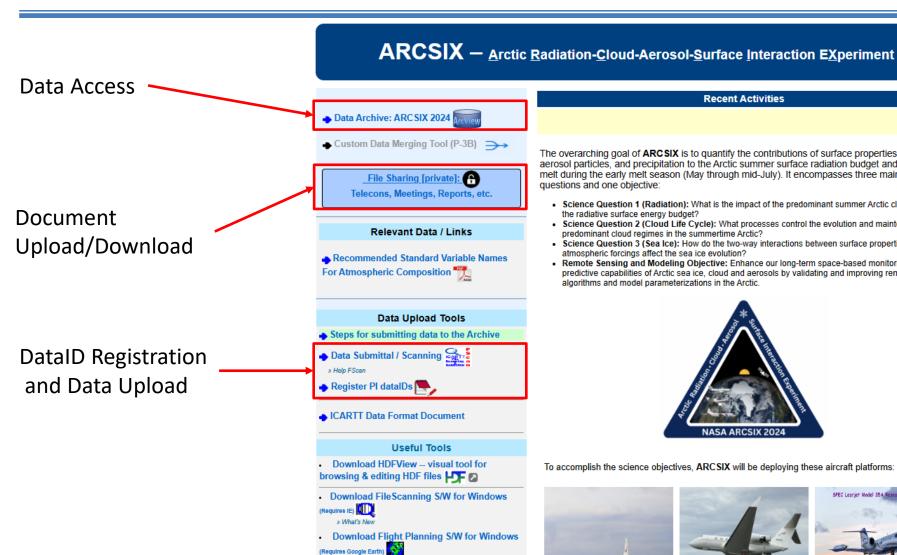
Michael Shook, Gao Chen, Ali Aknan, and Morgan Silverman

www-air Website Introduction

- https://www-air.larc.nasa.gov/missions/arcsix/
- A repository for all ARCSIX-relevant observational and ancillary data products and relevant documentation/reports to facilitate science team data exchange and data processing
- Data holdings include aircraft data as well as other data as needed/requested
- Data file types include binary (HDF/netCDF), text (ICARTT), and image (jpg/png)
- Password-protected document and file sharing
- Publication-quality ("final") data will be transferred to the NASA DAAC



ARCSIX Website



Recent Activities

The overarching goal of ARCSIX is to quantify the contributions of surface properties, clouds, aerosol particles, and precipitation to the Arctic summer surface radiation budget and sea ice melt during the early melt season (May through mid-July). It encompasses three main science questions and one objective:

- . Science Question 1 (Radiation): What is the impact of the predominant summer Arctic cloud types on the radiative surface energy budget?
- . Science Question 2 (Cloud Life Cycle): What processes control the evolution and maintenance of the predominant cloud regimes in the summertime Arctic?
- . Science Question 3 (Sea Ice): How do the two-way interactions between surface properties and atmospheric forcings affect the sea ice evolution?
- Remote Sensing and Modeling Objective: Enhance our long-term space-based monitoring and predictive capabilities of Arctic sea ice, cloud and aerosols by validating and improving remote sensing algorithms and model parameterizations in the Arctic.



To accomplish the science objectives, ARCSIX will be deploying these aircraft platforms:



NASA Goddard Space Flight Center (GSFC) Wallops Flight Facility (WFF) P-3 Orion Aircaft

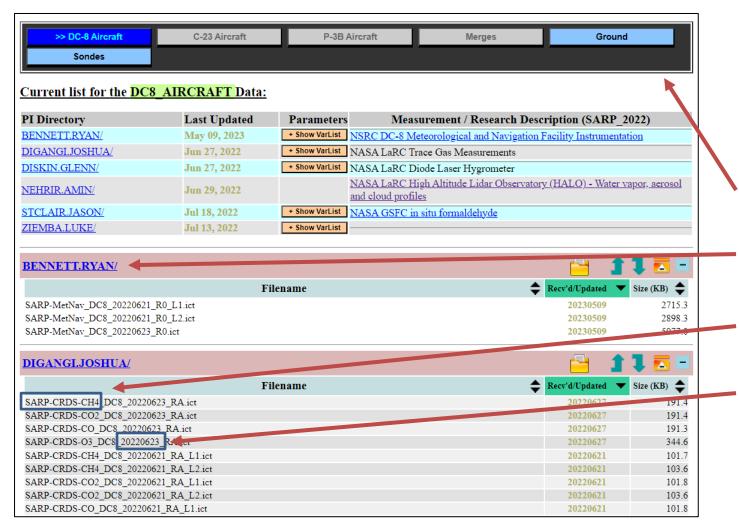


NASA Langley Research Center (LaRC) Gulfstream III Aircaft



SPEC Learjet Model 25 Research

Data Access: SARP Example



Data Organization:

- locationID (Platform)
- Principal Investigator
- dataID (identifier)
- 4. Flight or data collection dates

Data Submission Steps

- DataID Registration (one-time process):
 - dataID is part of the filename and will be used to organize PI files on the data repository (links data files to PI)
 - PI or file creator will need to first register dataID(s)
 before files can be submitted
- Data Submission:
 - File submission is through a scanning tool (FScan) for checking filenames and content
 - All incoming files are scanned:
 - ICARTT Files: file header, including keywords and data flags, as well as time stamps
 - HDF and netCDF files: data variable dimensions and attributes
 - Other files: file names
 - Support zipped multi-file upload
 - Script-based batch upload and download available
- Username/password: contact POCs



browsing & editing HDF files | Image: Description |

(Requires Google Earth)

Download File Scanning S/W for Windows

Download Flight Planning S/W for Windows

DataID Registration Page

DataIDs Registration -- ACTIVATE 2022

A dataID is the first part of an ICARTT [type] data filename (see the Data Format Document for details). Each dataID (per platform) must be unique.

IMPORTANT (PLEASE READ)

This registration is ONLY valid for the Platforms listed in the "Platform Box". Do NOT register if your platform is not listed. YOUR "PLATFORM DATA MANAGER" IS RESPONSIBLE FOR YOUR DATA ARCHIVING NEEDS.

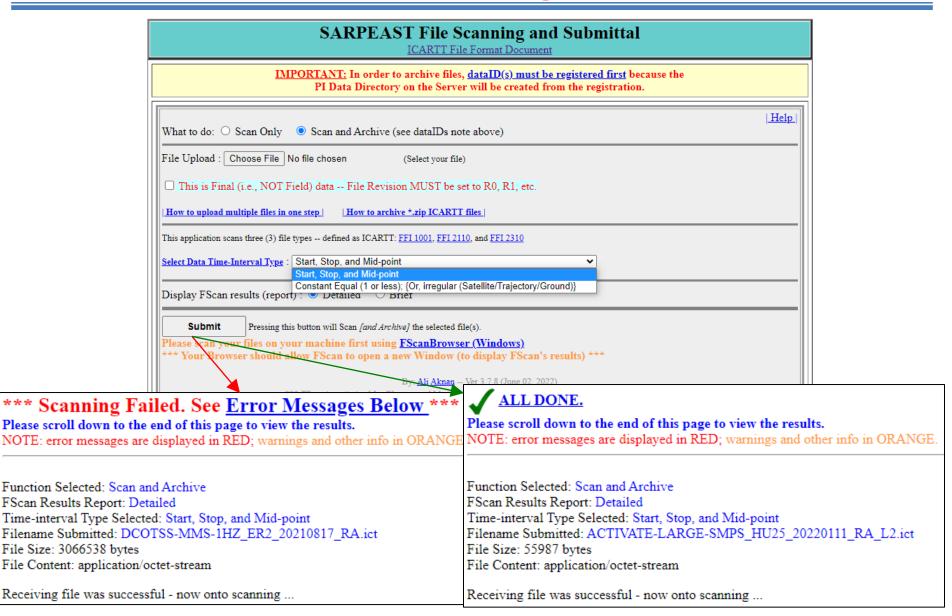
The PI's data directory will be created from LastName. FirstName. Please enter PI name correctly. Each dataID represents a [separate] group of files in PI's data directory. See file naming convention slide Platform (LocationID): PI Last Name: PI First Name: NASA King Air Aircraft BENNETT RYAN (KINGAIR) dataID: (max 45 chars) Data Description: (max 380 chars) Instrument(s): (max 190 chars) Prefix with "activate-Describe your measurments; e.g., Carbon Dioxide Mixing Ratio List Instruments; e.g., LI-COR 6252 e.g., activate-CO2 activate-MetNav NSRC UC-12 Meteorological and Navigation Facility Varies Reset Parameters + Add Another dataID Remove Last Entry Upload Your Instrument(s) Description Document: Choose File No file chosen (Select your file) 🧱 (NOTE: Any new file/document upload WILL OVERWRITE your previously uploaded document)*** ***(If you have more than 1 file (document) to upload, please email the files to: gao.chen@nasa.gov and/or ali.a.aknan@nasa.gov. Thank you!)*** OVERWRITE my previous record (i.e., ALL previously registered dataIDs for this mission will be removed). Link to PI website, instrument, experiment description, etc. https://baeri.org/nsrc/ Optional: to display on LaRC Archive webpage Text describing PI experiment or measurements (e.g., NASA LaRC DIAL - Troposphere O3, Aerosols, and Clouds Profiles): NSRC UC-12 Meteorological and Navigation Facility Parameters Optional: to display on LaRC Archive webpage Submit

Current Registered dataIDs on the Server for ACTIVATE 2022 PI Name: Last.First LocationID Registered dataIDs

Registered DataID Example

PI Last Name : PI First Name : Platform (<u>LocationID</u>):								
HAIR JOHN	LaRC GIII Aircraft	(LARC-G3)						
dataID: (max 45 chars) Prefix with "asiaaq-" e.g., asiaaq-CO2	Data Description: (max 380 chars) Describe your measurments; e.g., Carbon Dioxide Mixing Ratio	Instrument(s): (max 190 chars) List Instruments; e.g., LI-COR 6252						
Reset asiaaq-HSRL2	HSRL measurements of clouds and aerosols, as well as DIAL measurements of Ozone Concentration	HSRL2						
Reset asiaaq-HSRL2-images	Full flight images of the lidar measurements of clouds, aerosols, and ozone, plus raster-specific images within a flight, designated as Ln (n can be 1,2,3,or 4)	HSRL2						
Reset asiaaq-HSRL2-mlh	Aerosol derived mixed layer heights and mean backscatter and extinction within several layers from HSRL2	HSRL2						
Reset asiaaq-HSRL2-NearSurface	High horizontal resolution measurements of HSRL2 atmospheric aerosol and ozone with lower vertical resolution. Several combinations of horizontal and	HSRL2						
+ Add Another dataID - Remove Last Entry								
Upload Your Instrument(s) Description Docume	nt: Choose File No file chosen (Select your file)							
(NOTE: Any new file/document upload WILL OVERWRITE your previously uploaded document) ***(If you have more than 1 file (document) to upload, please email the files to: gao.chen@nasa.gov and/or ali.a.aknan@nasa.gov . Thank you!)***								
^^^(II you have more than I file (document) to upload,	please email the files to: <u>gao.cnen@nasa.gov</u> and/or <u>aii.a.aknan@nasa.gov</u> . 1 n	ank you:)						
OVERWRITE my previous record (i.e., ALL previously registered dataIDs for this mission will be removed).								
Link to PI website, instrument, experiment description, etc								
https://science.larc.nasa.gov/hsrl/ Optional: to display on LaRC Archive webpage								
Text describing PI experiment or measurements (e.g., NASA LaRC DIAL - Troposphere O3, Aerosols, and Clouds Profiles): NASA LaRC High Spectral Resolution Lidar, Generation 2 Optional: to display on LaRC Archive webpage								
Submit Submit								

FScan Page



Note: results open on a separate page, may need to change browser permissions

ARCSIX File Naming Convention

DataID_LocationID_YYYYMMDD_R# [_Description].extension

- DataID: a short description of measured parameter/species, instrument, or model prefixed by "ARCSIX-"
- **LocationID**: an identifier of measurement platform/type, provided on the dataID registration website in a drop-down box
 - ARCSIX locationIDs: P3B, G3, LEARJET, SATELLITE, GROUND, MERGE, MODEL, ANALYSIS, TRAJECTORY, SONDE, and OTHER; please reach out if others are needed
- YYYYMMDD: UTC date of takeoff for flight data or the beginning of the measurement for ground sites Note: ADT = UTC-3
- **R#**: Revision identifier. Typically RA, RB, RC, ... for field data and R0, R1, R2, ... for the publication quality data. Note: archived files cannot be overwritten, *only replaced with subsequent revisions*
- Description: optional additional description of the file if necessary
- Extension: "ict" for ICARTT files, and "h5" for HDF 5 files, nc for netCDF files, etc.
 - Allowed: *.ict, *.nc, *.cdf, *.hdf, *.h4, *.h5, *.hdf4, *.hdf5, *.he5, *.kmz, *.kml, *.htm, *.html, *.txt, *.jpg, *.jpeg, *.gif, *.png, *.bmp, *.pdf, *.xls, *.xlsx, *.doc, *.docx, *.ppt, *.pptx
 - Upon request: *.zip, *.tar, *.gz, or others
- The underscore, "_", is used ONLY to separate the different fields of the filename
- Examples: the filename for ARCSIX LARGE aerosol optical measurements made on a June 15,
 2024 flight may be:
 - ARCSIX-LARGE-OPTICAL_P3B_20240615_RA.ict (for field data)
 - ARCSIX-LARGE-OPTICAL_P3B_20240615_R0.ict (for publication quality data)

ARCSIX Data Submission Schedule

Mission Phase Data Type		Submission Deadline	Access Control	
Field Deployment	Field Data	24 hour after each flight or cal. day	Science team and Partners	
Post- Deployment	Publication- quality or "Final" Data	6 months after campaign concludes (nominally Feb. 16, 2025)	Public	

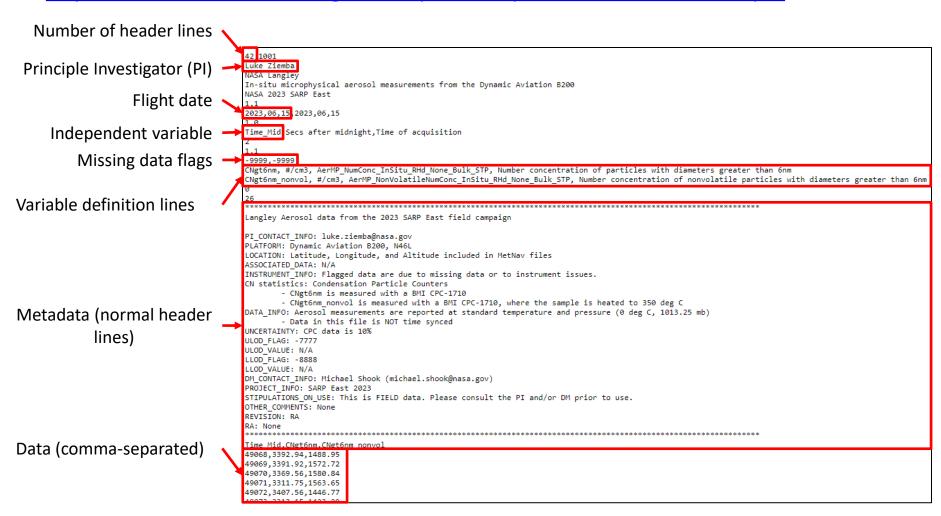
- Field data submission deadline may vary depending on field operation constraints
- The final data should be of publication quality and time synced to the time standard for each platform

ARCSIX Data Format Requirements

- The ARCSIX data will conform to ICARTT, netCDF, or HDF format standards. This supports NASA's Open-Source Science and Open Data initiatives by making ARCSIX data FAIR
- All in-situ measurements are required to report data in ICARTT format (https://www.earthdata.nasa.gov/s3fs-public/imported/ESDS-RFC-029v2.pdf)
- ICARTT files will be scanned to ensure compliance with the format requirements
- HDF and netCDF files should be as CF-compliant as possible, i.e., having all required global and variable attributes and properly dimensioned data variables (template URL to be posted)
- In-field and remote assistance will be available to the science team to troubleshoot file format and submission issues

ICARTT Format

- CSV text file with prescribed header format
- Self-describing (can be read programmatically)
- https://www.earthdata.nasa.gov/s3fs-public/imported/ESDS-RFC-029v2.pdf



ARCSIX Data Reporting Best Practices

- Use the same number, names, and order of variables throughout the mission for files within the same dataID and revision. This prevents issues with the online merge tool, and FScan now checks the variable list between files
- Measurement Time Reporting:
 - Fixed variable name(s): Time Start, Time Stop, and Time Mid
 - Report start, stop, and mid times if integration interval larger than 1 sec
 - Can use one time stamp (e.g., Time_Start or Time_Stop) for data at ≥ 1 Hz
- Use file header (e.g., DATA_INFO) or metadata to indicate whether the measurement time is synced to the time standard
- Trace gases: Indicate whether measurement is reported in dry or ambient condition
- Report absolute concentrations and aerosol extensive properties at STP:
 273.15K and 1013.25 hPa (i.e., 0°C and 1atm)
- Use required attributes for HDF and netCDF files and properly dimension data variables
- Variable short name should not start with a number or contain "-"
- Recommend standard unit notation: <u>WMO Codes Registry: wmdr/unit</u>

ARCSIX Science Data Policy

All participants are requested to accept the following responsibilities:

- > Submit data in ICARTT, netCDF or HDF format no later than the deadlines
- ➤ If unexpected events lead to any delay in data submission, the PI is required to notify the project leadership as soon as issues are known
- Publication-quality data cannot have mandatory user requirements or stipulations on use
- Publication-quality or "final" data should be submitted to the archive prior to any presentation at scientific conferences (e.g. AGU, AMS) or manuscript preparation, unless explicit authorization is obtained from the program managers
- ➤ All aircraft measurements from a common platform should be synchronized to science team pre-agreed time standard
- Consult with PIs when using their data in conference/data workshop presentations and/or manuscript
- ➤ Invite PIs of any data used to be co-authors (particularly during post-deployment research phase)
- > PIs should be available to answer questions about their data

ACVSNC Variable Standard Names

 Atmospheric Composition Variable Standard Name Convention (ACVSNC) is a NASA Earth Science Data Systems convention, intended to make data more findable and interoperable, and (re)usable:

https://www-air.larc.nasa.gov/missions/etc/AtmosphericCompositionVariableStandardNames.pdf

- Constructed from controlled vocabulary
- Tags, NOT short names or variable names:
 - For ICARTT files: short name, unit, standard name, long name

```
CH2O_pptv, pptv, Gas_CH2O_insitu_S_AVMR, mixing ratio by volume

CH2O_LOD_pptv, pptv, Gas_CH2O_insitu_S_AVMR, Limit of Detection

NOy_pptv, pptv, Gas_NOyasNO_insitu_M_AVMR, Total Reactive Nitrogen Mixing Ratio

Sc700_total, Mm-1, AerOpt_Scattering_insitu_red_RHd_Bulk_AMB, Dry Scattering at 700nm (Total Aerosols)
```

- For netCDF and HDF files: use ACVSN_standard_name attribute
- Contact Morgan, Gao, or Michael for questions or adding new standard names

Points of Contact

Field Repository (www-air.larc.nasa.gov)

- Michael Shook, NASA Langley Research Center, michael.a.shook@nasa.gov, 757-864-5793
- Gao Chen, NASA Langley Research Center, gao.chen@nasa.gov, 757-759-5642 (cell)
- Ali Aknan, AMA/NASA Langley Research Center, ali.a.aknan@nasa.gov (website and file scanner)
- Morgan Silverman, AMA/NASA Langley Research Center, morgan.l.silverman@nasa.gov (standard name issues)

Please free feel to reach out for data download, upload, format, and ACVSNC standard name issues

Example Document Sharing Page

https://www-air.larc.nasa.gov/cgi-bin/DocXhg/SARPDocs

Use	er ID :										
Pas	ssword :		Login								
SARP Documents / File Sharing											
SARP Documents / File Sharing											
	tatus pdate	Telecons	Presentations	Publications	Forecasts	Meetings	Research & Other Docs	Mission Reports	Hide All		
No.	Date Rec	v'd [Auth	or Name 🔻]	Document Descr	ription						
					_						
1.	2023-06-	15 [Travis] I	DA-B200 Flight Rep	ort 20230613 1230	[1.69 MB] * miss	ion_report_					
2.	2023-06-	15 [Travis] I	DA-B200 Flight Rep	ort 20230613 0930	[1.13 MB] * miss	ion_report_					
3.	2023-06-	15 [Travis] I	DA-B200 Flight Rep	ort 20230613 1230	[1.44 MB] * miss	ion_report_					
4	2023-06-	15 [Traviel I	DA_B200 Flight Ret	ort 20230613 0930	[1 12 MP 1 * miss	ion vanout					

Login here to view/upload documents

^{*} Login Required

Example Document Sharing Page

- https://www-air.larc.nasa.gov/cgi-bin/DocXhg/SARPDocs
- File upload process:
 - Log in
 - Choose file, document type, author name, and text to appear on the file list
- File list is public, but viewing/downloading requires logging in

