

## Overview of the Geospace Section Portfolio Review

### Portfolio Review Committee

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- Charge
- Timeline
- Community Input
- Decadal Survey's recommendations for NSF  
→ Aspirations for new scientific capabilities
- Key Issues for the Review
- Top-level portfolio recommendations



06/21/2016

GS PR Overview

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## Charge: GS Portfolio Review

1. Recommend the *critical capabilities* needed from 2016 to 2025 that would enable progress on the science program articulated in Chapter 1 of the Decadal Survey
2. Recommend the balance of *investments* in new and existing facilities, grants programs, and other activities that would optimally implement the Survey recommendations and achieve the goals of the Geospace Section (See: AGS Draft Goals and Objectives, including NRC/BASC Review, 2014; and GEO/Advisory Committee's "Dynamic Earth: GEO Imperatives & Frontiers 2015-2020")

*Recommendations should encompass not only observational capabilities, but also theoretical, computational, and laboratory capabilities, as well as capabilities in research support, workforce, and education.*

*Recommendations may include closure or divestment of some facilities, as well as termination of programs and other activities, and/or new investments enabled as a result. The overall portfolio must fit within the budgetary constraints provided to the Committee (flat in 2015 dollars).*

*All GS-funded activities should be considered together with the Survey recommendations.*

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## Guiding Principles for PR Recommendations

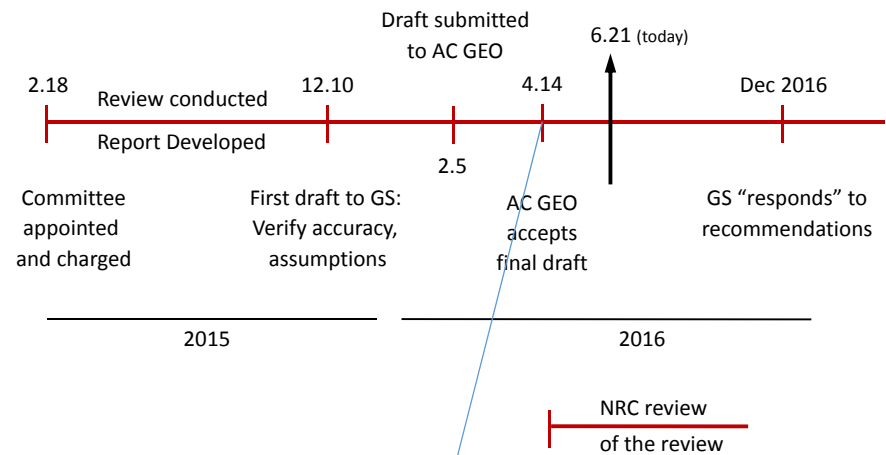
- Enable discoveries that transform our understanding of geospace
- Align GS investments with DS science goals and GS goals
- Achieve balance across the entire portfolio of activities
- *Maintain flexibility in adapting to new capabilities*
- Leverage GS investments
- Value peer-reviewed competition
- Promote open access to data and data standards
- Provide excellent training and career opportunities
- Inspire and inform public interest
- Promote transparency

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GS PR Overview

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## Timeline



[www.nsf.gov/geo/adgeo/geospace-review/geospace-portfolio-review-final-rpt-2016.pdf](http://www.nsf.gov/geo/adgeo/geospace-review/geospace-portfolio-review-final-rpt-2016.pdf)

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GS PR Overview

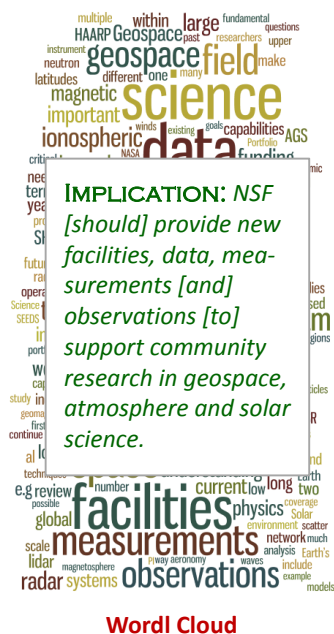
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## Community Input

- Solicitation for email comments: 47 written responses (62 signatories) spanning all GS program elements.
- Each committee member was asked to read all email responses
- 3 Town Halls (CEDAR, GEM, SHINE)
- Many verbal comments received

## 4 Broad Themes

- GS management and process (11)
- Programmatics other than facilities (13)
- Existing facilities, observatories and infrastructure (19)
- New facilities, observatories and infrastructure (17).



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## DS Recommendations for NSF Implementation

- Support existing ground-based facilities and complete programs in advanced stages of implementation: **Status quo \$43.6M per year**
- Maintain and grow basic research programs at NSF (and at NASA, AFOSR and ONR) for a more effective transition from basic research to space weather forecasting applications: **\$1M? per year**
- DKIST base funding for M & O, data analysis/service, development of advanced instrumentation: **GS –AST coordination**
- Data exploitation and systems: **\$0.5M? per year**
- Midscale project line for SSP @\$4-30M: **up to \$6M? per year for 5 years**
- Cubesats: \$2.5M per year @ NSF ⇒ augmentation **of \$1M per year**
- International collaborations, e.g., EISCAT 3D: **\$1M? per year**
- Grand Challenge Research (HSCs): NSF contribution at **\$2M? per year**
- Education: Continue FDSS | Develop curriculum program | FDSS for 4-year colleges | Continue summer schools **\$\$??**

DRIVE →

## DS Recommendations for NSF Implementation

**\$11M per year augmentation**  
⇒ **25% increase**

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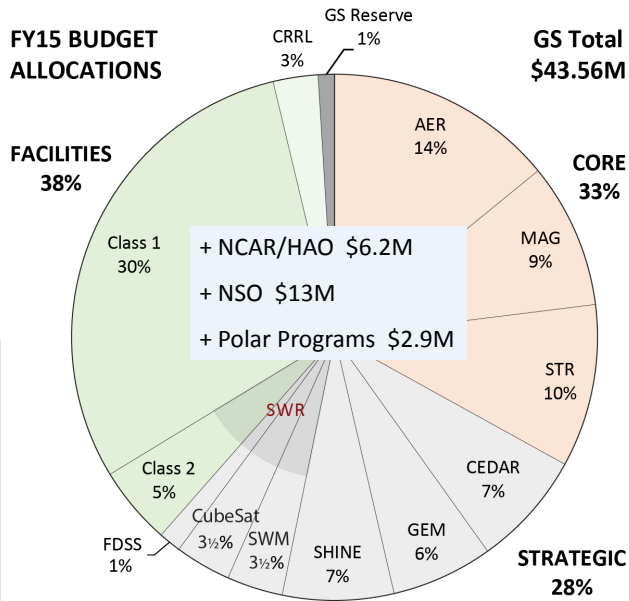
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## Key Issues for the Review

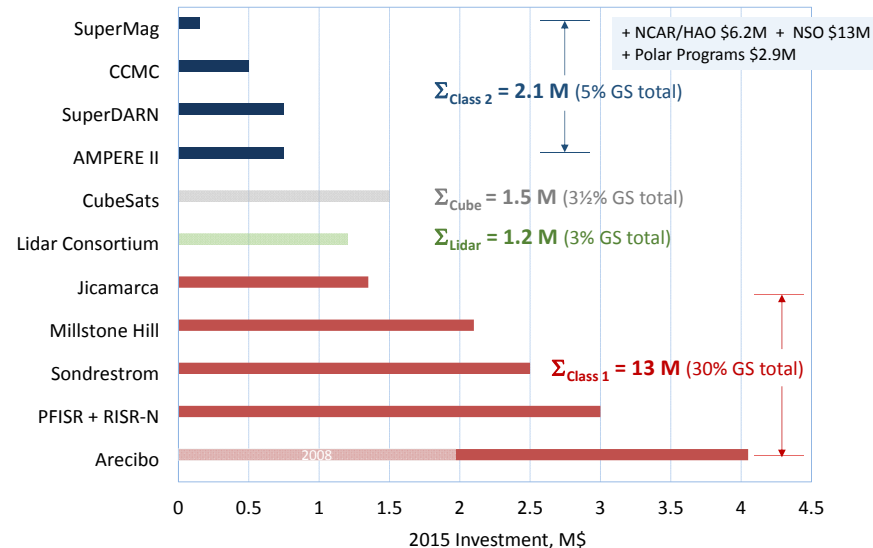
- **Status quo:** No free energy to implement DS recommendations
- **Future:** How best to accommodate increasing emphasis on cross-disciplinary, integrative and predictive geospace science?
- **Grants programs:** Reverse trend toward declining investment in grants programs and declining proposal success ... or keep as is?
- **CubeSat program:** *Scientific* value proposition *broadly* at NSF as interest and resources ramp-up at other agencies?
- **GS Facilities:** How to
  - Support upgrades w/o squeezing other programs
  - Accommodate innovation and vitality
  - Initiate a mid-scale projects line

GS Facilities	
<b>Class 1</b>	6 ISRs
<b>Class 2</b>	SuperDARN SuperMag AMPERE II CCMC

Current GS Investments	
1/3 Core	
1/3 Facilities	
1/3 Strategic	



## GS Facilities Investments (2015)



## Portfolio Recommendations

Current elements | status quo

**Core Grants Programs (AER, MAG, STR):** Maintain current budget share

**Targeted Grants Programs (CEDAR, GEM, SHINE):** Maintain current budget share out to ~2020; transition a portion of the budget thereafter to **Integrative Geospace Science (SWM, GCP) programs**

**Faculty Development in Space Sciences (FDSS):** Maintain current budget

**Space Weather Modeling (SWM) Program:** Maintain current budget to 2020; grow thereafter with reprogrammed funds from targeted grants programs

### Facilities Program:

- Maintain current budgets for 4 “Class 1” facilities (ISRs at Jicamarca, PFISR, RISR-N, Millstone Hill less Madrigal Data Center)
- Maintain current budgets for 4 “Class 2” facilities (AMPERE, SuperMag and SuperDARN and Community Coordinated Modeling Center (with NASA))

## Portfolio Recommendations

Current elements | changes

**CubeSat Program:** Reduce budget by ⅓ by 2020 (1.5M → 1M)

### Facilities Program:

- Reduce funding for **Arecibo ISR** by ¼ by 2020; ancillary instruments funded via grants programs and peer review (4.1M → 1.1M)
- Terminate funding for **Sondrestrom ISR** by 2020; remaining site instruments funded via grants programs and peer review
- **Consortium of Resonance and Rayleigh Lidars (CRRL)** to be funded via grants programs and peer review; operates as PI-led project rather than community facility

Reprogram funding to 5 new program elements by 2020

- **Grand Challenge Projects:** *Element of Integrative Geospace Science (IGS) grants program together with SWM*
- **Data Systems:** *Facilit(ies) to exploit emerging information technologies for integrated software and data analysis tools, geospace data mining and data assimilation. Peer-reviewed projects receiving support from this program are expected to become Class 2 facilities by 2025*
- **Distributed Arrays for Scientific Instruments (DASI):** *Development of distributed measurement systems. Peer-reviewed projects receiving support from this program are expected to become Class 2 facilities by 2025*
- **Innovation and Vitality:** *Peer-reviewed grants for innovations in facilities and models and upgrades (as needed) to maintain state-of-the-art*
- **European Incoherent Scatter Scientific Association (EISCAT):** *Begin forging a partnership with the EISCAT consortium to use new EISCAT-3D capability and EISCAT-Svalbard as a replacement for Sondrestrom*

Semi-Decadal Senior Reviews

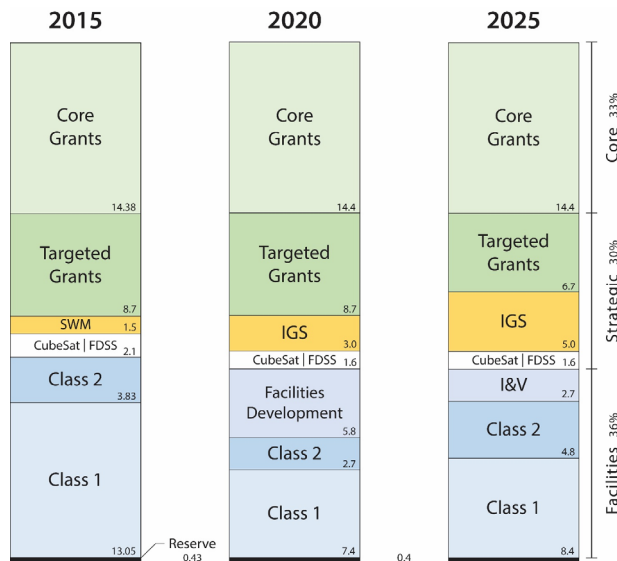
1. Grants Programs | Objectives

- Review the balance of investments in core and strategic grants programs in light of the budget and research environment at the time of the review;
- Evaluate the programs' effectiveness in achieving GS and Decadal Survey science goals; and
- In consultation with GS staff, recommend adjustments in the direction and balance of the grants programs if such adjustments would enhance the overall effectiveness of the GS Grants Programs in achieving Section and DS science goals.

2. Facilities Senior Review | Objectives

- Reconcile the GS facilities budget with the costs required to provide adequate M&O for all GS facilities and to maintain the state-of-the-art in facilities instrumentation and capabilities.
- Review and rank each facility's capabilities (i) to enable, as a standalone instrument or system, transformative scientific discoveries, and (ii) to contribute to integrative scientific understanding as a complementary element in NSF's distributed capabilities for observing geospace as a system. Capability (ii) cuts across all GS programs, so the Senior Review panel would need to draw on expertise in each of the GS core research programs.

Recommended GS Portfolio: 2020 to 2025



Reprogrammed Portfolio Elements: 2015 → 2020 → 2025

