Data Analysis Working Group

Annual Report 2021

Chairs: Emma Bland & Kevin Sterne

Mandate

To maintain, improve, document and distribute software for analyzing and visualizing SuperDARN radar data for use by scientists and students.

Membership

Co-chairs: Emma Bland & Kevin Sterne

Members:

- PIs: none

- Scientists (non-PI): Daniel Billett, Emma Bland, Angeline Burrell, Nathaniel Frissell, Devin Huyghebaert, Pasha Ponomarenko, Evan Thomas, Maria-Theresia Walach, Carley Martin

- Students: Francis Tholley, Cooper Robertson, Shane Coyle

- Computer scientists: Marina Schmidt

- Engineers: Kevin Sterne

Communication

New website
https://superdarn.github.io/dawg/

Quarterly reports to Executive Council
These high-level updates are available to everyone via the DAWG website

Questions or feedback for us?
Please contact us directly!

Scientific work: FITACF 3.0

White Paper on FITACF 3.0
P. Ponomarenko, E. Bland & K. Kotyk, 2021

https://superdarn.github.io/dawg/documents/

Identified origin of noise contamination in fitted data, and a method to filter it

Hardware and operational factors affecting the data pre-selection in FITACF (E Bland, P Ponomarenko, K McWilliams & N Nishitani)

RST updates

Scientific development

- Routine to remove non-Gaussian noise/interference from FITACF files
- Added the Shepherd (2017) elevation angle algorithm to FITACF 3.0
- Library for processing and plotting ionospheric sounding ("snd") mode data

Other features

- New library for directly displaying the contents of old-format dat-files
- Updated documentation on file formats
- Consolidation of RFC documentation

"Behind the scenes"

- Minor refactoring of FITACF 3.0 source code
- Reduced compiler warnings, improved code modularity & memory management

Other

- Compliance with GPLv3 license requirements
- More visible credit to previous RST authors, especially the original JHU/APL authors
- Tutorials for new developers

RST authors/contributors in 2020-2021:
Emma Bland, Angeline Burrell, Pasha Ponomarenko, Marina Schmidt, Kevin Sterne, Evan Thomas, Maria-Theresia Walach

pyDARN

What is pyDARN?	What's New?	What's Next?
A python library for SuperDARN data visualization - User-friendly interface - Long-term vision: maintainable, scalable, flexible - Narrower scope than DaViTPy	- Field of view plotting - Grid plotting - Updated fan plotting - Ground-scatter-mapped coordinate system	- Convection maps - Cartopy - Coordinate systems (geographic, magnetic) - Day-night terminator

pyDARN authors/contributors in 2020-2021:
Marina Schmidt (lead developer), Daniel Billett, Emma Bland, Shane Coyle, Nathaniel Frissell, Devin Huyghebaert, Carley Martin, Cooper Robertson, Francis Tholley

Highlights from the DAWG meeting

Participants: 30

Approach to this year's meeting

- "Big picture" agenda items focusing on (1) the software from a user perspective and (2) science

- Emphasis on participation: interactive meeting discussion board on "Padlet" to allow more people to contribute

User interaction with RST & pyDARN

- Ease of installation, release schedule

- Some users still download RST from Github. Use Zenodo to use a citable source of the code!

FITACF 3.0

- Proposed that FITACF 3.0 becomes the default fitting algorithm in RST

- Watch this space!

Thanks to everyone who has contributed this year!