Geospace Science Update

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Outline

- Section Update
  - Staffing
- FY18 Activities
  - Budgets
  - 10 Big Ideas
  - Facilities
  - CEDAR, GEM, SHINE
  - Cubesats
  - Geo Cyber Infrastructure
- SWORM
- Steps against Harassment
- Decadal Mid-term assessment

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MAG – Lisa
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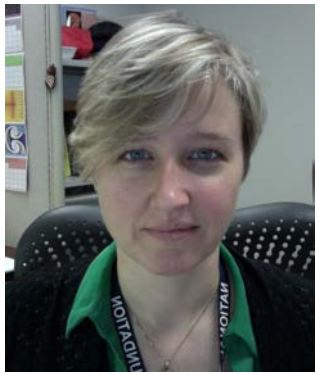

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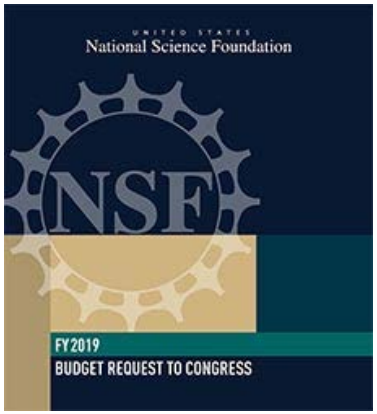
NSF and AGS Budgets



- Once again operating on a CR
  - NSF funded through Dec 7, 2018
    - Receiving a fraction of FY18 appropriation levels
  - House and Senate Markups have NSF up between 4-5% over FY18

- On Feb 12, 2018 as part of the budget process the NSF's FY2019 request was submitted to Congress

	FY17 Actual	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 & OPP
  - Google NSF FY19 Budget for detailed information

Quick Facts about FY18

- Overall spending in section was $50.3M up 4% from FY17
  - Support for CubeSat program from AGS Division Director
  - Funds from division to pay down mortgage rates

AER	MAG	STR	SWR	FAC
12.6M	7.9M	8.3M	3.5M	17.9M

  - These reflect “loans” from SWR to AER (1.5M) and FAC (2.7M)
- Additional facts about AER, MAG, STR, SWR grants in 2018
  - 124 Actions resulting 56 new awards with a 45% success rate
  - ~70% of new awards made as standard grants
  - ~25% average mortgage rate for the section

NSF's 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
- Google NSF 10 Big Ideas for more information

AMISR

- Evaluation of submissions to the AMISR recompetition is underway,
  - Expect to make a selection in the coming months
- PFISR has become the centerpiece of a mulit-messenger space physics observatory at PFRR
- A new generator was purchased for RISR allow low power continuous operations
  - RISR-C data is now available via Madrigal

Arecibo Observatory Moving Forward

- NSF has selected a UCF – UMET – YEI consortium to operate AO for 5 years
  - Just completed 5 days of continuous operations in support of the World Days
  - Initial tests of the HF heater system have gone well

- Public Law 115-119 included $14.3M in disaster relief funding for repairs to restore AO world class status
  - Just granted a waiver by OMB to allow 5 years for spending
  - 30 scientists and engineers participated in a line feed workshop
    - Unanimous recommendation maintain same design, but consider stronger materials
    - Support for increasing transmitter power and adding a solid sate modulator
- ***NSF welcomes proposals for science investigations at Arecibo.***

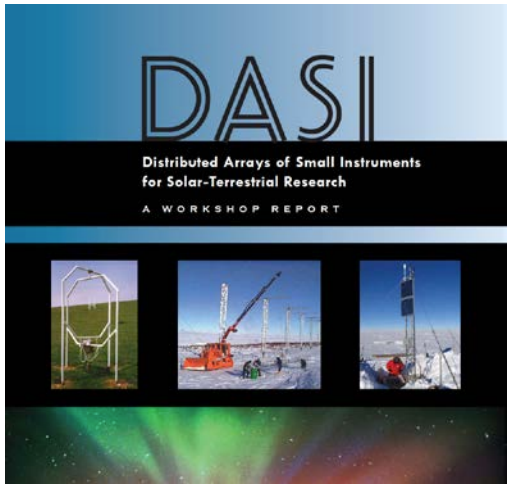
Sondrestrom Research Facility


ISR and LIDAR at SRF

- After 35 years of exemplary science accomplishments
  ISR operations ended on 3/31/18
- Management of the site is now being handled by CPS
  - Environmental and engineering assessment report has been delivered
  - PIs being supported in retrieving their instruments over the summer
  - Site has been winterized and is being monitored
- Future of the site will be based upon PR recommendations, environmental and engineering assessment, and interactions with the Greenland Self-rule government
  - Expect to issuing our final decision in the coming months

Pathway to New Facilities

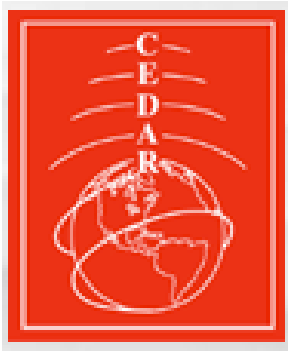
- Distributed Array of Small Instruments
  - Useful input gathered from CEDAR, GEM, SHINE meetings
  - Internally discussing how to implement the DASI recommendations in the Geospace portfolio review
    - Planning for an initial call in FY19



- Innovation and Vitality Program
  - Support renovation and upgrade of existing facilities
  - Facilitate the development of new instrumentation
- Midscale Projects
  - NSF Big Idea supporting $4-70M projects

Revision of CEDAR, GEM, & SHINE

- New solicitations for CEDAR and GEM released on Feb 28 and are now accepting proposals
  - Google NSF CEDAR or NSF GEM for details
  - PI's encouraged to contact PO before submission



- STR is going to operate without a separate SHINE solicitation in FY19
  - Funding for STR program remains the same
  - "Roadmap for Reliable Ensemble Forecasting of the Sun-Earth System" workshop (held at NJIT March 28-30, 2018) is part of community input for STR prorities

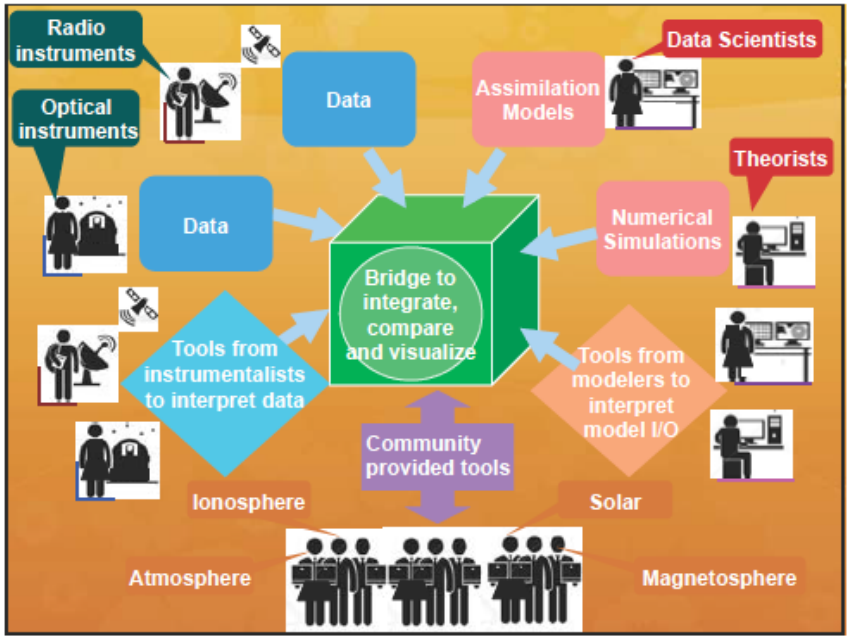
Cubesat Program

- Cubesat Solicitation Deadline
  - Submissions where due June 13th
  - Google NSF CubeSat
  - Support for 1-2 missions at total cost $1.2M each
- CubeSat-Enabled Science and Engineering meeting has generated significant interest in collaborations with CISE/CNS and ENG/ECCS
  - Focused novel science applications of CubeSats and CubeSat constellations

Geospace-related CSSI award

- **Cyberinfrastructure for Sustained Scientific Innovation (CSSI) - Data and Software: Elements and Frameworks**
- Elements: Software: The Integrated Geoscience Observatory (InGeO) – PI A. Bhatt

InGeo is a data-linking and software-sharing system to facilitate community-centered and data-driven systems science research with an initial focus on geospace.



Support for SWORM

- SWORM is producing a new strategy
  - Update was called for original plan
  - Awaiting approval of Kelvin Droegemeier as OSTP Director
- Goal 1 – Space Weather Benchmarks
  - NSF and NASA are leading a Next Step Benchmarking activity
    - NSF has funded STPI to take a leading roll in this activity
- Goal 5 – Advance Understanding and Forecasting
  - Lead an interagency team develop space weather research priorities
    - Submitted to SWORM for approval
- Goal 6 – International Cooperation
  - Participated in “Space Weather as Global Challenge” meeting at the Japanese Embassy

Steps against Harassment

- The National Science Foundation (NSF) will not tolerate sexual harassment, other forms of harassment, or sexual assault, within the agency, at awardee organizations, field sites or anywhere science or education is conducted.

- New terms and conditions going into effect on Oct 21 require awardee organizations to report findings of sexual harassment
  - Currently applies to PIs and CoPIs
  - New CGI increments will trigger the reporting requirements
- See NSF Harassment Page for more details

NSF Diversify Recommendations

- **Diversify** observing platforms with microsatellites and midscale ground-based assets. (*pg 79*)
  - Midscale project line for projects with costs of $4-90M (*pg 80*)
  - Consistent with 2010 A&A decadal survey recommendation that mid-scale line as second priority in large-ground based projects (*pg 79)*
    - *Mid-scale project line is one of the NSF 10 Big Ideas with an expected FY19 funding level of $60M*
    - *NSF reduced the lower threshold of MREFC projects to $70M. This change allows for consideration of projects at the upper end of the mid-scale cost-range, as defined by the Survey, within the MREFC process at NSF*
  - Frequency Agile Solar Radiotelescope (FASR) and Coronal Magnetism Solar Observatory (COSMO) are called for having well-developed science and implementation plans (*pg 118*)
    - *FASR and COSMO eligible for mid-scale support*
  - CubeSat program should support two new starts per year (*pg 81)*
    - *Funding levels have not supported that level, but 3 new starts were supported in FY15 and we anticipate supporting 1-2 new starts in FY19. AGS/GS, ENG/ECCS, and CISE/CNS are collaborating on a program for FY19.*

NSF Realize Recommendations

- **Realize** scientific potential by sufficiently funding operations and data analysis. (*pg 81-82*)
  - Provide funding for NSO synoptic observations
    - *AST continues to support the NSO Integrated Synoptic Program (NISP) at a level consistent with the recommendations of the 2012 Portfolio Review (i.e. Advancing Astronomy in the Coming Decade: Opportunities and Challenges). In FY16 NSF began partnering with NOAA through an Interagency Agreement whereby NOAA provides partial support for operations of the Global Oscillation Network Group (GONG).*
  - Complete ATST (now known as DKIST) and support operation costs
    - *DKIST construction is supported as an MREFC project with first light expected in FY20. AST is currently in the 4th year of a 5-year (FY15-FY19) funding ramp to full DKIST operations*

NSF Integrate Recommendations

- **Integrate** observing platforms and strengthen ties between agency disciplines.
  - Support science that falls between sections, divisions, and directorates. In particular, outer heliosphere should be included in scope of AGS division (*pg 85*)
    - *AGS and AST have jointly supported several interdisciplinary projects in the area of solar physics that are of mutual interest to both divisions.*
    - *AGS and AST continue to engage in dialogues to encourage support for areas of overlapping science and projects at the boundaries*
    - *Discussions are ongoing between AGS and AST on the proper home for outer heliosphere projects*
  - Coordinate ground- and space-based observations with NASA and other agencies (*pg 87*)
    - *AGS/GS and NASA Heliophysics have begun discussions for programs to capitalize on the ICON and GOLD mission synergies with the NSF supported ground-based observational assets*

NSF Venture Recommendations

- **Venture** forward with science centers and instrument and technology development.
  - Create Heliosphysics Science Centers (HSC) with NASA with annual funding in the $1-3M range (*pg 87*)
    - *Due to dedicated appropriation funds for HSC NASA will lead the HSC competition with NSF providing considerable input on the best practices for conducting science center competitions*

NSF Educate Recommendations

- **Educate**, empower, and inspire the next generation of space researchers.
  - Faculty Development in Space Sciences (FDSS) program should accept applications from 4-year and Ph.D. granting institutions (*pg 91)*
    - *FDSS was conducted in FY14 and allowed applications from 2- and 4-year colleges as well as Ph.D. granting institutions.*
  - Replace Center for Integrated Space Weather Modeling summer school (*pg 92*)
    - *Currently supported via NSF-1757501 with an end date of 4/30/21*
  - Support community workshops to advance professional development of graduate students (*pg 92*)
    - *The annual CEDAR, GEM, and SHINE workshops support the attendance of 70-90 graduate student per year. The level of support is adjusted as justified.*
  - Add solar and space physics to list dissertation research areas in annual survey of Earned Doctorates (*pg 93*)
    - *AGS will work with the Science and Engineering Indicators group to discuss the feasibility of this recommendation*

Questions

- Happy to provide answers ☺