

Airborne Data Processing and Analysis (ADPAA)



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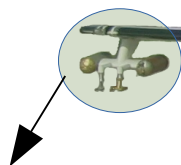
Overview, Outline, and Objective

- Research Aircraft
 - Instrumentation and Data Processing for different platforms.
 - Choice of a platform for a project.
 - Necessary of a “large” research aircraft.
 - What is the research objective and science analysis?
- Airborne Data Processing and Analysis(ADPAA)
 - Features of ADPAA
 - What can ADPAA do?
 - Documentation Provided
 - Getting answers for questions.
 - How are tag numbers used?

Citation Research Aircraft: 2010



Nose Boom Gust Probe



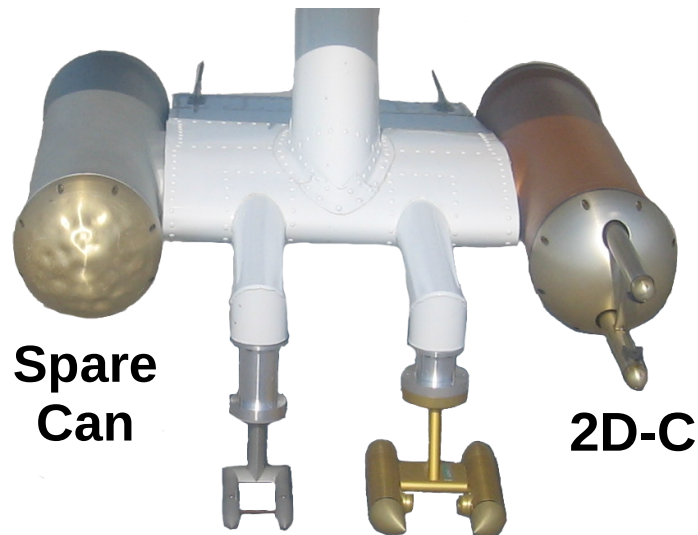
Temp.
Probe



Dew Point
Temp.



Spare
Can

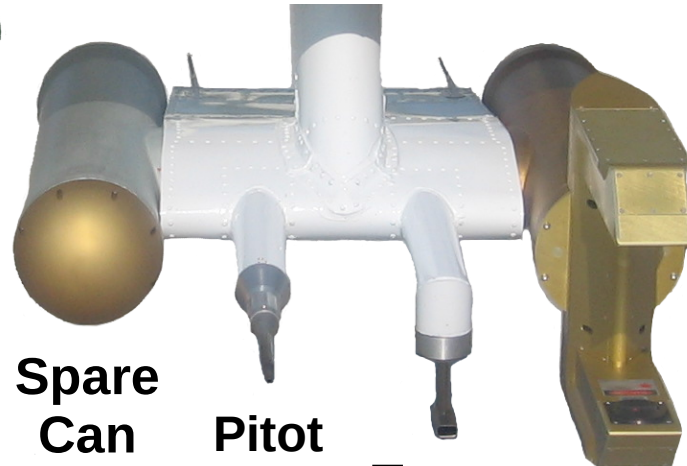


2D-C

LWC

CDP

Spare
Can

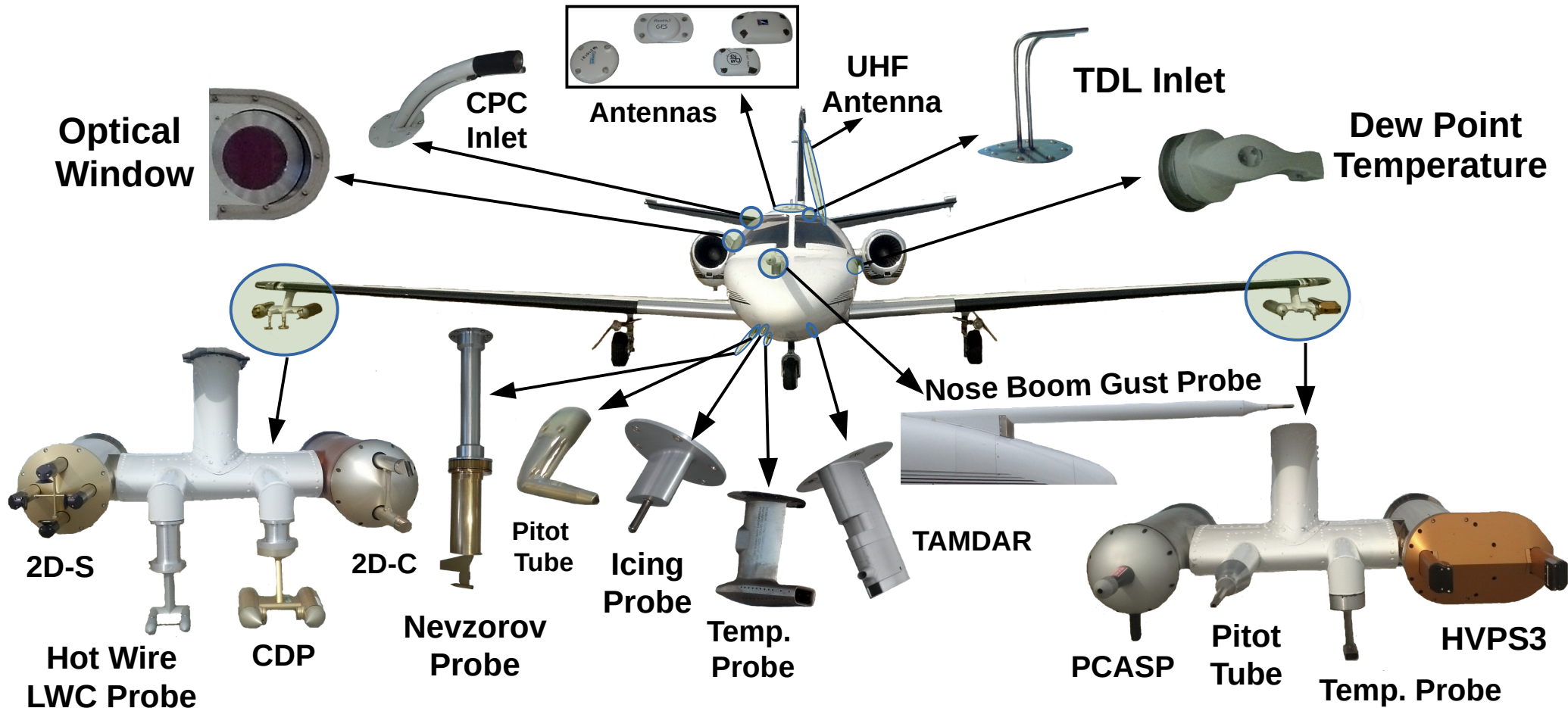


Pitot
Tube

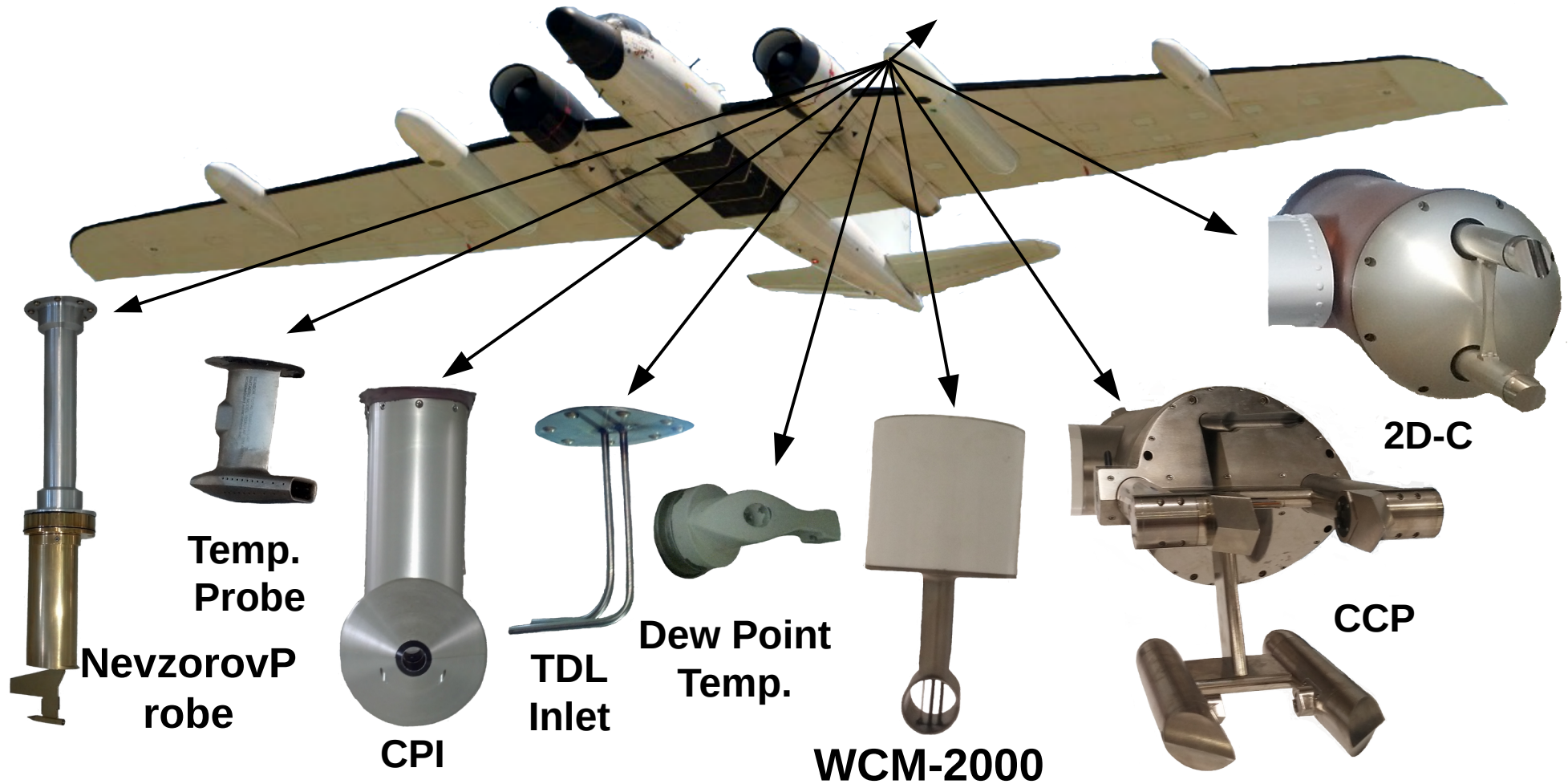
Temp.
Probe

HVPS

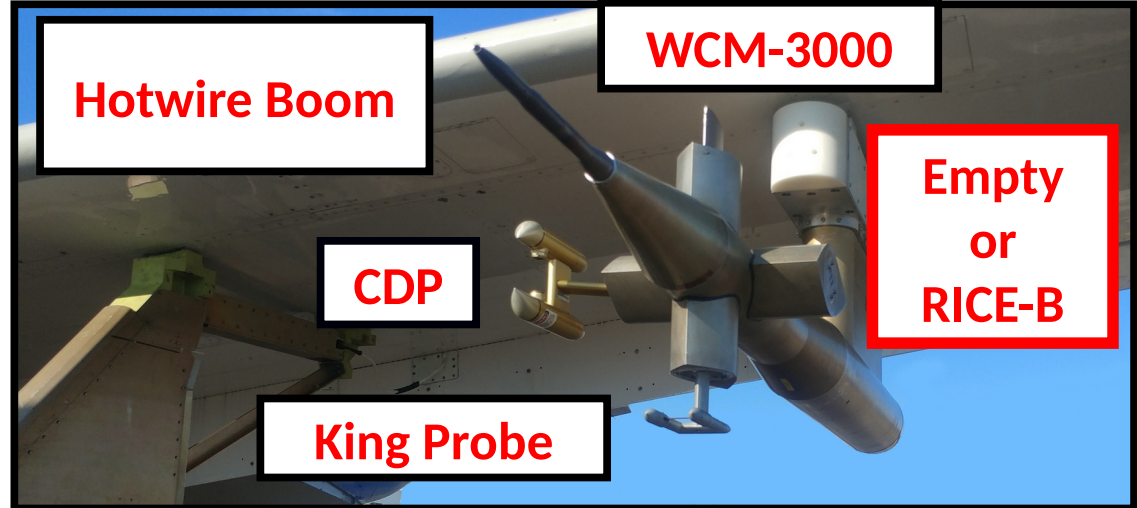
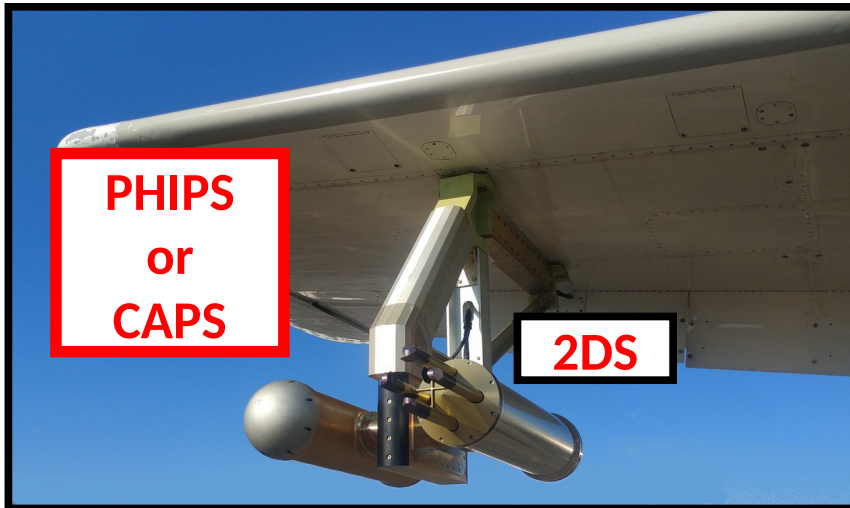
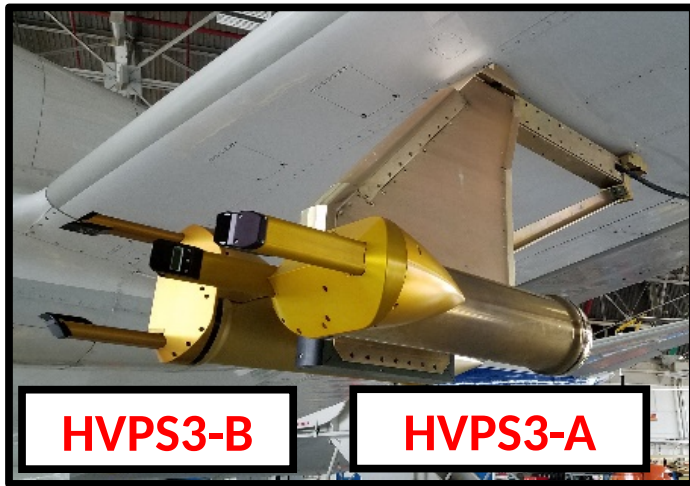
Citation Research Aircraft: 2015 (CAPE2015)



WB-57: 2017 (Cirrus Clouds)



NASA P-3: 2023 (IMPACTS)



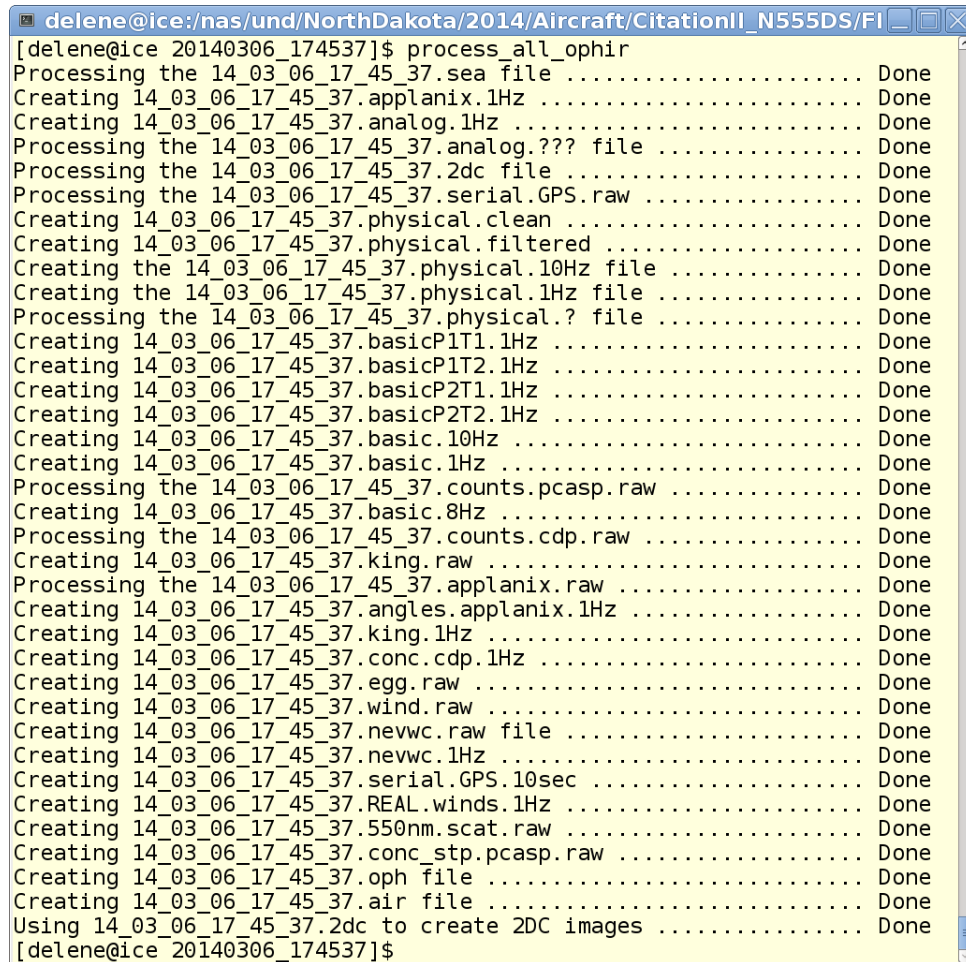
ADPAA Processing of Measurements

- Data Processing
 - Flight and Project Processing Scripts
- Analysis
 - Cplot/Cplot2 (IDL) & aplot (Python) Visualization Packages



ADPAA Package Programming Language(s)

- Main Language
 - IDL (New Code in Python)
- Additional Languages
 - Perl
 - Bash
 - Csh
 - FORTRAN
 - C
 - Matlab
 - Scilab



```
delene@ice:/nas/und/NorthDakota/2014/Aircraft/CitationII_N555DS/FI
[delene@ice 20140306_174537]$ process_all_ophir
Processing the 14_03_06_17_45_37.sea file ..... Done
Creating 14_03_06_17_45_37.applanix.1Hz ..... Done
Creating 14_03_06_17_45_37.analog.1Hz ..... Done
Processing the 14_03_06_17_45_37.analog.??? file ..... Done
Processing the 14_03_06_17_45_37.2dc file ..... Done
Processing the 14_03_06_17_45_37.serial.GPS.raw ..... Done
Creating 14_03_06_17_45_37.physical.clean ..... Done
Creating 14_03_06_17_45_37.physical.filtered ..... Done
Creating the 14_03_06_17_45_37.physical.10Hz file ..... Done
Creating the 14_03_06_17_45_37.physical.1Hz file ..... Done
Processing the 14_03_06_17_45_37.physical.? file ..... Done
Creating 14_03_06_17_45_37.basicP1T1.1Hz ..... Done
Creating 14_03_06_17_45_37.basicP1T2.1Hz ..... Done
Creating 14_03_06_17_45_37.basicP2T1.1Hz ..... Done
Creating 14_03_06_17_45_37.basicP2T2.1Hz ..... Done
Creating 14_03_06_17_45_37.basic.10Hz ..... Done
Creating 14_03_06_17_45_37.basic.1Hz ..... Done
Processing the 14_03_06_17_45_37.counts.pcaspc.raw ..... Done
Creating 14_03_06_17_45_37.basic.8Hz ..... Done
Processing the 14_03_06_17_45_37.counts.cdp.raw ..... Done
Creating 14_03_06_17_45_37.king.raw ..... Done
Processing the 14_03_06_17_45_37.applanix.raw ..... Done
Creating 14_03_06_17_45_37.angles.applanix.1Hz ..... Done
Creating 14_03_06_17_45_37.king.1Hz ..... Done
Creating 14_03_06_17_45_37.conc.cdp.1Hz ..... Done
Creating 14_03_06_17_45_37.egg.raw ..... Done
Creating 14_03_06_17_45_37.wind.raw ..... Done
Creating 14_03_06_17_45_37.nevwc.raw file ..... Done
Creating 14_03_06_17_45_37.nevwc.1Hz ..... Done
Creating 14_03_06_17_45_37.serial.GPS.10sec ..... Done
Creating 14_03_06_17_45_37.REAL.winds.1Hz ..... Done
Creating 14_03_06_17_45_37.550nm.scatsc.raw ..... Done
Creating 14_03_06_17_45_37.conc_stp.pcaspc.raw ..... Done
Creating 14_03_06_17_45_37.oph file ..... Done
Creating 14_03_06_17_45_37.air file ..... Done
Using 14_03_06_17_45_37.2dc to create 2DC images ..... Done
[delene@ice 20140306_174537]$
```

Data Formats Supported

- Input from any M300 (*.sea) Acquisition File
 - Conversion scripts support instrument recorded data.
- Main Data Format
 - Gzipped (compressed) NASA/UND ASCII 1001 Format
- Output Format
 - NASA/UND ASCII 1001 Format
 - 2013 ICARTT NASA Format (ict)
 - NetCDF
- Data File Import Routines (IDL, Python, Matlab, Scilab, Igor)
- Many Conversion Routines

ADPAA Supported Instruments

- Companies (Applanix, Aventech, Alicat, BMI, DMT, Honeywell, SEA, SPEC, Thermo, TSI)
- Processing Tag Number Standard
 - <https://adpaa.sourceforge.io/wiki/index.php/.:M300Tags:home>



Data Processing

- Data Quality Control
 - Calibration Checks
 - Data Missing Values Codes
 - Levels of Data Processing
 - Raw Recorded Data
 - Engineering to Physical Units
 - Single Instrument Data Files
 - Combined Instrument Data File
- Data Quality Assurance
 - Scientific Data Review

Comments on Scientific Data

- Quick Visualization of data is very Important.
 - Fast creation of preliminary version of the data.
 - Create a final data set after the project is over by applying manual edits to the “raw” data files which replace “bad” data with missing value codes.
- Archive the raw data and any editing files.
- Work with ASCII data as much as possible.
 - Compress ASCII files.
- Use a standard data format, which includes Meta data in all data files.

Availability and Copyright

- SourceForge Repository (SVN)
 - Current version 4632
 - 4 Administrators
 - 17 Active Developers
 - 19 Past Developers
- Download
 - svn checkout:
`svn://svn.code.sf.net/p/adpaa/code/trunk`
`adpaa-code`
- GNU/GPL v3 Licensed
 - Have to remain open, even when forked.



References

Gateway - <http://aerosol.atmos.und.edu/ADPAA/index.html>

Web Site - <https://sourceforge.net/projects/adpaa/>

Wiki - http://adpaa.sourceforge.net/wiki/index.php/Main_Page

Delene, D., Andrea, S., Hibert, K., Nairy, C., Moore, J., Twohey, L., Kim, M.-S., Gapp, N., O'Brien, J., & Klinman, J. Airborne Data Processing and Analysis Software Package (Version 4632). Zenodo, January 16, 2024.
<https://doi.org/10.5281/zenodo.10519255>.

Delene, D. J., Airborne Data Processing and Analysis Software Package, Earth Science Informatics, 4(1), 29-44, 2011, URL:
<http://dx.doi.org/10.1007/s12145-010-0061-4>, DOI: 10.1007/s12145-010-0061-4