The Satellite Needs Working Group (SNWG) and NASA's SNWG Management Office at IMPACT

LANCE UWG / May 3, 2022

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What is the Satellite Needs Working Group?

- Through the White House National Science and Technology Council's U.S. Group on Earth Observations (USGEO), the Satellite Needs Working Group (SNWG) partners with Federal agencies to identify high-priority sustained and unmet needs for satellite Earth observations. The SNWG conducts a biennial survey to formally document and communicate satellite Earth-observing needs to NASA and other space-based Earth observation providers.

- NASA conducts a detailed assessment of needs identified in the surveys and responds to each, also deriving and proposing potential solutions to multiple high-priority needs.

- Solutions with budget are presented to OSTP and OMB and carried as a proposal for congressional funding in the President's budget. If funded, Solutions move from formulation and implementation to operations.

- SNWG Cycles: 2016, 2018, 2020, & **upcoming 2022 with survey release set to Kick-off on June 1!**

IMPACT Overview and SNWG Role

IMPACT Project Description:
The Interagency Implementation and Advanced Concepts Team (IMPACT) supports the Earth Science Data System (ESDS) Program's goal of overseeing the lifecycle of Earth science data to maximize the scientific return of NASA's missions and experiments for research and applied scientists, decision makers, and the society at large.

Role:

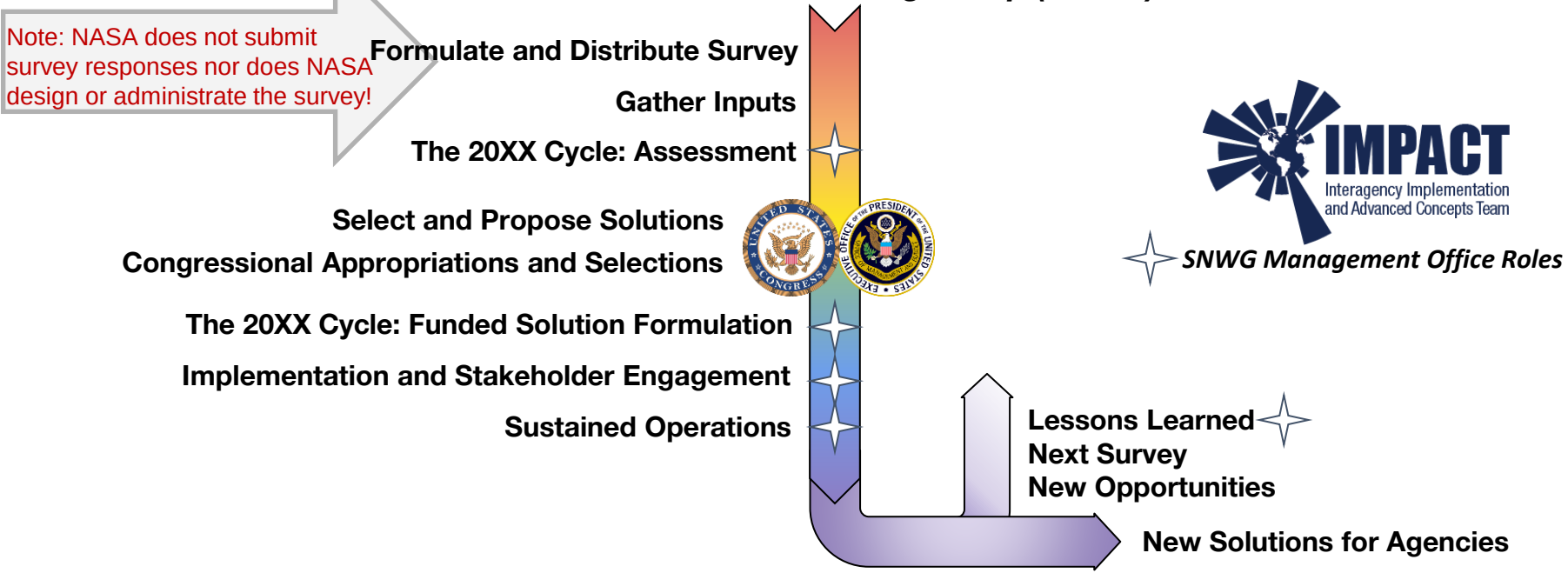
- *Manage Interagency Implementations* - assist other agencies in incorporating NASA Earth observation data into their workflows
- *Assess and Evaluate Operational Capabilities* - provide technical and operational expertise to support airborne data management and stewardship
- *Develop Advanced Concepts* - provide strategic, technical, and management expertise for rapid prototyping, development, and testing of advanced concepts

IMPACT's role has been **expanded** to instantiate the SNWG Management Office. The management office supports all phases of the SNWG lifecycle, implements data production efficiencies, streamlines processes, and supports requesting agencies through training and by verifying solution satisfaction in operations. The SNWG Management Office is a natural extension of IMPACT's vision and capabilities, as well as current and past work.

SNWG Authority and Lifecycle

White House National Science and Technology Council
U.S. Group on Earth Observations (USGEO)
Satellite Needs Working Group (SNWG)

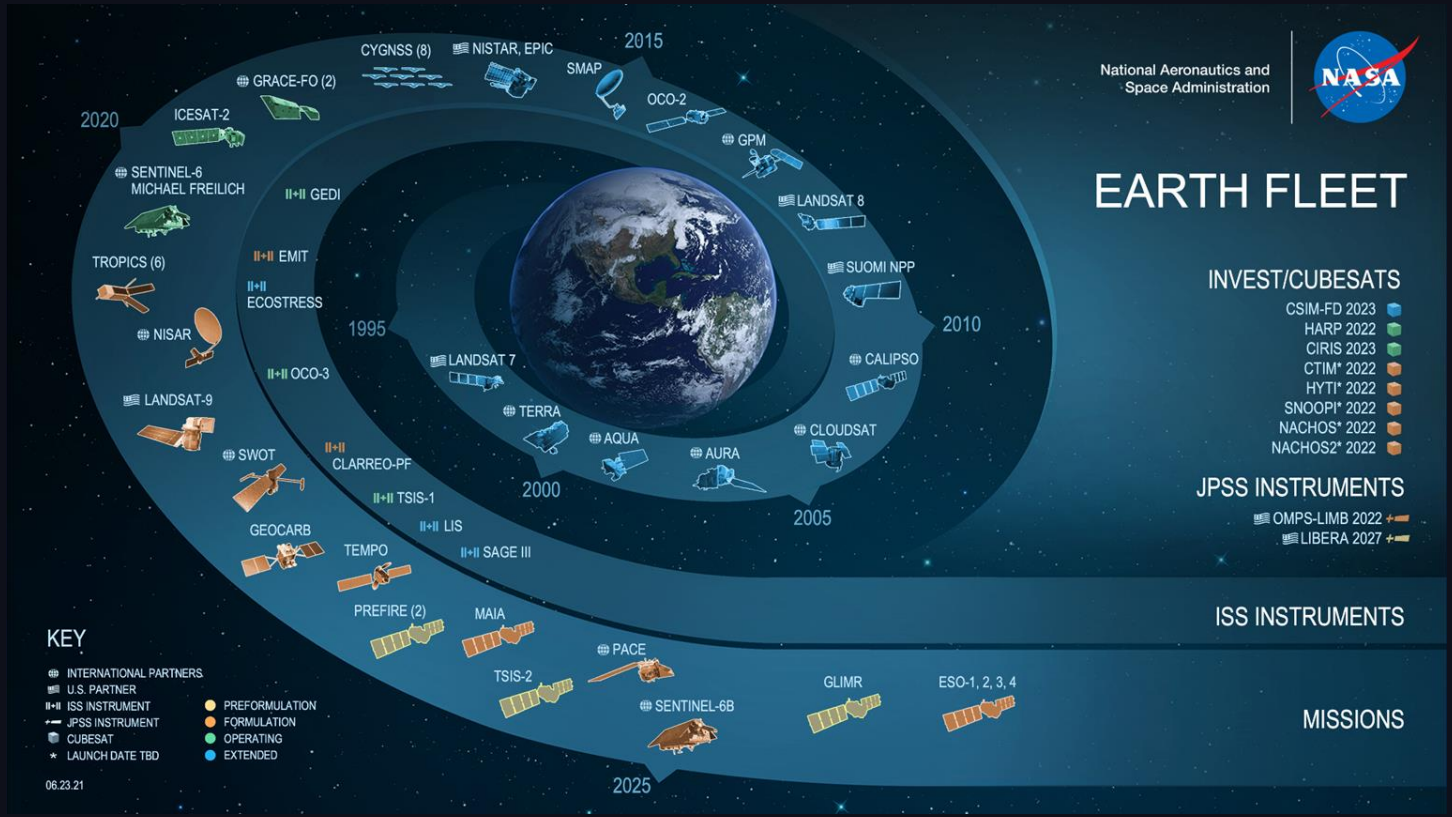
Note: NASA does not submit survey responses nor does NASA design or administrate the survey!



IMPACT
Interagency Implementation and Advanced Concepts Team

SNWG Management Office Roles

Missions to Measurements and SNWG Solutions



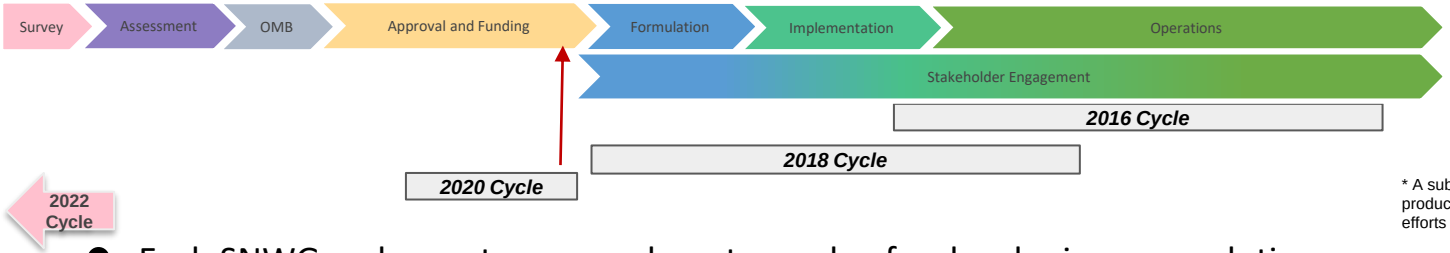
NASA's Earth Science Division and Earth Science Data Systems drive Missions to Measurements.

The *NASA* ***Satellite Needs Working Group (SNWG)*** *Team* develops ways to turn measurements into solutions for U.S. federal agencies. The ***SNWG Management Office*** *manage*s and coordinates NASA's efforts to execute SNWG activities.

Earth Science Data Information Systems (ESDIS) and Distributed Active Archive Centers (DAACs) make data products and services available to user communities.

SNWG Cycles Overlap

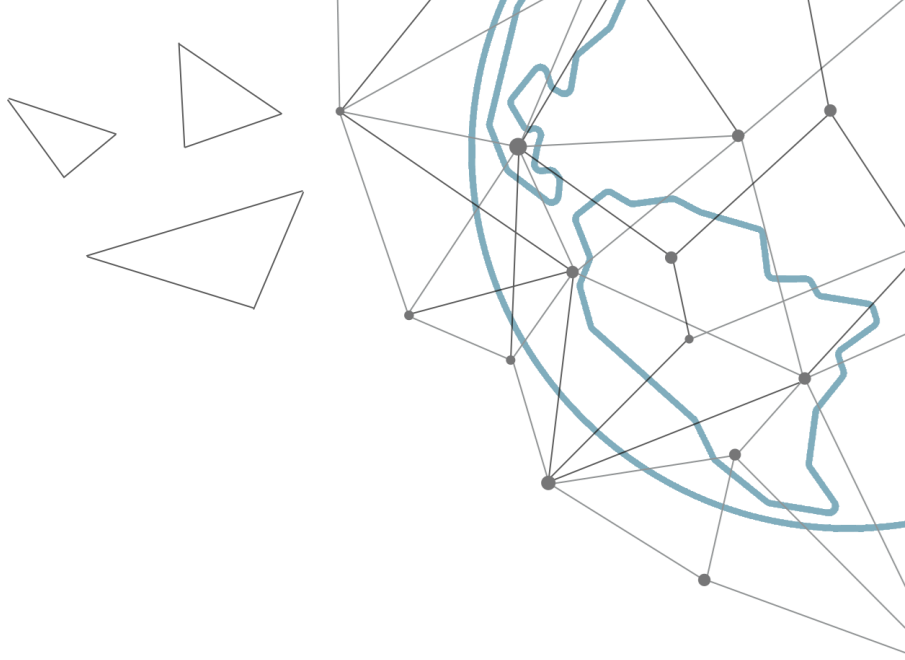
Cycle	Surveys Received	Survey Assessment	Propose Solutions	Approval	Formulation	Implementation	Operations
2016	75		5	5		1	4
2018	80		9	9	3	4.5*	1.5*
2020	▲123 50%	71 NASA participants	^14	TBA 05/2022			
2022	*TBD Sep 2022*						



- Each SNWG cycle creates a new, long-term plan for developing new solutions, their technical implementation, and support for routine operations.
- Overlapping cycles require a complex and growing project management plan.
  - Some project implementation and operations have been incorporated into IMPACT/SNWG operations, others in collaboration with Centers/JPL
- Each cycle, SNWG-MO provides value to NASA/ESD and the larger SNWG effort by improving processes and adding new efficiencies.

* A subset of Quick Look products from ICESat-2 SNWG efforts are now operational

^ 9 solutions were proposed for funding, 1 solution NASA incorporated into existing plans, and 4 commercial solution activities were folded into activities already part of the CSDA Program. NASA HQ will announce the OMB direction for 2020 solutions in May 2022!



SNWG-2016 and SNWG-2018

Status of SNWG-2016 and SNWG-2018 Activities

Formulation → Implementation → Operational

SNWG-2016 Activities
Historical airborne data products
Harmonized Landsat Sentinel-2 (HLS) product
Support for Maxar products
Additional NISAR downlink station
Support to agencies in accessing the requested data

SNWG-2018 Activities
Global 200m NISAR soil moisture product
Global surface water extent product
Water quality product
Land surface disturbance/change product
Land surface deformation product
Radiation & clouds – SatCORPS
Atmospheric composition using GEOS-5
* Low latency freeboard & ice thickness products over the Great Lakes
Animal tracking using ICARUS ("Internet of Animals")

* A subset of products are now operational

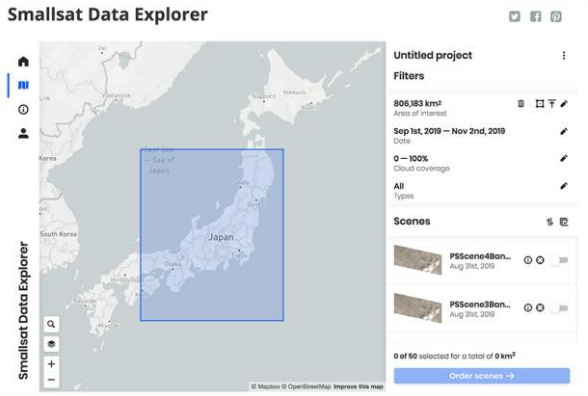
SNWG-2016 Cycle Highlights

Harmonized Landsat Sentinel-2 Data (HLS)

- Cloud migration of operational processing with tools and tutorials offered by LP DAAC.

Access to Commercial Satellite Products

- New license agreements with commercial vendors for Planet and Maxar imagery plus tools for search and acquisition of NASA holdings



Curation of Suborbital Field Campaigns

- Development of a new Catalog of Archived Suborbital Earth Science Investigations (CASEI) for uniform access to past field campaign data

SNWG-2018 Cycle Highlights

Observational Products for End-Users from Remote Sensing Analysis

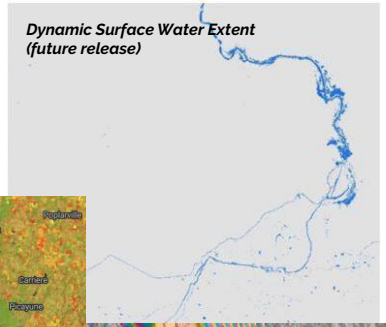
- (OPERA) will implement new products for:
  - Global surface water extent
  - Global land surface disturbance
  - Surface displacements in North America
- First Product Release in February 2023, User Workshop this Fall

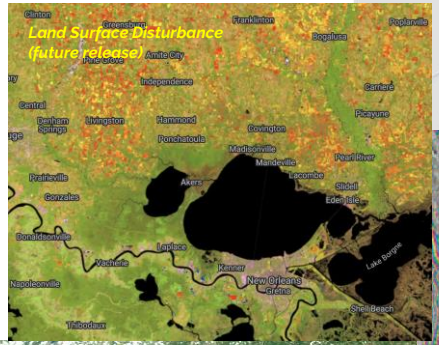
Water Quality Products from Sentinel-3

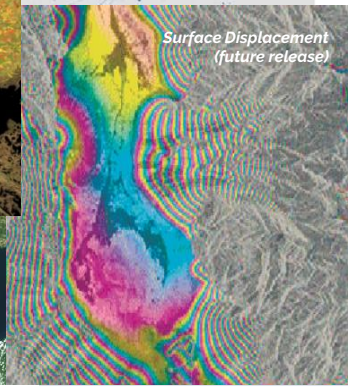
- Additional Sentinel-3 imagery and products for ocean and inland water bodies are now available and provided by LAADS DAAC

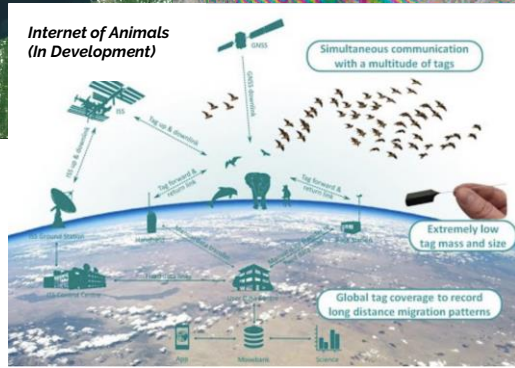
Animal Tracking via ICARUS (Internet of Animals)

- Developing concept plans for a new and improved ability to track migratory species from space
- Understand their linkages to biodiversity as measured from remote sensing









Images of products shown are representative examples only; specific products are in formulation stages.

E.g. LANCE hosting Expedited Products from a SNWG-2018 Solution:

ICESat-2 QLs, Freeboard and Lake Ice Thickness

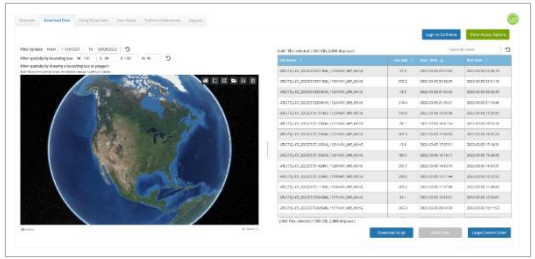
New Low Latency ICESat-2 Datasets

The five new datasets are the result of a joint effort by NASA's Satellite Needs Working Group Management Office (SNWG MO), ICESat-2 team, and Land, Atmosphere Near real-time Capability for EOS (LANCE).

Dr. Andrew Molthan, NASA SNWG MO Project Scientist and SNWG Stakeholder Engagement Program (SEP) Lead

Five new datasets developed from Ice, Cloud, and land Elevation Satellite-2 (ICESat-2) data provide sea ice, water extent, and vegetation information approximately 72 hours after a satellite observation. Development of these quick look (QL) datasets was a joint effort by NASA's Satellite Needs Working Group Management Office (SNWG MO) and the ICESat-2 team in collaboration with NASA's Land, Atmosphere Near real-time Capability for EOS (LANCE).

The datasets are derived from existing ICESat-2 Level 3 standard datasets and designated with the QL suffix. The datasets are sea ice height (ATL07QL), land and vegetation height (ATL08QL), atmospheric layer characteristics (ATL09QL), sea ice freeboard (ATL10QL), and inland surface water (ATL13QL). The new datasets are available through NASA's National Snow and Ice Data Center Distributed Active Archive Center (NSIDC DAAC, which archives and distributes ICESat-2 data), discoverable through LANCE, and supported by the SNWG Stakeholder Engagement Program (SEP).



NSIDC DAAC Sea Ice Height Quick Look (ATL07QT) dataset download page. ICESat-2 QL datasets also can be accessed through the SNWG Stakeholder Engagement Program (SEP) page and through LANCE. Credit: NSIDC DAAC; accessed 03-08-2022.

New Low Latency ICESat-2 Datasets | Earthdata (nasa.gov)

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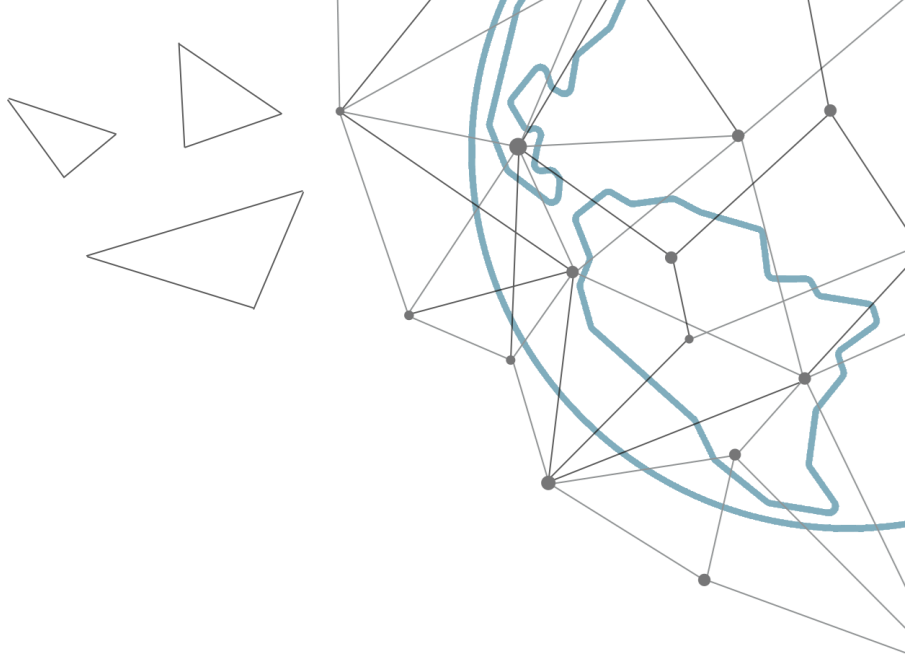


SNWG MO & Open Source Science

SNWG MO Espouses & Fosters Open Source Science policy

- **Solutions must embrace Open Source Science.** We will be building these principles into agreements with future solution teams to develop code and software in the open, move more workshops and trainings further into the open, publish with open access, and host all solution data and artifacts in the open. Work on best-effort basis with existing NASA SNWG solution teams.
- **Encourage federal agency and scientific community inputs, feedback, and collaboration throughout the SNWG Lifecycle.**
- **Dedicated Stakeholder Engagement.** Create a program and intentionally plan support for community engagements, evaluate what training and engagement resources are available throughout ESD or within solutions, and promote equitable outreach and engagement efforts for each of the SNWG solutions.

Select SNWG Training Materials Already Online

EARTHDATA
OPEN ACCESS FOR OPEN SCIENCE

IMPACT Program

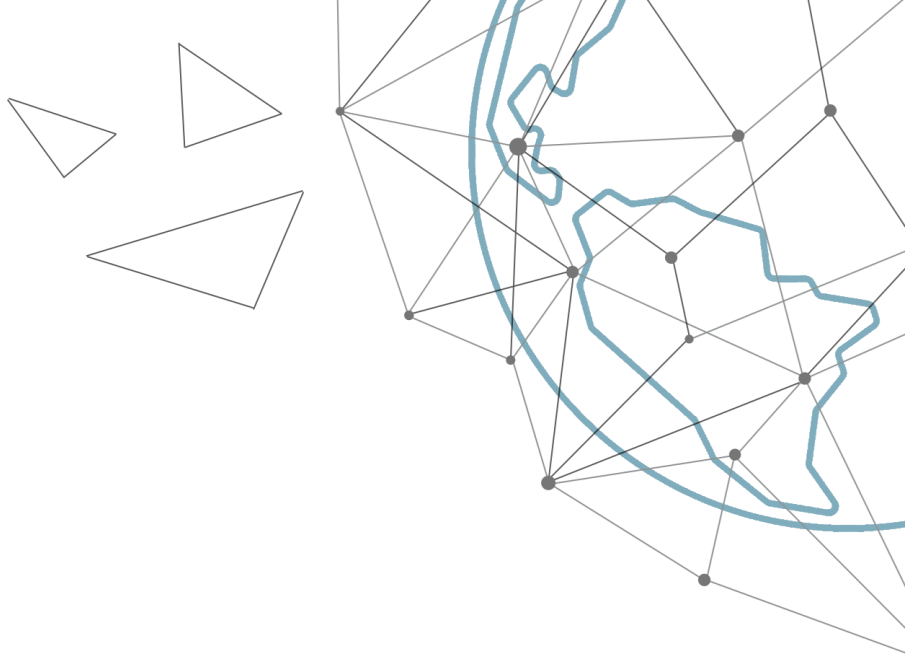
- IMPACT Overview
- The Airborne Data Management Group (ADMG)
- Algorithm Publishing Tool (APT)
- Analysis and Review of CMR (ARC)
- Data Curation for Discovery (DCD)
- Satellite Needs Working Group (SNWG)
- Stakeholder Engagement Program (SEP)

Stakeholder Engagement Program (SEP)

The Satellite Needs Working Group (SNWG) includes a Stakeholder Engagement Program (SEP) focused on supporting SNWG product user communities with relevant training and end-user engagement activities. SEP efforts include aggregation and delivery of relevant training in remote sensing topics, background on developed products, and training on how to efficiently access and utilize new products for stakeholder decision-making. Resources aggregated or provided by SEP focus on NASA and partner contributions in areas of remote sensing training, code recipes, and data processing.

Our SEP web presence continues to grow with links to new Solutions and materials and is getting an overhaul for release of new Earthdata.

Search “IMPACT SNWG SEP” or visit
https://earthdata.nasa.gov/esds/impact/snwg/sep



SNWG-2020 Status and SNWG-2022 Preparations

SNWG-2020 Submitted a Total of 123 Surveys

First-Time Participation in the SNWG Process

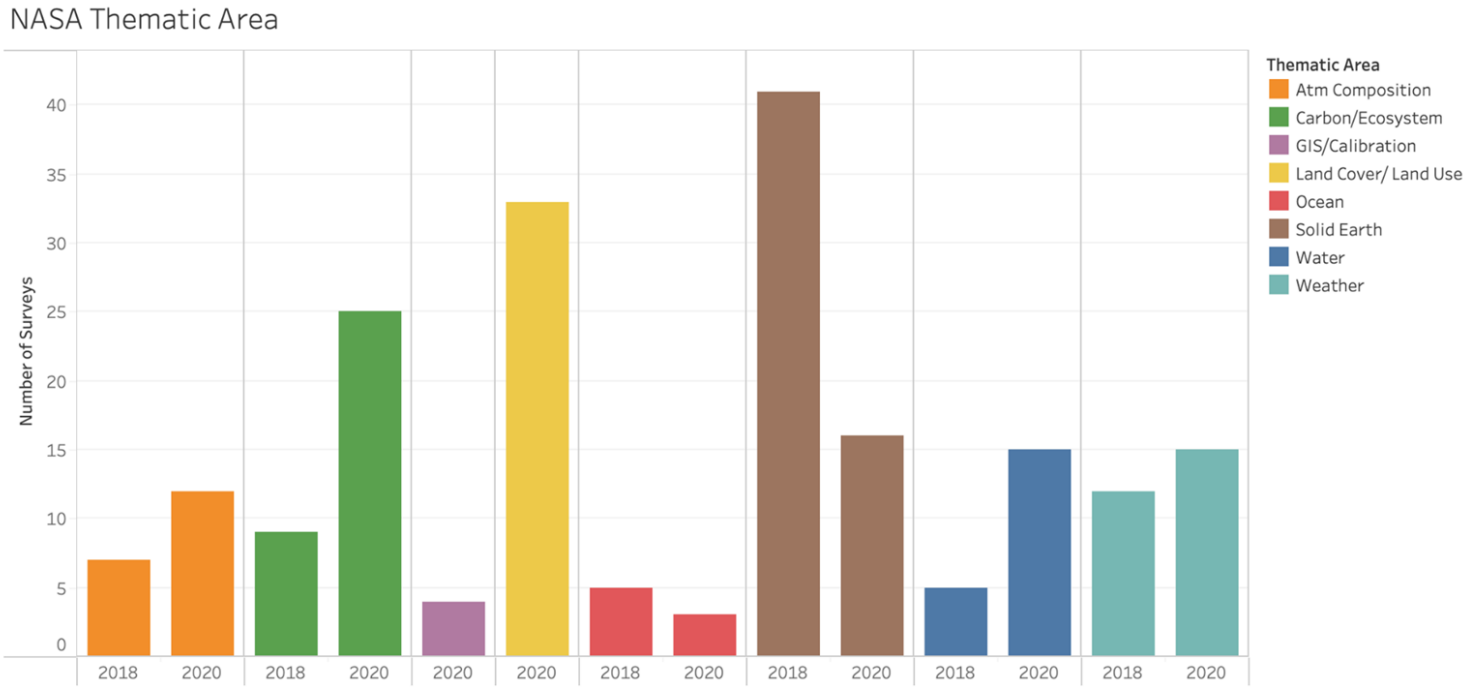
Department	Agency (23) *Agency Names are linked to their section in Presentation Mode*	No. of Submitted Surveys
Department of Energy	Office of Science (SC)	16
Department of Interior	Bureau of Land Management (BLM)	4
	Bureau of Indian Affairs (BIA)	1
	Fish and Wildlife Service (FWS)	7
	National Park Service (NPS)	4
	Office of Surface Mining Reclamation and Enforcement (OSMRE)	3
	Bureau of Land Reclamation (USBR)	6
	United States Geological Survey (USGS)	29
Department of Commerce	***National Institute of Standards and Technology (NIST)***	2
	National Oceanic and Atmospheric Administration (NOAA)	19
	United States Census Bureau (USCB)	3
Department of State	***Bureau of Oceans and International Environment and Scientific Affairs (OES)***	2
	Office of Management Policy, Rightsizing and Innovation (M/PRI)	1
Department of Homeland Security	Office of Intelligence and Analysis (OIA)	1
US Agency for International Development	USAID	1
Department of Agriculture	Agriculture Research Service (ARS)	8
	Foreign Agriculture Service (FAS)	3
	Forest Service (FS)	1
	Farm Service Agency (FSA)	1
	National Agriculture Statistics Service (NASS)	4
	Natural Resources Conservation Service (NRCS)	2
Environmental Protection Agency	Office of Air and Radiation (OAR)	3
	Office of Research and Development (ORD)	2
National Science Foundation evaluated satellite needs through a separate process		

Submissions by Thematic Area

The total number of survey submissions increased from 79 in 2018 to 123 in 2020.

Needs submitted increased in 2020 for nearly all Thematic Areas.

Land Cover/Land Use Thematic Area was added in 2020. These Needs were previously categorized in Solid Earth.



SNWG 2020 Activity Selection Process

- A total of 123 survey responses were submitted to NASA from USGEO. The Assessment Teams identified 458 potential solutions that reduced to 165 unique solutions when evaluated across the Thematic Areas with 44 that were satisfied with existing NASA solutions.
- Solutions ranged from *no reasonable solution* (i.e., new satellite/constellation) to *modify existing product*, and to *solution exists-no further work*
- Each Focus Area team identified and prioritized potential solutions
- HQ down-selected the highest priority solutions from each Focus Area, seeking cross-cutting solutions

Proposed Activities Identified in the 2020-21 Satellite Needs Working Group Analysis

ID #	Summary of Proposed Activity
# 1	TEMPO/GOES Near Real-Time and Enhanced Products
# 2	Global Harmonized Landsat Sentinel-2 Derived Vege… …Suite
# 3	Vertical Land Motion Product (VLM)
# 4	Global Evapotranspiration (G-ET) Produ…
# 5	Harmonized Surface Thermal Infr… …t (H-TIR)
# 6	Global Deformation Monito… …0 Most Active Volcanoes
# 7	Air Quality Forecast… …uated Pandora Sensors
# 8	Merged GNSS … …heric Sounder Measurements for Planetary Boundary Layer Product… …RO)
#9	Fa… …n Elevation Mosaic and Strip Products
# 10	…om Sea Surface Salinity

Announcement of OMB Direction Coming from HQ in May 2022

Solutions Featuring Commercial Data

…	Broader Access to Planet Data (License Uplift)
B	Access to DESIS Data (License Renewal)
C	Broader Access to Spire Data (License Uplift)
D	Discovery and Access to Commercial Data at NASA

SNWG-2022 Preparations

- Schedule
  - The survey will be released by USGEO on June 1, conclude in August, with surveys sent to USGEO and then to NASA in late September.
  - More time: NASA will start garnering participants earlier, adding participant workshops/training this summer, increase time for solution ideation, discussion, and prioritization, and add time for cost estimation of potential data products with ESDIS & DAACs.
- Participation
  - More participation from Center SMEs, and more inclusive of partner agencies (NOAA and USGS) and NASA ESD orgs
  - Clearly defined Roles and Responsibilities for each Milestone in the assessment process
- Process
  - Scalable- we expect an increased number of needs to be submitted for SNWG-2022
  - More meaningful interview structure
  - Well-communicated from kick-off and stable throughout the assessment
- Assessment Tools (IMPACT / SNWG MO)
  - We have added tools for workflow management, communication, final agency report generation, metrics, and connecting past proposed solutions to current cycle needs. Training and workshops on tools in late Summer 2022.

Contact info:

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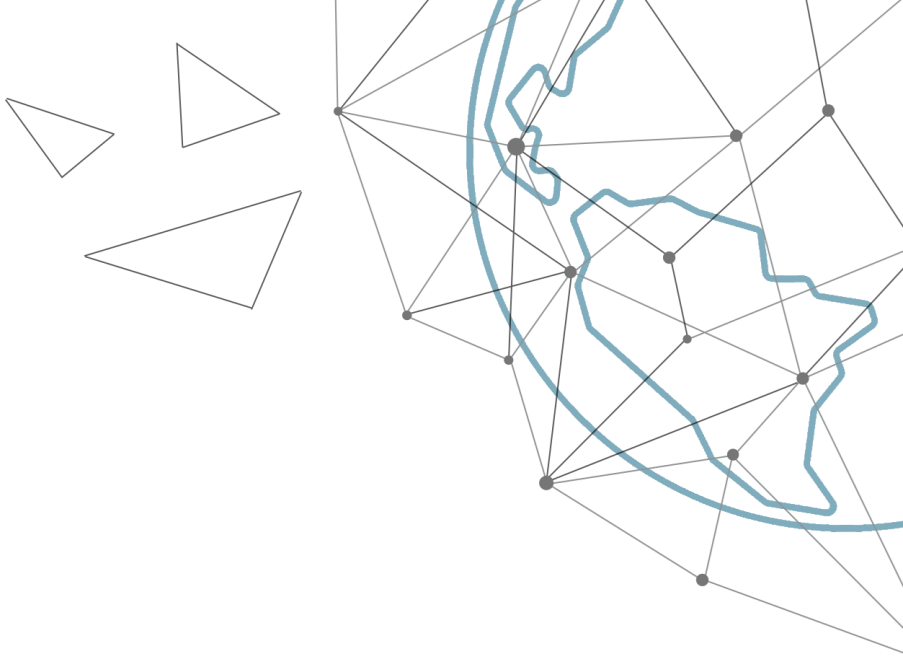
Thanks!



Back-Up

SNWG Stakeholder Engagement Program (SEP)

NASA needs input/guidance from SNWG agencies' scientists and managers throughout the formulation and implementation process to develop products that have the greatest value to requesting SNWG agencies, their stakeholders, and the broader science and applications communities.

NASA's SNWG-Stakeholder Engagement Program will:

- Request agency input throughout the solution development process in 2018, 2020,->
  - Determine parameter, resolution, data formats, accuracy, etc.
  - Identify agency datasets that can be integrated into the SNWG product cal./val. efforts, thereby providing greater scientific value
  - Targeted meetings, workshops
- Seek agency scientists to evaluate provisional products to ensure that they meet agency needs before becoming operational
- Develop and curate consistent training resources across all SNWG solutions
- Curate and leverage educational, product-specific, and data-set specific training already developed across NASA ESD to aid stakeholder adoption of SNWG solutions.

SNWG 2020 Activity Selection Process

- A total of 123 survey responses were submitted to NASA from USGEO. The Assessment Teams identified 458 potential solutions that reduced to 165 unique solutions when evaluated across the Focus Areas with 44 that were satisfied with existing NASA solutions.
- Solutions ranged from *no reasonable solution* (i.e., new satellite/constellation) to *modify existing product*, and to *solution exists-no further work*
- Each Focus Area team identified and prioritized potential solutions
- HQ down-selected the highest priority solutions from each Focus Area, seeking cross-cutting solutions based on the following principles:
  - Benefit and value to SNWG agencies
  - Number of agency needs satisfied
  - Maturity of the proposed solution
  - Projected Agency level of satisfaction with implementation
  - The solution is reasonable and can be implemented with existing data from all Earth observing systems (NASA, interagency, and international)