Geospace Section Update

Acting Section Head: Robb Moore

Program Directors: Alan Liu, Roman Makarevich, Ilia Roussev, Mangala Sharma, Lisa Winter

Expert: John Meriwether

Division of Atmospheric and Geospace Sciences

National Science Foundation

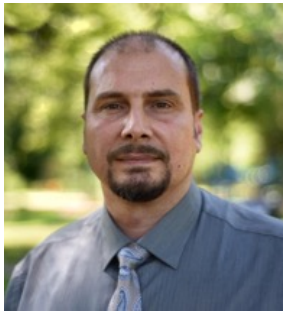
AGS and the Geospace Section

Acting AGS Division Director
Chungu Lu

Acting GS Section Head
Robb Moore

Aeronomy
Alan Liu

Magnetospheric Physics
Lisa Winter



Solar Terrestrial Research
Ilia Roussev

Geospace Facilities
Roman Makarevich

Space Weather Research
Mangala Sharma

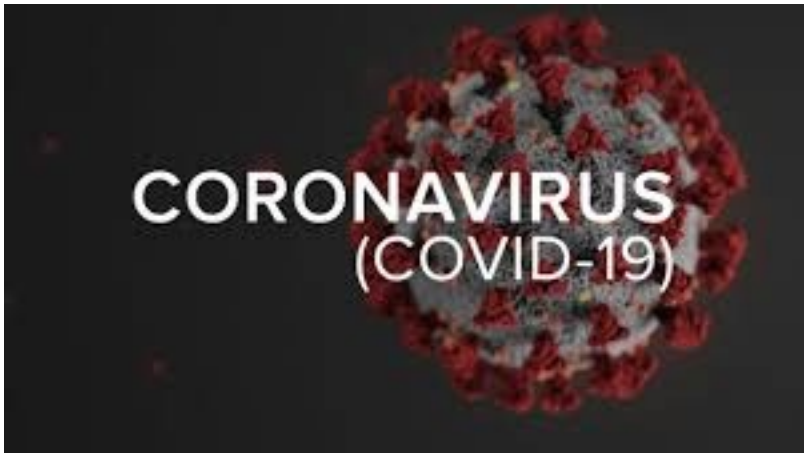
Expert
John Meriwether

Outline

- Section Update
  - COVID-19
  - DEI
- FY21 Activities
  - Budgets
- Science Highlights
- Upcoming Opportunities
  - Mid-Career Opportunities
  - PRF
  - SII

NSF and COVID-19

- NSF remains open for business
  - Staff are utilizing telework options to practice social distancing and comply with stay-at-home orders



  - Travel is restricted to essential for preserving life and property through June
  - Panels and other meetings are using web conferencing technologies
  - New proposals are welcome!! (no deadlines)
- Important Notice No 146 has information about NSF implementation of OMB guidance on administrative relief for COVID-19 impacts
  - Google NSF Coronavirus for website with update info

DEI Remains a Priority for NSF

- Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science
  - Broadening participation at scale
  - Enhancing Collaborative infrastructure
  - Supports the NSF INCLUDES National Network
  - NSF INCLUDES solicitation has LOI deadline of 10/4/2021 Full Proposal January 25, 2022
- Improving Undergraduate STEM Education: Pathways into the Earth, Ocean, Polar and Atmospheric & Geospace Sciences
  - Focus addressing critical needs in Geoscience education
  - Pathways for informal networks, undergraduate preparation, graduate opportunities
  - IUSE:GEOPaths solicitation has a recent deadline of 01/26/2021 Awaiting a new solicitation.

NSF Wide Solicitations

- Accelerating Research through International Network-to-Network Collaborations (AccelNet)
  - Support linkage between US and international networks that require coordination on grand research challenges
  - Full proposals due October 11, 2021
- Historically Black Colleges and Universities - Excellence in Research (HBCU- EiR)
  - The program aims to establish stronger connections between researchers at HBCUs and NSF's research programs.
  - LOI – July 22, 2021 and Full Proposals Oct 5, 2021
- Non-Academic Research Internships for Graduate Students (INTERN) Supplemental Funding Opportunity
  - Provides graduate students opportunity for internship in a non-academic setting

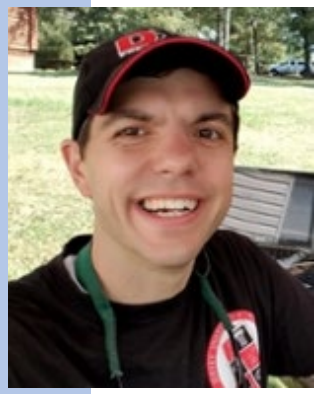
Quick Facts about FY20

- Overall spending in section was $55.2M up 8.6% from FY19
  - Reflects significant increase that was invested mainly in the core programs

AER	MAG	STR	SWR	FAC
11.5M	9.7M	9.6M	9.2M	15.1M

  - SWR funded several SWQU awards in collaboration with NSF/MPS and NASA
- Additional facts about AER, MAG, STR, SWR grants in 2020
  - 95 new award actions
  - Vast majority of new awards are made as standard grants
  - Section mortgage rate is under control

Faculty Early Career Development Program (CAREER) 2021



Frissell, Nathaniel
Univ Scranton

Aeronomy

Jaynes, Allison
Univ Iowa

Magnetospheric Physics

Marshall, Robert
Univ Colorado Boulder

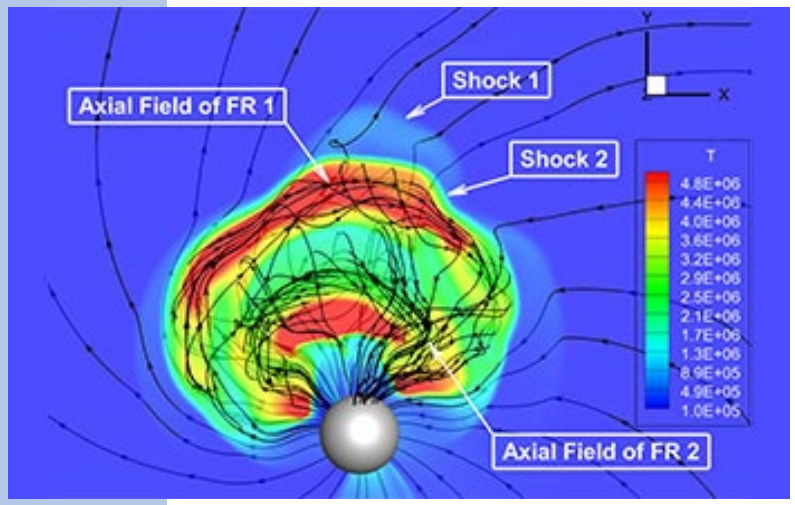
Aeronomy

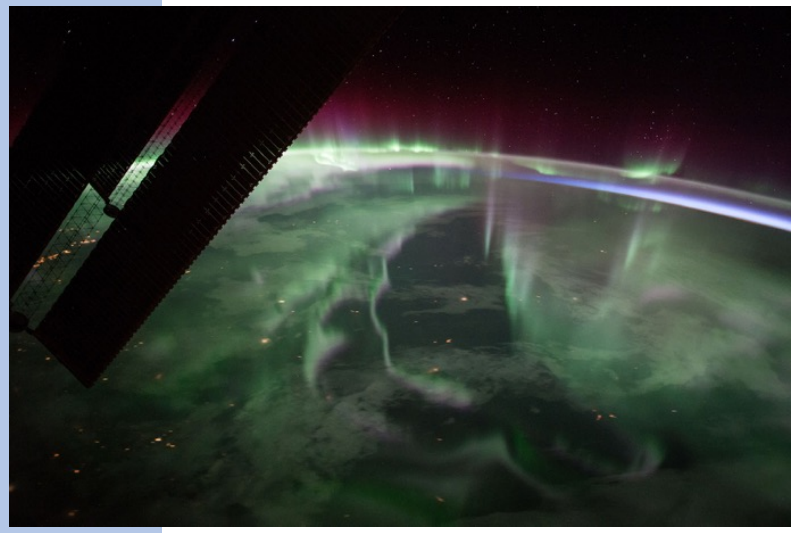
Jeremy Riousset
Florida Inst Technology

Aeronomy

*Not all awards have been processed yet.

SWQU - Space Weather with Quantified Uncertainties

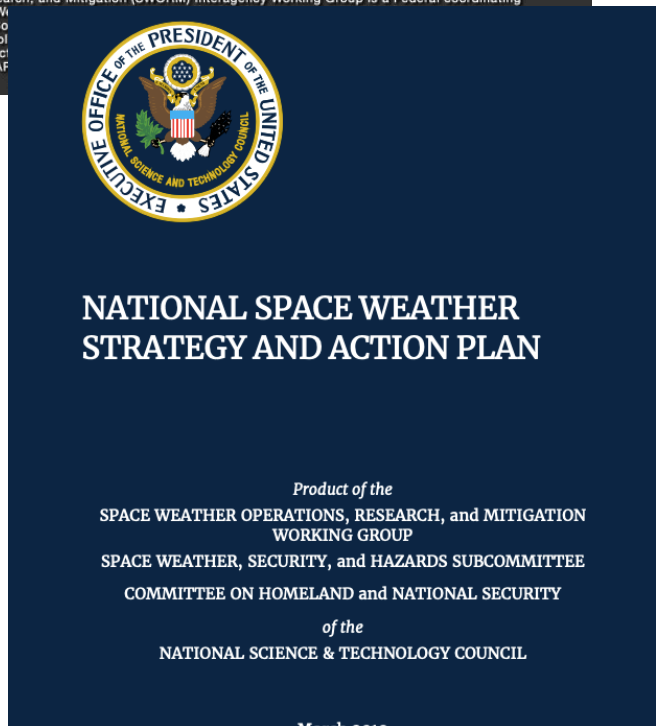




- Partnership between NASA and NSF GEO/MPS Directorates
- Sep 2020: NSF+NASA 6 awards totaling >$17M (FY20) for Next Generation Software for Data-driven Models
- Awardees
  - (NSF+NASA) Improving Space Weather Predictions with Data-Driven Models of the Solar Atmosphere and Inner Heliosphere (PI: N. Pogorelov, U. Alabama at Huntsville)
  - (NSF) NextGen Space Weather Modeling Framework Using Data, Physics and Uncertainty Quantification (PI: G. Toth, U. Michigan)
  - (NASA) Ensemble Learning for Accurate and Reliable Uncertainty Quantification (PI: E. Camporeale, CU Boulder)
  - (NSF) Composable Next Generation Software Framework for Space Weather Data Assimilation and Uncertainty Quantification (PI: R. Linares, MIT)
  - (NASA) A Flexible Community-based Upper Atmosphere Ensemble Prediction System (PI: A. Ridley, U. Michigan)
  - (NSF) Forecasting Small-Scale Plasma Structures in the Earth's Ionosphere-Thermosphere System (PI: T.-W. Fang; CU Boulder)

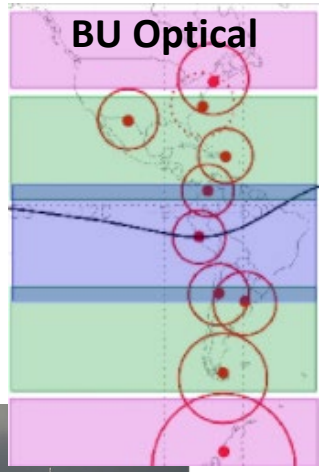
Space Weather Operations, Research and Mitigation Working Group

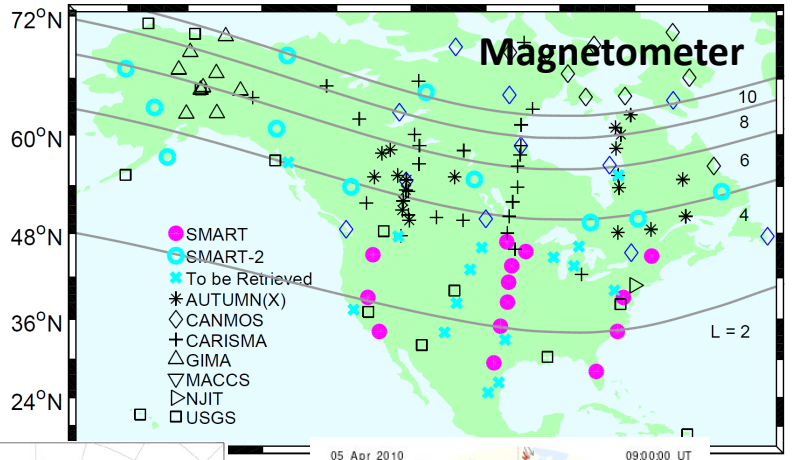
www.sworm.gov

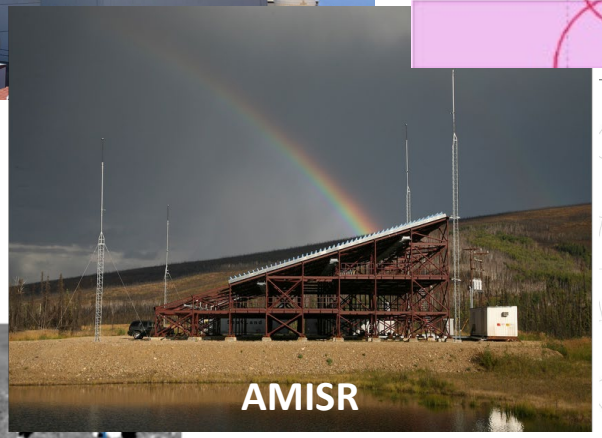


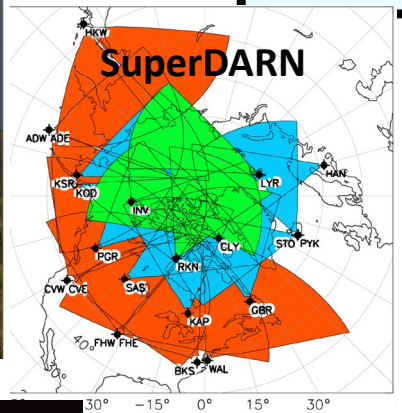
- NSF continues to be active in the SWORM interagency working group and implementing the National Space Weather Strategy and Action Plan (NSW-SAP).
- Our major focus:
  - Objective 2 - Develop and Disseminate Accurate and Timely Space Weather Characterization and Forecasts
- We actively support research to operations and operations to research (R2O2R) – NSF "broader impacts" criterion
  - NASA, NSF, NOAA R2O2R partnership
  - Current emphasis on efforts related to the transition of models into operations (e.g., SWMF, CCMC, etc.)
  - Considering future pathways for operational observing systems (e.g., GONG and Neutron Monitors)
- Continue to support NAS community workshops and other activities related to NSW-SAP

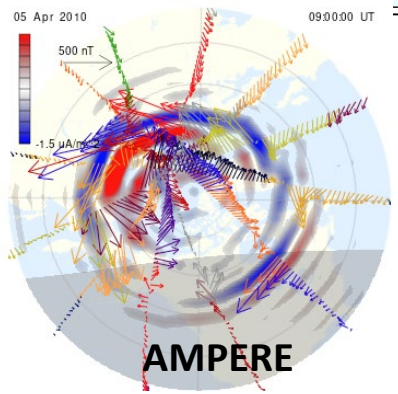
Vast Array of Observing Approaches

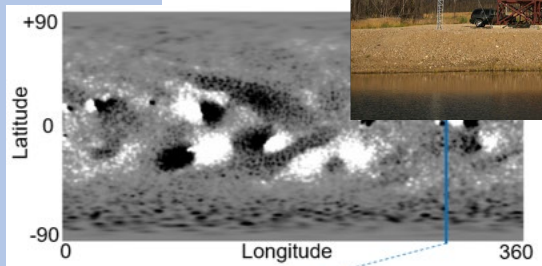


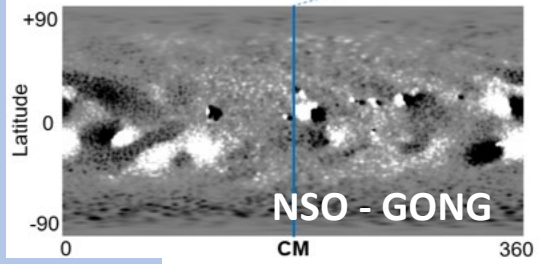


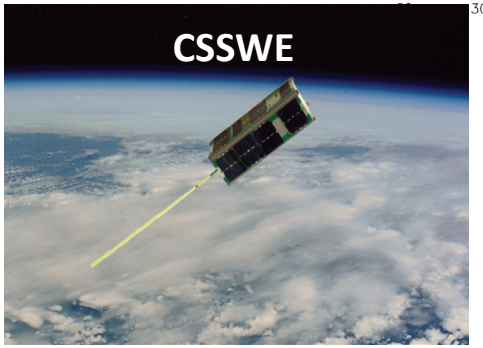


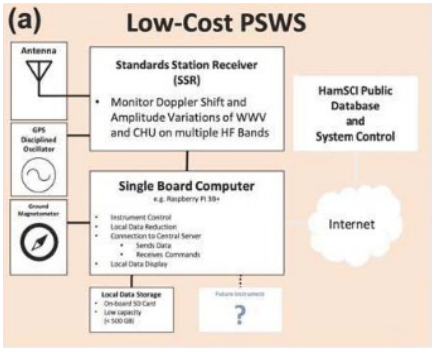


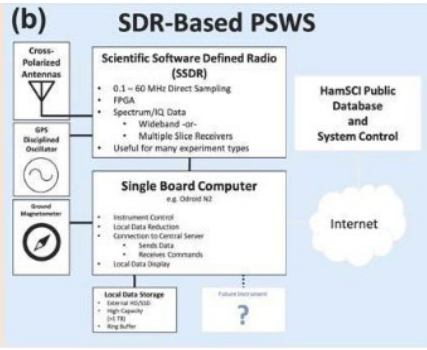








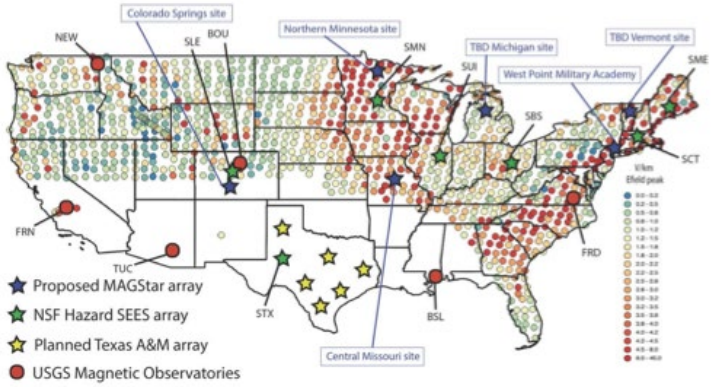




Arecibo Update

- December 2020 Collapse of the Observation Platform
  - No one was hurt
  - 305-m instruments offline while cleanup efforts conducted
  - Other science efforts continue (e.g., LIDAR, 12-m dish)
  - NSF working closely with AOMT to determine root cause

Distributed Array of Small Instruments (DASI)

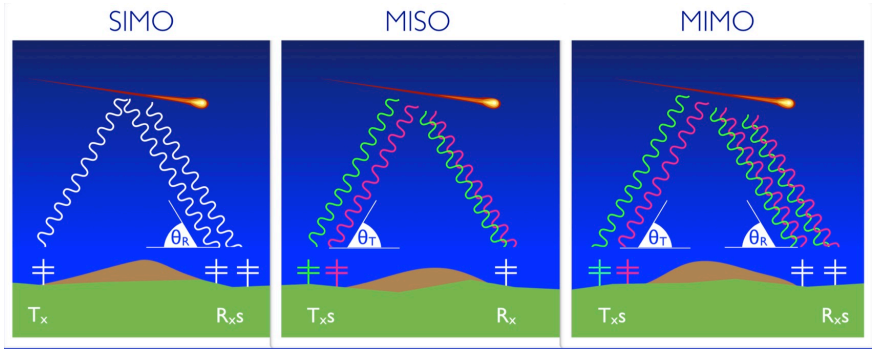


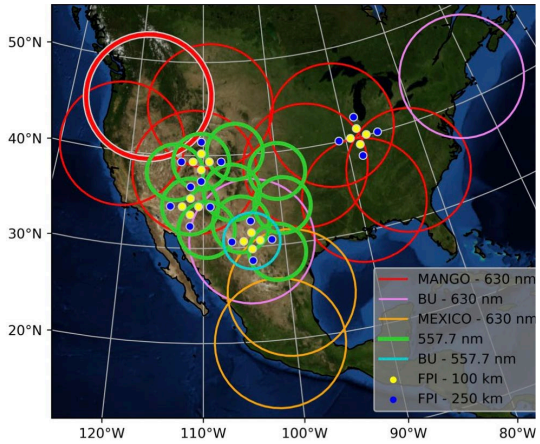
MagStar

- PI – Gannon – CPI
- Add six new magnetometer stations for GIC studies

MIMO Meteor Radar

- PI – Volz – MIT
- Distributed Radar for studying neutral winds

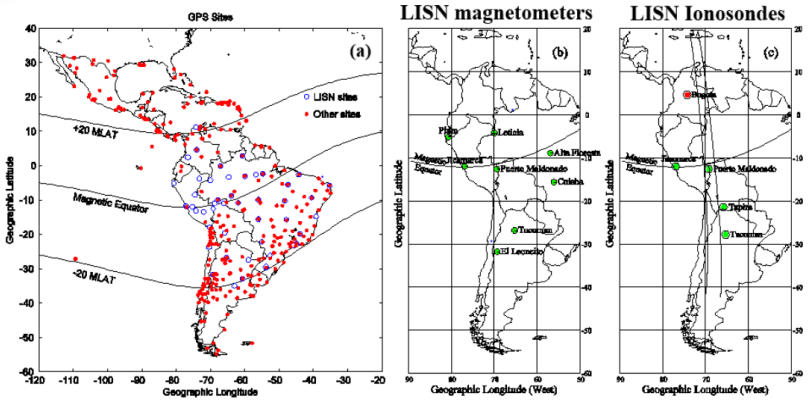




Optical Network for IT Studies

- PI – Kendall – SRI
- Deploys all-sky camera and FPIs to study ITM coupling

Distributed Array of Small Instruments (DASI)

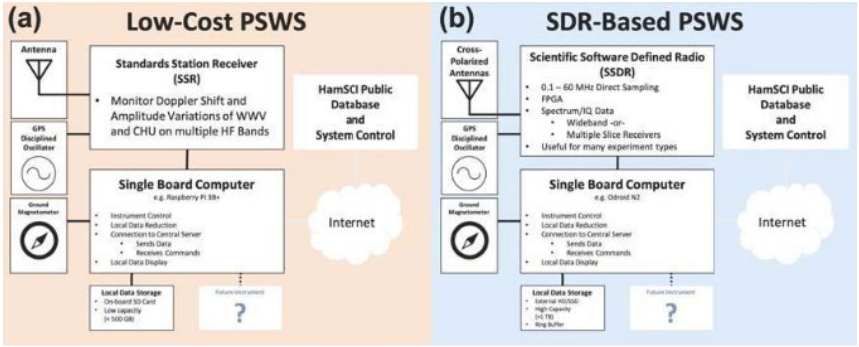


LISN investigations of TIDs

- PI – Valladares – UT Dallas
- Implement continuous Doppler and bistatic ionosonde observations

Personal Space Wx Station

- PI – Frissell – U of Scranton
- Collab with Ham Radio operators for Sp Wx Obs



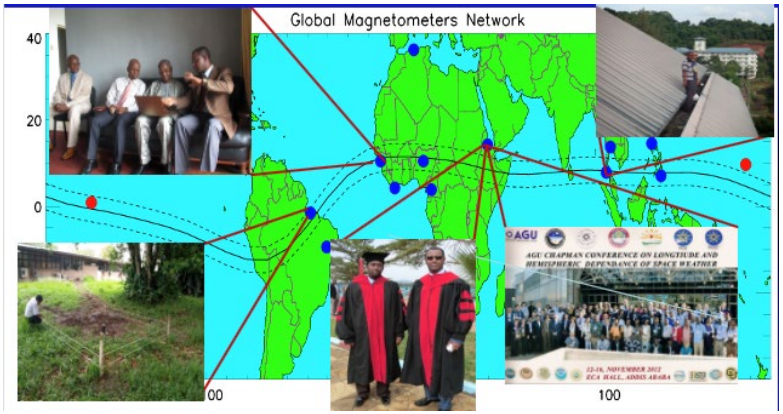
Space Wx Underground

- PI – Smith – UNH
- Uses undergraduate and high school students to develop and deploy magnetometers

Magnetometer networks

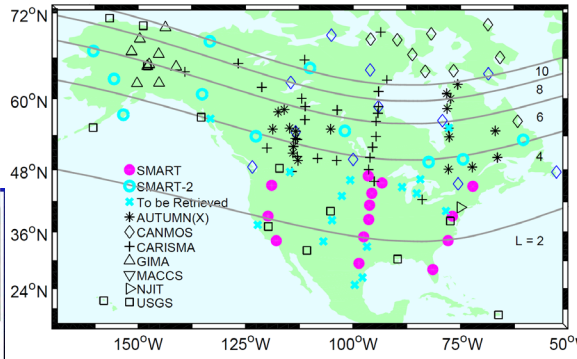
PIs - Moldwin & Engbretson

AMBER



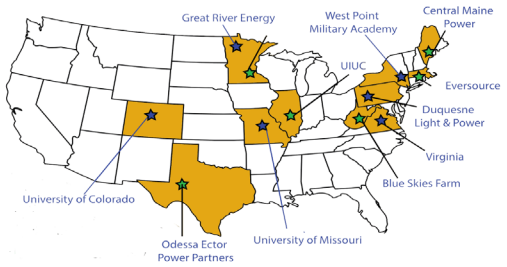
PI - Yizengaw

SMART



PI - Chi

MagStar



PI - Gannon

- MAG and GFS programs have provided support for multiple magnetometer networks over the past year

nature physics

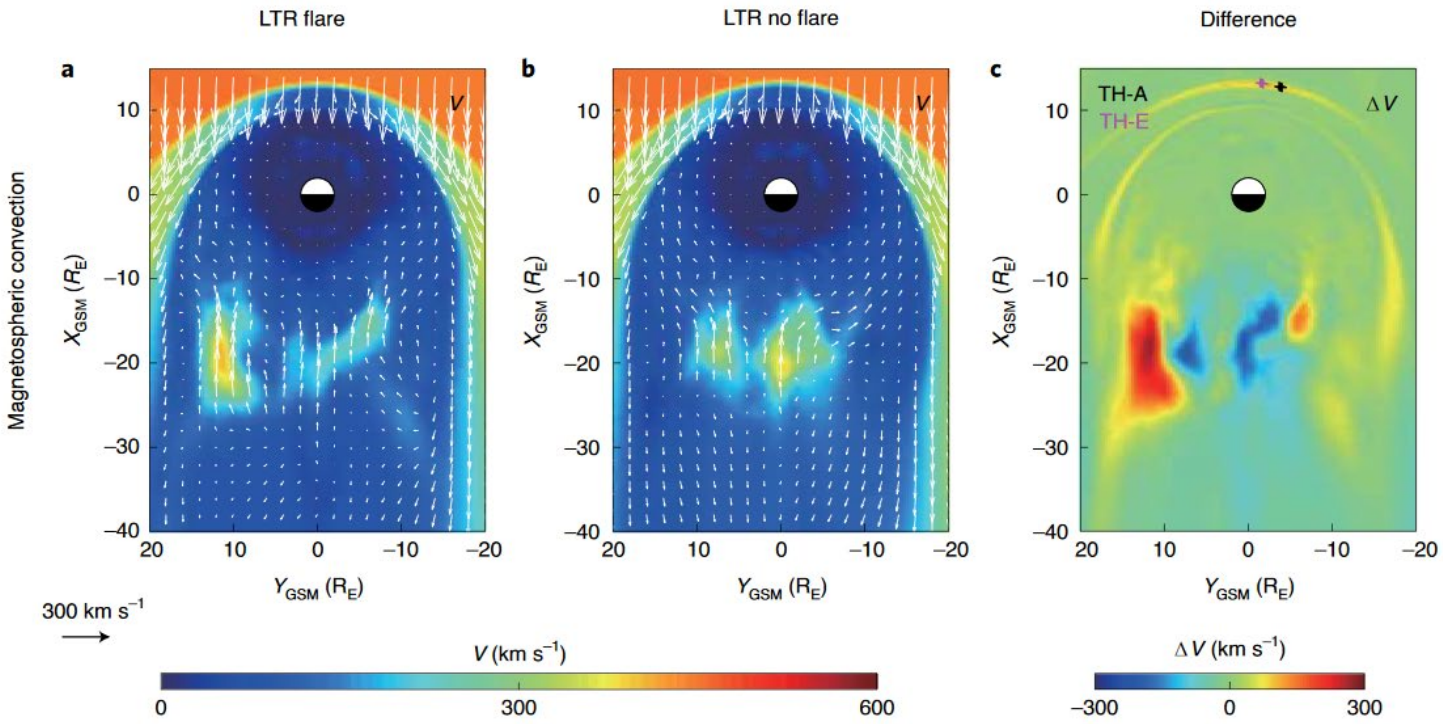
LETTERS

https://doi.org/10.1038/s41567-021-01203-5

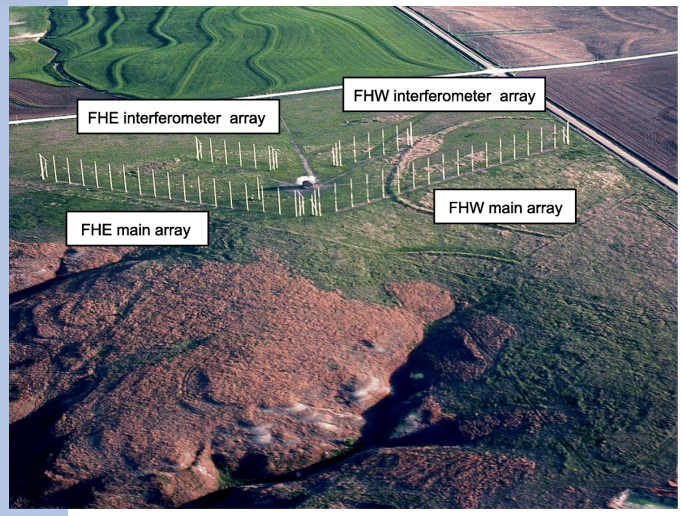
Check for updates

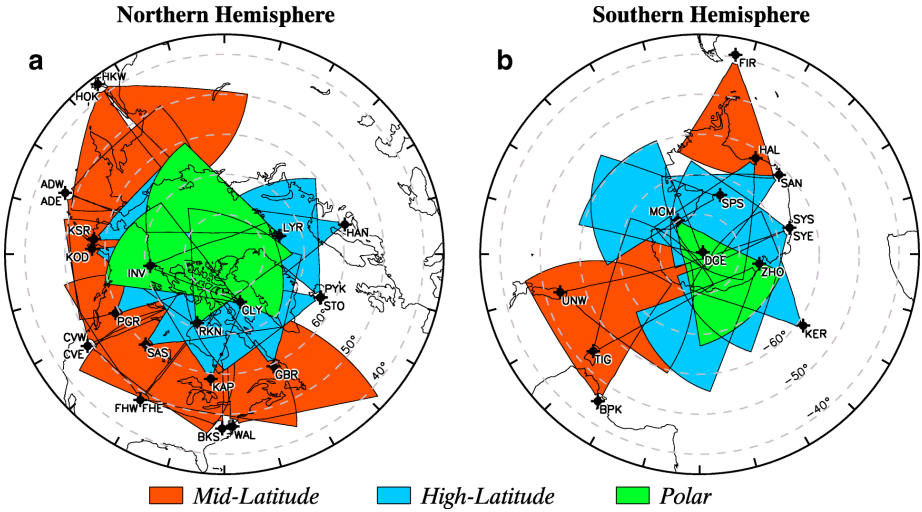
Solar flare effects in the Earth's magnetosphere

Jing Liu[1]✉, Wenbin Wang[2], Liying Qian[2], William Lotko[2,3], Alan G. Burns[2], Kevin Pham[2], Gang Lu[2], Stanley C. Solomon[2], Libo Liu[4], Weixing Wan[4], Brian J. Anderson[5], Anthea Coster[6] and Frederick Wilder[7]

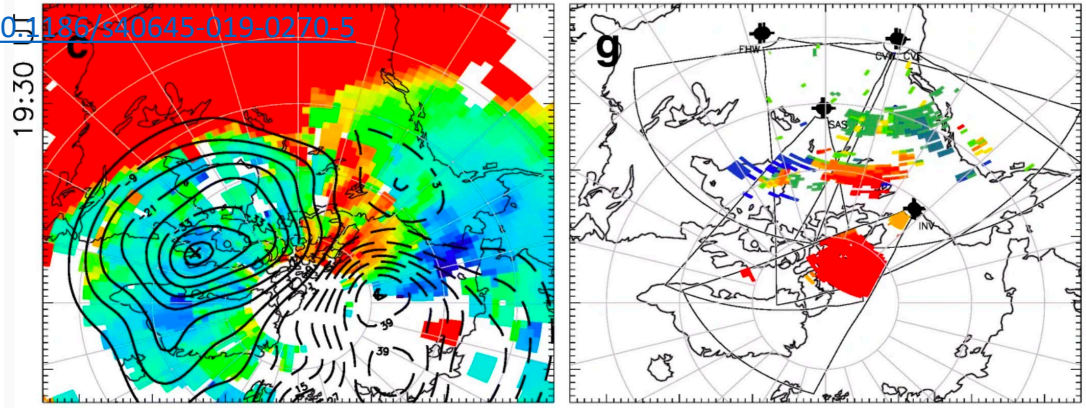


SuperDARN Renewal





https://doi.org/10.1186/s40645-019-0270-5



- NSF awarded 5-year extension (2020-2025) to U.S. SuperDARN consortium: Virginia Tech (PI Ruohoniemi), Dartmouth (Shepherd), Penn State (Bristow) and JHU-APL (Chartier)

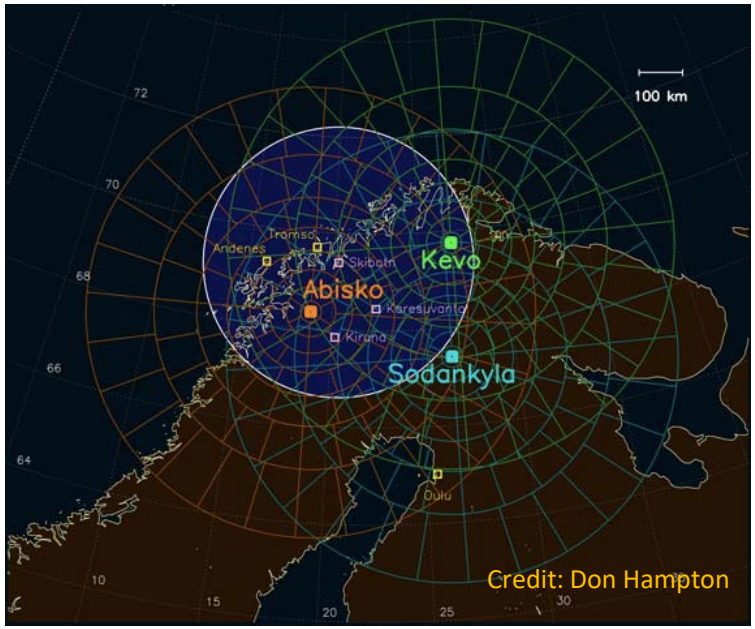
MRI: Development of a Tristatic Network of Ground-based Aeronomic Observatories to Operate in Synergy with the EISCAT-3D Facility

- PI: Mark Conde, Co-PI: Don Hampton and Aaron Ridley, $2.5M

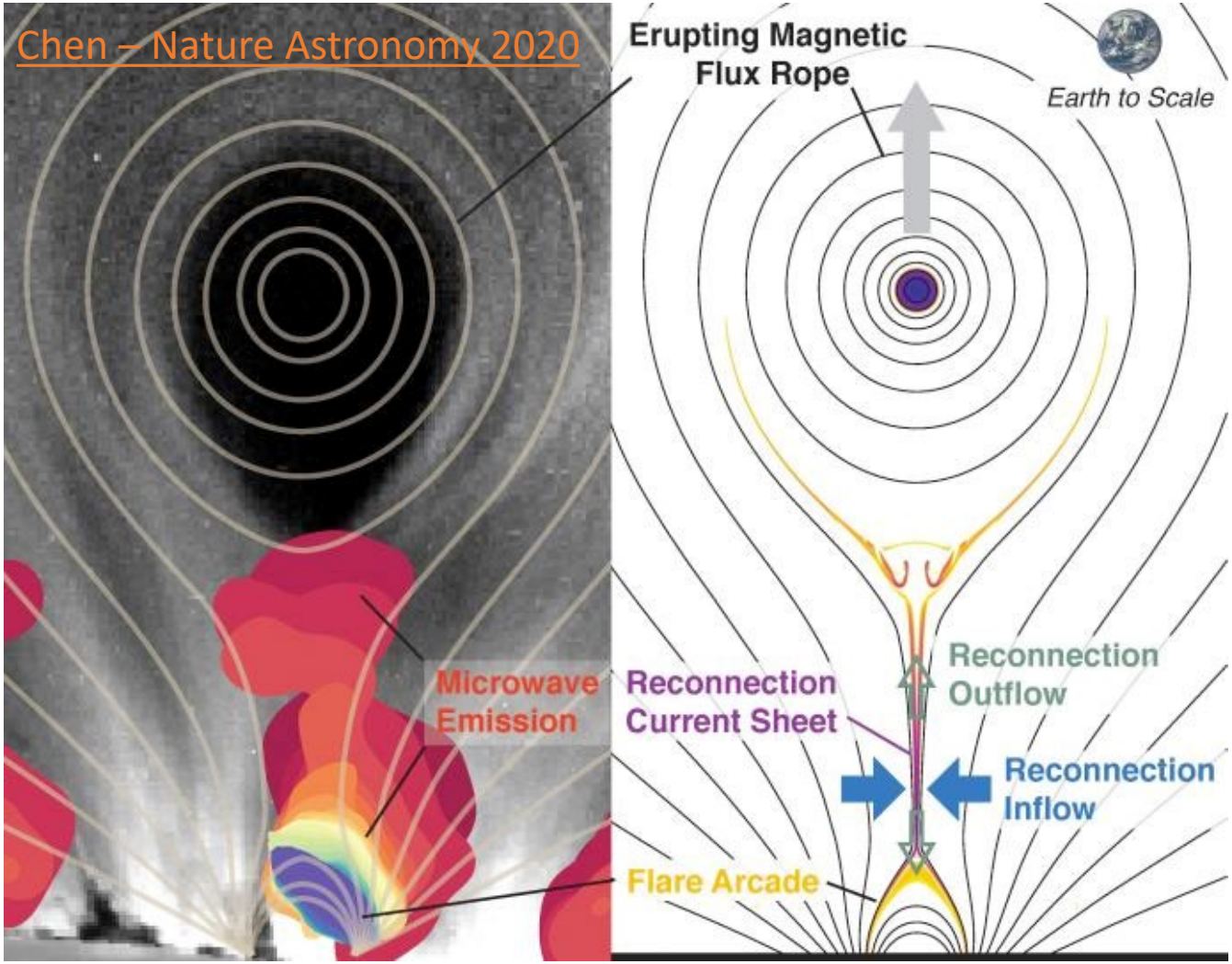
Three mini observatories in northern Scandinavia

- All-sky imaging FPI (SDI)
- narrow-field FPI, all-sky camera, GNSS receiver, magnetometer

Synergy with the new EISCAT 3D ISR

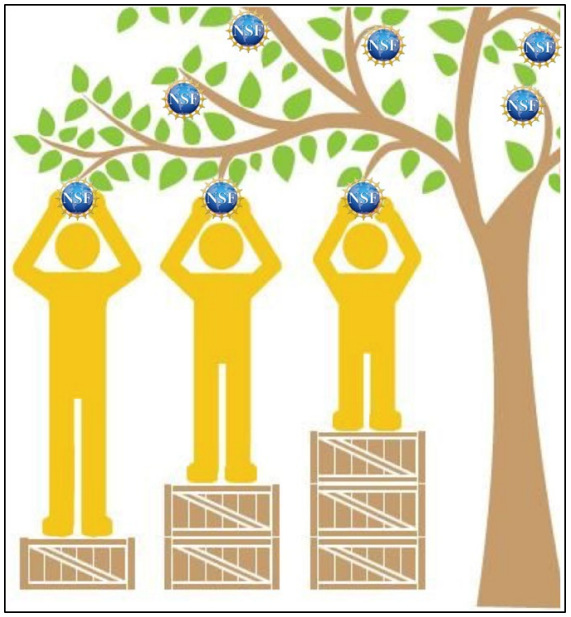


Electron Acceleration in Solar Flares



- Observations from EOVSA show that electron acceleration during solar flares is occurring at magnetic bottle at bottom of current sheet

AGS – Opportunities for Mid-Career



- Support meritorious research & promote equity/access that sustains a diverse community of mid-career scientists
  - Juggling research/teaching, services, life -> “leaky pipeline” of talent
  - Disproportionately affects underrepresented groups
- Encourages investigators meeting one or more of the following criteria
  - No prior or recent NSF funding
  - On soft money support
  - At PUI, MSI, or community college
  - From underrepresented groups in AGS disciplines
- Google AGS Mid Career DCL

AGS Postdoctoral Research Fellowships

- After a hiatus the AGS-PRF program has returned to support highly qualified early career investigators independent research efforts

- Solicitation Information
  - Provides two years of support
    - 94K in year 1 and 96K in year 2
  - Award made directly to PI, but need to identify a host institution
  - Graduate student or less than 2 years since PhD to apply
  - No deadlines
  - Google NSF AGS PRF for more information

Spectrum Innovation Initiative (SII)

- ENG, CISE, and GEO Directorates are supporting an effort focusing on effective spectrum utilization and/or coexistence techniques

- Solicitation Information
  - Centers must
    - Focus on reserarch ensuring US leadership in future wireless technolgies
    - Foster scientific and technical collaboration to grow spectrum workforce
    - Transformational impact on spectrum management issues
  - 5-year projects with up to $5M/year
  - Proposals window March 1 – April 1 2021
  - Google NSF SII for more information

We need you!

- The heart and soul of the NSF proposal review process is the participation of experts such as yourself
  - Please, please, please agree to contribute ad hoc reviews and join panels
- New solicitations and cross directorate activities are increasing the demand for reviewers
- Thanks to all who have already stepped up!

Thank you – Questions?

- Happy to provide answers ☺