STEM Science Activation

Presentation to the Committee on the Review of Progress toward Implementing the Decadal Survey Vision and Voyages for Planetary Sciences

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Definitions

Education.* Comprises those activities designed to enhance learning in science, technology, engineering, and mathematics (STEM) content areas using NASA's unique capabilities.

SMD STEM Science Activation: A state composed of dispositions, practices, and knowledge that enables success in proximal science, technology, engineering, art, and mathematics learning experiences

Rationale: Now that SMD has all agreements in place, we are moving from the planning phase to the doing (aka activation) phase of our program.

* Per NPD's 1380.1 and 1388.1

STEM Science Activation: Description

- SMD's unique contribution to STEM is through our content and experts, but this program does not fund "pipeline" efforts
- Description of Team Members can be viewed at: https://science.nasa.gov/stem-activation-team along with a Map of 2016 Activities: https://science.nasa.gov/learners
- Program is also supporting STEM efforts for the 2017 Total Solar Eclipse. See: https://eclipse2017.nasa.gov/
- "Macro" Measures of Success by 2020
  1. Enable STEM – Active in all 50 states
  2. Improve U.S. Scientific Literacy – Statistical Improvement of Science and Engineering Indicators 2014 by 2020.
  3. Advance National Educational Goals- e.g. supporting American Innovation and Competitiveness Act (P.L.114-329) goal achievement by 2020
  4. Leverage Through Partnerships –10% increase in partnerships from Baseline of 200
- To date, program has achieved "reach" beyond expectations…

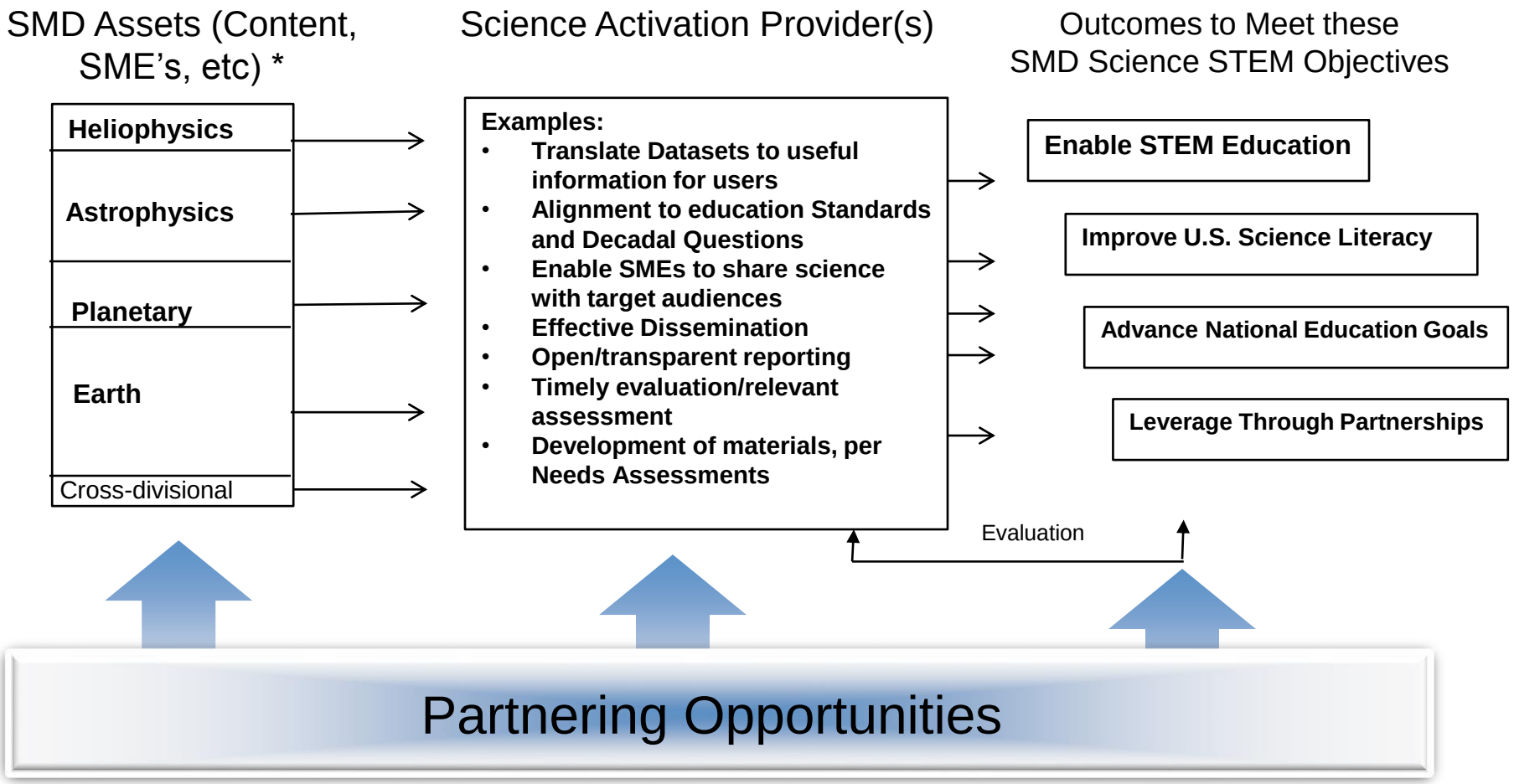
Key Features of the SMD STEM Science Activation Effort

- The SMD STEM Science Activation emphasizes NASA's unique assets to meet evidence-based audience needs in an active-learning way (not internally focused to meet NASA needs)
- Awardees cooperate with SMD *and each other* to promote understanding by major Science discipline in support of SMD's Science Education objectives/priorities

- Model relies on multiplication effect of partnerships
- Approach responds to technical and social evolution in science education environment

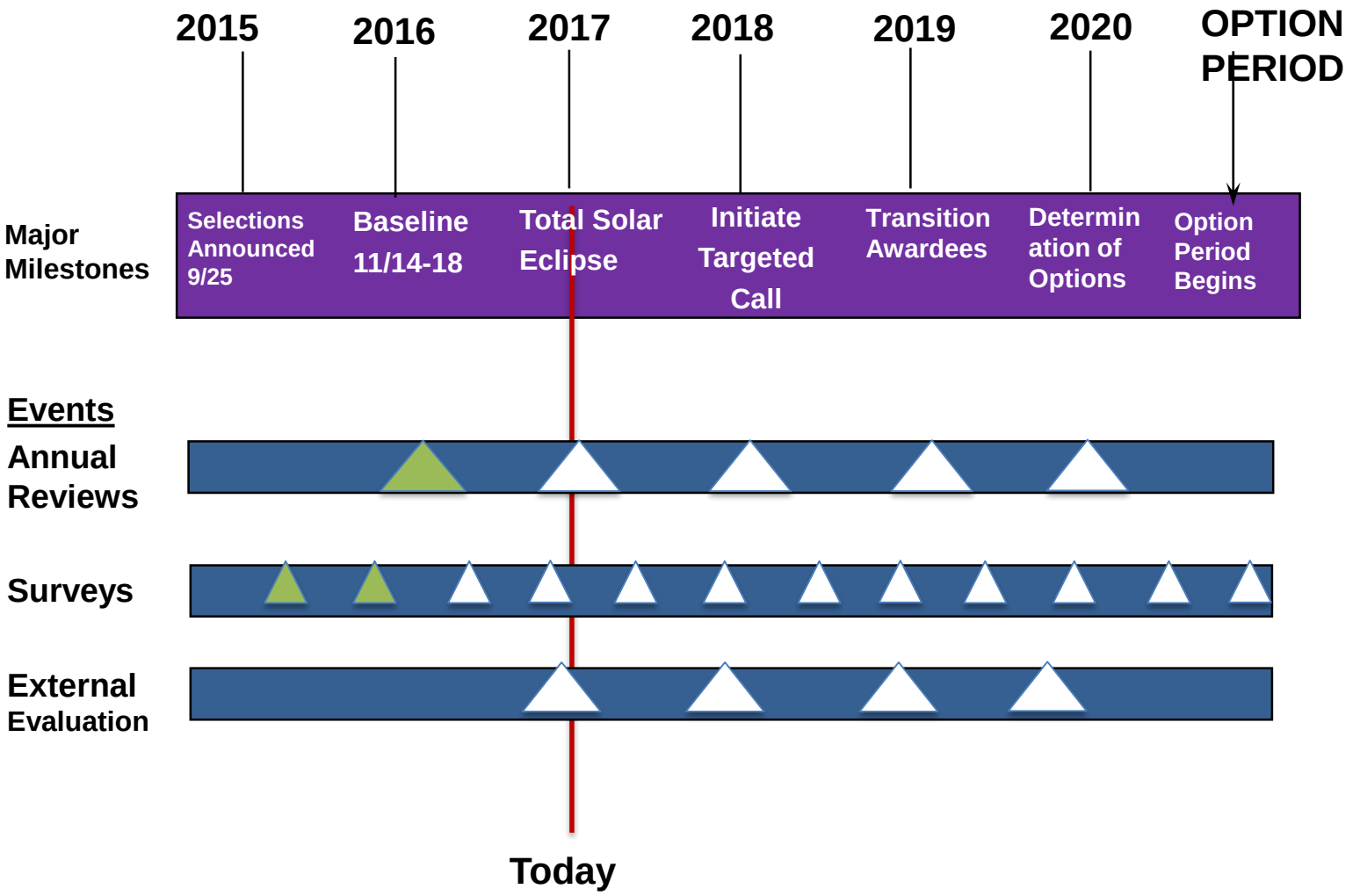
Desired Outcome - To further enable NASA science experts and content into the learning environment more effectively and efficiently with learners of all ages

SMD Science STEM Activation Model

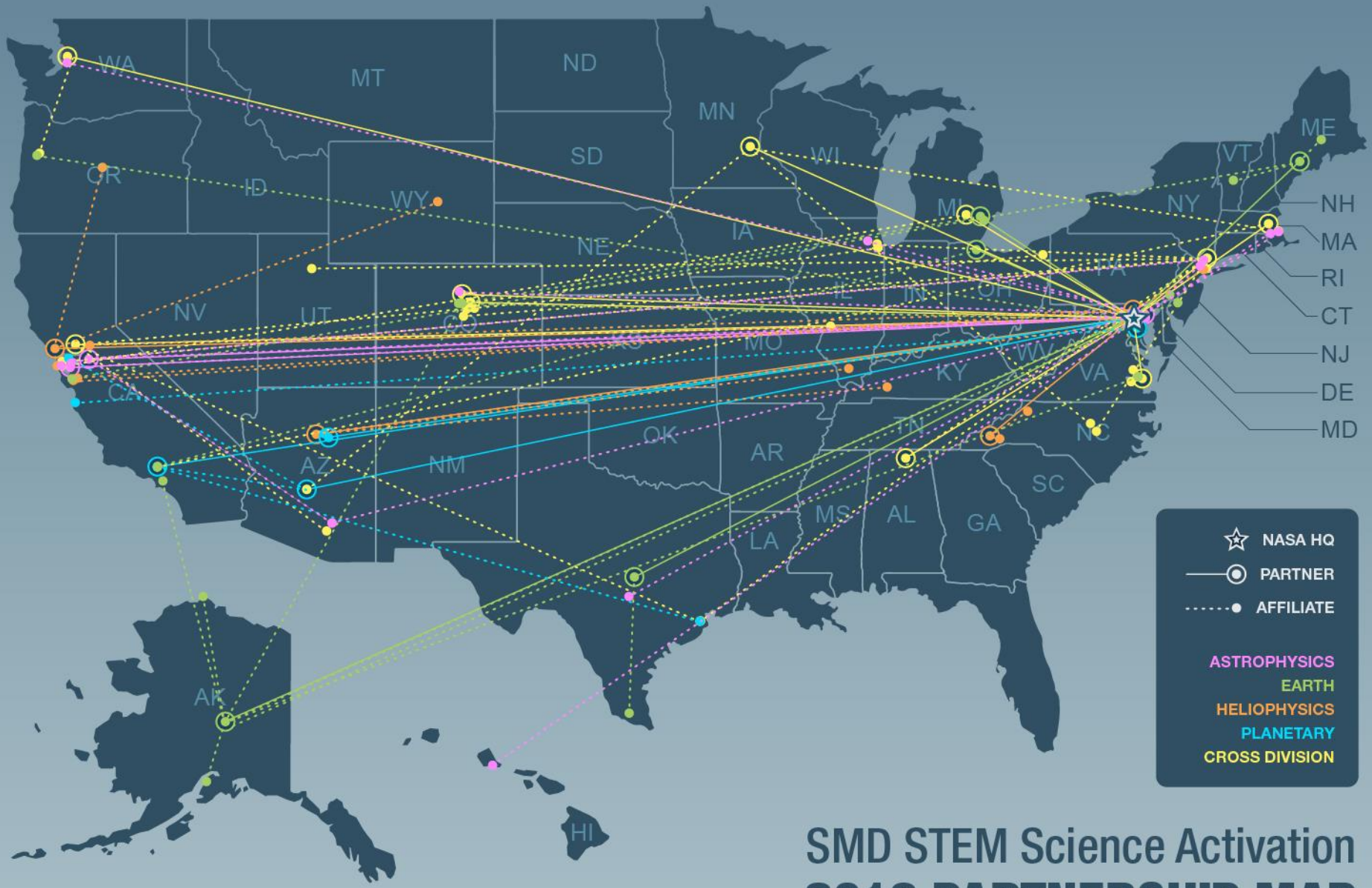


* Divisions responsible for science content datasets, Infrastructure/Tools (e.g. Eyes, GSFC Visualizations), SME selection, and enabling flight opportunities

SMD STEM Science Activation Schedule
2017 and Beyond



2016 “Reach” of Awardees



SMD STEM Science Activation
2016 PARTNERSHIP MAP

5/19/2017

In 2020, Description of Success

By 2020: Qualitative listing

- Active learners
- Deliver effective, evidence-based approaches in authentic, data-rich science experiences to meet defined audience needs
- Significant impact on target audiences with increased interest, engagement, achievement in STEM learning and interest in careers
- Reach underserved communities; helping students access resources; understanding support mechanisms and awareness of real-world STEM opportunities
- Help educators understand the value of NASA assets for learning; integrate high-quality NASA or partner-produced science content; and better prepare to support STEM learning goals and standards
- Effective cross-collaboration so that Collective is operating towards the common Desired Outcome
- Better connections between informal and formal education
- Improve science literacy through technology
- Stakeholder engagement- educators Improve citizen understanding and engagement with science and science policy; increased ability to communicate; improved data collection and interpretation skills; students/citizen scientists

Future Opportunities

- Better use of our Data
  - Strategic Approach
  - Technology intersection
    - Mobile platforms
    - Visualizations
  - Citizen Science and Crowdsourcing
  - SME Connections

Next Back- Up Charts…

SMD STEM Science Activation Program - Summary

External Evaluator(s)

Each agreement has an independent external evaluator

Overall effort will have National Academies Board on Science Education

Opportunities

- Enabling of SMD content and experts into additional areas and venues
- Improved coordination across SMD science education
- Reduction in fragmentation and duplication of efforts
- Increased support of targeted audiences based on needs assessments
- Improvement in the understanding of science literacy

Risks/Areas of Concern

- More Dynamic Education environment post ESSA
- Budget uncertainty until restructuring progress is demonstrated
- Identification of milestones to fill gaps in Formal and Underserved areas

Measurable Achievement

- Progress towards CoSTEM goals by 2020
- Statistical Improvement in applicable S&E Indicators by 2020
- Statistical improvement in scientific literacy surveys by 2020
- Budgets reflect progress towards Desired Outcome
- Active in all 50 states
- 10% increase in number of partnerships by 2020

How Are Agreements Evaluated/Managed?

- SMD Divisions have a Lead to coordinate agreements. Dr. Hakeem Oluseyi has been assigned to Planetary and Helio
- Each agreement includes a needs assessment, logic model, baseline of tasks, reporting, internal evaluation, and statement of collaborations
- The entire effort will be evaluated by external independent evaluators and other outside groups (e.g., National Science Academies' Board on Science Education)
- Monthly telecons and cross-collaboration subteams (aka topical areas of interest) Reporting through the OEd processes
- Annual review by internal and external experts occurs in November of each year to:
  - Assess performance
  - Set priorities for upcoming year
  - Effort that does not meet evaluation criteria will be transitioned out before end of performance period and/or not extended for option period
  - New effort can migrate into agreements on a existing science-discipline, or audience basis

2017 Total Solar Eclipse: By the Numbers (to date!)

- Broke all NASA records! Over 40M views of live broadcast!
- Top websites for the past 30 days per *analytics.usa.gov*
- 11 Spacecraft observing
- 1 Gulfstream–III aircraft and 2 WB-57 aircraft
- 1 International Space Station
- 50+ High Altitude Balloon Teams at *http://eclipse.stream.live*
- 240+ Airports in the Path of Totality
- 12 Zoos in the Path of Totality
- 20 National Parks in the Path of Totality
- 6800+ Libraries hosting events, 2M safe solar viewers distributed
- 290 Museums and Science centers receiving toolkits with 240 hosting events
- 234 Solar System Ambassadors supported 453 events pre-eclipse events to date with another 200 planned
- 40 Challenger Centers
- PBS Learning Media resources - over 37K engagements
- 84 GLOBE sites and over 37,000 users registered on the new GLOBE eclipse a
- 68 Citizen CATE sites
- 15 Broadcast locations (web and TV)
- 30K Boy Scout patches distributed
- 3 Girl Scout Camp sites and kits distributed to 90 Councils
- 1 US Coast Guard ship and an eclipse event planned at USS Yorktown

https://eclipse2017.nasa.gov

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