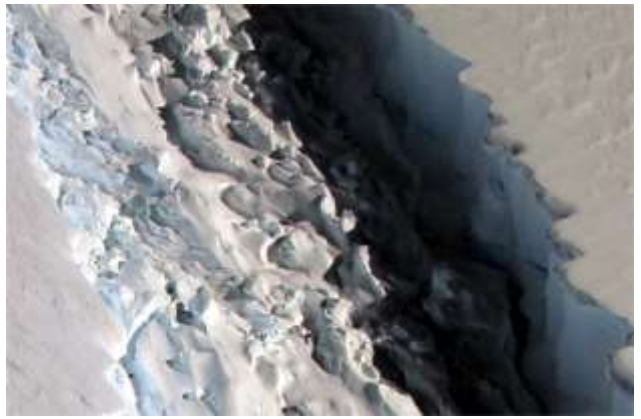
SCIENCE






Science from Satellites in Service to Society NASA's Earth Science Division

Sandra A. Cauffman

Deputy Director, Earth Science Division
Summary and augmentation by Bradley Doorn, Water Resources and Agriculture Program
(*and long-time JACIE cheerleader*)

September 18, 2018

Outline

- Appropriation/Budget Status
- Flight Program Status and Plans
- Earth Venture Opportunities and Hosted Payloads
- *Small-Satellite Constellation Data Buy Pilot*
- *Earth Science Partnerships*
- Non-Flight Program Plans/Highlights
- 2017 *Earth Science and Applications from Space* Decadal Survey

Private Sector Small-Satellite Constellation Pilot

- Pursuing contracts with three companies to buy ***existing*** data products related to ECVs, derived from private sector-funded small-satellite ***constellations*** (3-satellite minimum constellation, full longitude coverage); ***for evaluation by NASA researchers to determine value*** for advancing NASA research and applications activities and objectives;
  - Planet – three satellite constellations including 200+ satellites supplying imagery and derived products over the entire Earth
  - DigitalGlobe – operates five satellite constellations that provide very high-resolution (31-50-cm) images
  - Spire – constellation of 48 satellites collecting Radio Occultation soundings and ship reports
- May provide a cost-effective means to augment and complement the suite of Earth Observations
- **Have identified a broad set of ESD-funded researchers who will be supported to *assess the value of the geophysical information in the data products for advancing NASA research and applications objectives***
  - 1 year evaluation period
  - Participants primarily chosen from existing ESD-funded community – evaluation support as budget augmentation
  - Written reports to ESD (not scientific papers)
  - Quality of geophysical information
  - Data availability (latency) and subdistribution rights vs. cost
  - Vendor plans for constellation maintenance/evolution
- Attempting to make awards ASAP

Earth Science Partnerships

Harnessing commercial and NGO partnerships to amplify our work to understand the Earth as an integrated system and enable societal benefit by essentially leveraging the expertise of NASA and the partners to achieve together what neither could alone.

Current Partners

CONSERVATION INTERNATIONAL

Google

MercyCorps

Microsoft

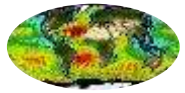
Activities

- Advancing the ability of remote sensing to inform economic valuation of ecosystem services
- Increasing the public's access to and use of Earth observations to explore our planet
- Integrating Earth observations into humanitarian decision making to strengthen global resilience to environmental shocks and stressors
- Supporting decision making in smart cities by integrating Earth observations into cloud-based services

NASA Earth Science Division Elements

Flight (incl. Data Systems)

Develops, launches, and operates NASA's fleet of Earth-observing satellites, instruments, and aircraft. Manages data systems to make data and information products freely and openly available.

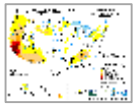


Research & Analysis

Supports integrative research that advances knowledge of the Earth as a system. Six focus areas plus field campaigns, modeling, and scientific computing.

Technology

Develops and demonstrates technologies for future satellite and airborne missions: Instruments, Information Systems, Components, InSpace Validation (cubesat and small-sat form factors).

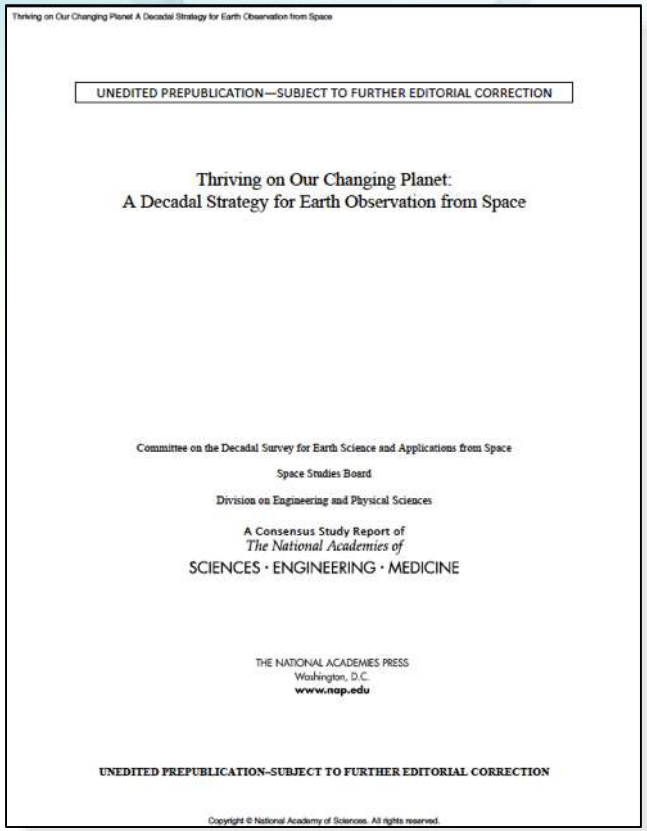


Applied Sciences

Develops, tests, and supports innovative uses of Earth observations and scientific knowledge to inform private and public sector planning, decisions, and actions. Activities include disaster response support and capacity building.

2017 Decadal Survey Snapshot

2017 DECADAL SURVEY


Thriving on Our Changing Planet A Decadal Strategy for Earth Observation from Space

UNEDITED PREPUBLICATION—SUBJECT TO FURTHER EDITORIAL CORRECTION

Thriving on Our Changing Planet:
A Decadal Strategy for Earth Observation from Space

Committee on the Decadal Survey for Earth Science and Applications from Space

Space Studies Board

Division on Engineering and Physical Sciences

A Consensus Study Report of
The National Academies of
SCIENCES · ENGINEERING · MEDICINE

THE NATIONAL ACADEMIES PRESS
Washington, D.C.
www.nap.edu

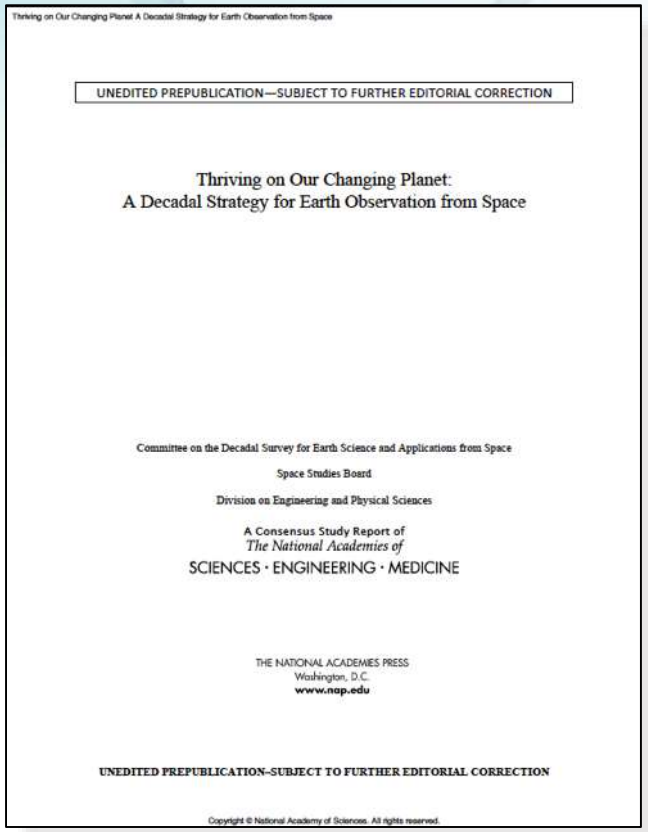
UNEDITED PREPUBLICATION–SUBJECT TO FURTHER EDITORIAL CORRECTION

Copyright © National Academy of Sciences. All rights reserved.

- Publicly released January 5, 2018
- Supports the ESD (and international) *Program of Record*
- Prioritizes *observations* rather than specific missions
- Emphasis on *competition* as cost-control method
- Explicitly allows *implementation flexibility*
- Explicitly encourages *international partnerships*
- Endorses *existing balances* in ESD portfolio

2017 Decadal Survey Snapshot (cont.)

2017 DECADAL SURVEY


Thriving on Our Changing Planet A Decadal Strategy for Earth Observation from Space

UNEDITED PREPUBLICATION—SUBJECT TO FURTHER EDITORIAL CORRECTION

Thriving on Our Changing Planet:
A Decadal Strategy for Earth Observation from Space

Committee on the Decadal Survey for Earth Science and Applications from Space

Space Studies Board

Division on Engineering and Physical Sciences

A Consensus Study Report of
The National Academies of
SCIENCES · ENGINEERING · MEDICINE

THE NATIONAL ACADEMIES PRESS
Washington, D.C.
www.nap.edu

UNEDITED PREPUBLICATION–SUBJECT TO FURTHER EDITORIAL CORRECTION

Copyright © National Academy of Sciences. All rights reserved.

- Recommends "Continuity Measurement" strand ($150M full mission cost "cap") as an addition to the existing Venture-class program
- Identifies 5 "Designated" observables for mandatory acquisition (*Aerosols; Clouds, Convection, & Precipitation; Mass Change*; *Surface Biology & Geology; Surface Deformation & Change)*
- Calls for "cost-capping" essentially all missions
- Introduces a new competed "Explorer" flight line with $350M cost constraint, 3 observables to be chosen by ESD from among 6 identified
- Calls for "Incubator Program" between Technology, R&A, and Flight to mature specific technologies for important – but presently immature – measurements (preparation for next Decadal)
- ***ESD is conducting focused community forums (for ~18 months) to translate the recommendations into an executable program and, for Flight, a portfolio of specific, realistic, launch-ordered missions and solicitations.***
    - Decadal new mission budget wedge opens only in late FY21

Applied Sciences Program: Selected Highlights–2018

Disasters

ROSES call for applications focused on a few disaster types – flood, hurricane, earthquake.

Water Resources

Call to support water resources management. Two-step process planned.

Sustainable Development Goals

Earth science call for applications and research on SDG 14 (oceans) and SDG 15 (life on land).

Food Security and Agriculture Consortium

New effort led by UMd to advance uses of Earth obs for humanitarian pursuits, economic growth, and resilience in food systems in U.S. and globally.

Impact Assessments

VALUABLES Consortium conducting economic studies on Earth science; also arranging venues for Earth scientists wanting to learn about policy and economic terms/methods.

SERVIR

New Amazonia regional hub for South America is planned to open in Spring.

DEVELOP

2018 marks the 20th year for this development, workforce & Earth science applications program.

ARSET Trainings

Over 15 professional-level hands-on and webinar trainings on remote sensing to reach people across all 50 U.S. States again in 2018.

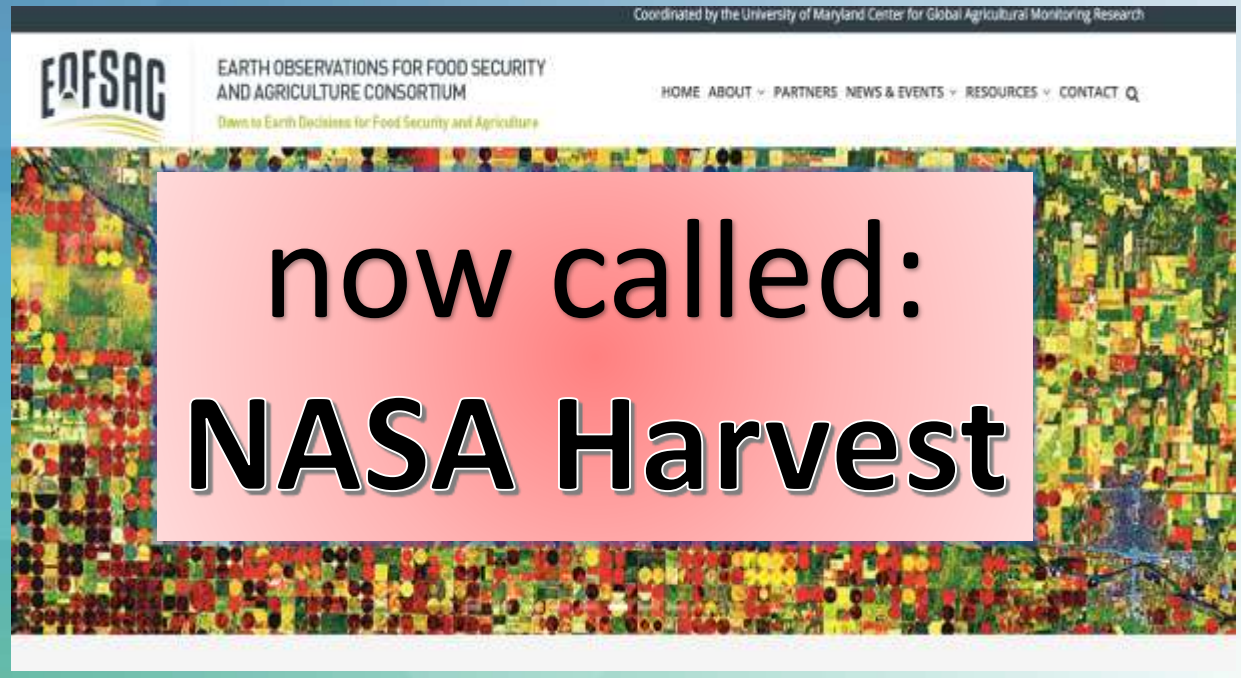
Applied Science Program Solicitations

Most solicitations encourage (actually are seeking) innovative data integration solutions:

Excerpt from ROSES 2018 A.36

……This section should also include any non-NASA data sets that are expected to play an important role in the applications (e.g., commercial satellite data, ground (in situ) sensors, specific geospatial datasets, etc.)…..

Water Resources and Agriculture Program Initiatives



https://wwao.jpl.nasa.gov

http://www.eofsac.org

QUESTIONS?

Needed more than ever!!