



NSF's Contributions to SWAP Implementation

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Outline

- NSF and Space Weather
 - Support for basic research
 - Budget outlook
- Support for SWORM
 - Goal 1 - Benchmarks
 - Goal 5 – Advance Understanding and Forecasting
 - Goal 6 – Increase International Cooperation
- Opportunities
 - 10 Big Ideas
 - PREEVENTs
 - FAC Program Director

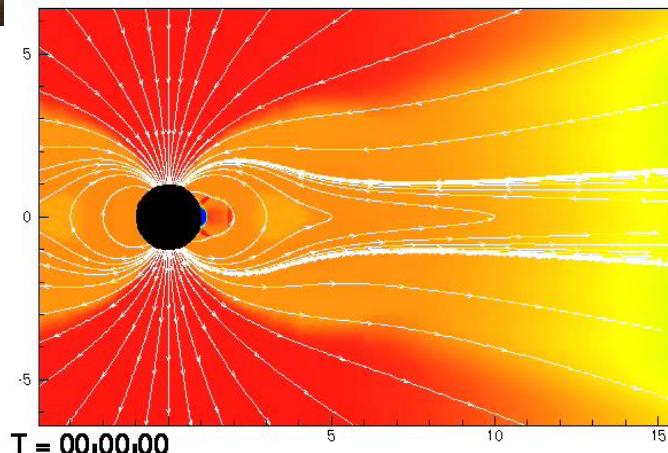


Space Weather Research



PFISR

• CSEM Center for Space Environment Modeling
University of Michigan



SWMF

- Support investigators using observations, modeling, and theory to advance fundamental understanding of space weather and related processes

$$\frac{\partial \rho}{\partial t} + \nabla \cdot [\rho \vec{u}] = 0$$

$$\frac{\partial (\rho \vec{u})}{\partial t} + \nabla \cdot \left[\rho \vec{u} \vec{u} + \left(p + \frac{B^2}{8\pi} \right) \vec{I} + \frac{1}{4\pi} \vec{B} \vec{B} \right] = 0$$

$$\frac{\partial \vec{B}}{\partial t} + \nabla \cdot [\vec{u} \vec{B} - \vec{B} \vec{u}] = 0$$

$$\frac{\partial (\rho E)}{\partial t} + \nabla \cdot \left[\vec{u} \left(\rho E + p + \frac{B^2}{8\pi} \right) - \vec{B} (\vec{u} \cdot \vec{B}) \right] = 0$$

$$\nabla \cdot \vec{B} = 0$$

$$p = (\gamma - 1) \left[E - \frac{1}{2} \rho u^2 - \frac{1}{2} B^2 \right]$$

Alfvén



NSF and AGS Budgets

- We have been operating on CR since start of the fiscal year
 - Presents numerous challenges
 - Recall President's request had NSF down **10%**
 - New Omnibus spending bill has NSF up **3.9%**
 - Focuses mainly on top level numbers RRA (**+5%**), MREFC, HER, & AOAM
- On Feb 12, 2018 as part of the budget process the NSF's FY2019 request was submitted to Congress



	FY17 Enacted	FY19 Request	Change
NSF	\$7,504M	\$7,472M	-0.4%
GEO	\$825M	\$852M	+3.3%
AGS	\$253M	\$239M	-5.6%

- Prior to congressional action on budget caps NSF was down **30%**
- GEO increase to support OOI and ARF in OCE
- Google [NSF FY19 Budget](#) for more information



Support for SWORM Implementation



- SWAP Identifies 6 Goals
 - **Goal 1 – Establish Benchmarks for Space Weather Events**
 - **Goal 2 – Enhance Response and Recovery Capabilities**
 - **Goal 3 – Improve Protection and Mitigation Efforts**
 - **Goal 4 – Improve Assessment, Modeling, and Prediction of Impacts on Critical Infrastructure**
 - **Goal 5 – Improve Space Services through Advancing Understanding and Forecasting**
 - **Goal 6 – Increase International Cooperation**

Space Weather Benchmarks

- Phase 1 Benchmark report is awaiting approval
 - 5 Major Space impacts are targeted
 - Induced geo-electric fields
 - Ionizing radiation
 - Ionospheric disturbances
 - Solar radio bursts
 - Upper atmospheric expansion
 - Initial estimates of 1 in 100 year storms and theoretical maxima event
- NSF and NASA are leading a Next Step Benchmarking activity for the SWORM
 - Finalizing SOW to support workshop and community report
 - Will be looking for volunteers update and revise the phase 1 benchmarks



Advance Understanding and Forecasting

- NSF led an RFI to gather community input on research priorities for space weather which closed April 6th
 - Received over 30 responses and are working with the Goal 5 team to process the input
- Contributed input to the baseline instrumentation requirements that are part of the goal 5.3.9
- Provided support the Earthscope project to expand coverage of the magnetotelluric survey





Advance Understanding and Forecasting II

- Space weather model development can be supported by the NSF PREVENTs program
 - Last year two multi-million dollar proposals received funding from the program
 - LOI are required part of the submission process
 - July 27, 2018 Deadline
- Coordinating with NASA/NOAA on a tri-agency O2R pilot
 - NSF will accept proposals into the Core programs in AGS and AST
 - Grants for 1-year of funding only See DCL (NSF 18-052) for details
 - Google [NSF Space Weather O2R](#)
 - Beginning discussions with NASA and NOAA for MOU to support second phase

Increase international cooperation

- Participated in UN/USA ISWI Meeting
- Attended USA/Canada Bilateral Space Weather Meeting
- Assisting efforts associated with Space Weather as UN-COPUOS Thematic Priority 4





NSF 10 Big Ideas



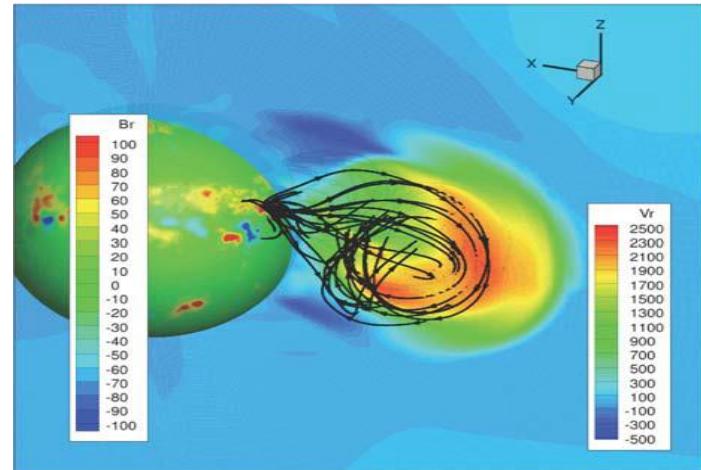
- FY19 Request includes \$282M to support the 10 Big Ideas
 - Origin of the 5% reductions in RRA activities within each directorate
- 6 Research Ideas each get \$30M for a total \$180M

Harnessing the Data Revolution	Navigating the New Arctic	Future of Work at Human Tech Frontier
The Quantum Leap	Understanding the Rules of Life	Windows on the Universe

- Process Ideas get \$102M total
 - Midscale Research Infrastructure \$60M
 - INCLUDES \$20M
 - Growing Convergence Research \$16M
 - NSF 2026 Fund \$6M
- https://www.nsf.gov/news/special_reports/big_ideas/

PRE-EVENTS

- Expecting \$18M in FY18 for support of this program
 - Google [NSF PREEVENTS](#) for full details
- Track 1
 - Workshop Proposals accepted anytime
 - NEW collaborations only
 - Contact Ilia Roussev or Carrie Black for more details
- Track 2
 - Letters of Intent Due July 27, 2018
 - Rules on compliance are strict. Reach out if you have questions.
 - Fully submitted and signed LOIs are REQUIRED for submission of Full Proposals
 - Full Proposals Dues September 18, 2018
 - 2-Step review process of full proposals. Award notification dates dependent on when NSF receives FY19 funds.





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Overview

Open & closing dates

① 04/05/2018 to 05/16/2018

Salary

\$133,689 to \$178,573 per year

Pay scale & grade

AD 04

Work schedule

Full-Time - Full-time.

Appointment type

Permanent - Permanent.

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Announcement number

AGS-2018-0009

Thank You – Questions?

