NASA's Science Program: Priorities and Issues

National Space Users Council Users' Advisory Group

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Three Priorities

1) Major progress is needed in Climate Science – towards regional forecast and including predictive analytics. This forces a closer integration of science and application domains. Commercial partnerships are a must.

2) Science is critical element of Artemis and international leadership, especially in presence of international competition. Must balance human and robotics approaches, do not put on collision course against each other.

3) Innovation both in technology and in overall approach is and remains critical for US leadership. Every mission needs to enhance what is possible in space.



<image><image>



NEWS FROM NASA SMD

CLIMATE AND SOCIETY

DISCOVERY, TECH

Mars Perseverance: 2 Yrs on Mars

Pandora's Cluster







NEWS FROM NASA SMD

CLIMATE AND SOCIETY



DISCOVERY, TECH



EARTH SYSTEM OBSERVATORY

INTERCONNECTED CORE MISSIONS

SURFACE BIOLOGY AND GEOLOGY

Earth Surface & Ecosystems

SURFACE DEFORMATION AND CHANGE Earth Surface Dynamics CCP

CLOUDS, CONVECTION AND PRECIPITATION Water and Energy in the Atmosphere

> AEROSOLS Particles in the Atmosphere

MASS CHANGE Large-scale Mass Redistribution

Water: Surface and Below Surface



Commercial Data Buys: Hurricane Ian

and the second



Challenges, Issues

- Strategy is in trouble, threatening continuity of key data-sets in late 20s, and reducing likelihood that system can be studied as such.
- Lack of funding due to
 - Performance issues (CV19, suppliers, technical, other) with NISAR, and GeoCarb
 - Lack of ability to gain support on Capital Hill for proposed strategy
- Roles of all gov players remains unclear reducing speed to benefit user. Role of commercial data is increasing.
- As speed matters, we need to adapt more to new environment. (E.g. "Spacecraft as a service", standardized buses., or SDA-like approaches)

How Important are Climate Tipping Points

- Tipping points may be important
- What does it mean?
 - Urgency of research?
 - Translation scale and speed?





<image><image>

NEWS FROM NASA SMD

CLIMATE AND SOCIETY



DISCOVERY, TECH

The National Academies of SCIENCES - ENGINEERING - MEDICINE

CONSENSUS STUDY REPORT

The National Academics of SCIENCES - ENGINEERING - MEDICINE

CONSENSUS STUDY REPORT

Pathways to Discovery in Astronomy and Astrophysics for the 2020s

ORIGINS. WORLDS. and LIFE

A Decadal Strategy for Planetary Science & Astrobiology 2023-2032

Driving Towards Tech/Programmatic Success







Clipper with LRD 2024

Roman with LRD 2026/7

Mars Sample Return, LRDs: 2027, 2028

CLPS Deliveries 2023-2026

Delivery Site: Gruithuisen Domes Provider TBD CP-21 | 2026



Delivery Site: Mare Crisium

Delivery Site: Lacus Mortis **Provider:** Astrobotic TO2-AB Q1 2023

Delivery Site: Lunar Far Side Provider TBD CS-3 2025



Delivery Site: Reiner Gamma Provider: IM CP-11 | 2024



Provider: Intuitive Machines (IM) Task Order (TO)2-IM | Q1 2023

> **Delivery Site:** Mare Crisium **Provider:** Firefly TO19D 2024





Delivery Site: Shackleton Connecting Ridge Provider: IM TO PRIME-1 | 2023

Delivery Site: South Polar Region Provider TBD CP-22 2026

Delivery Site: Nobile Crater **Provider :** Astrobotic VIPER | Dec 2024





Delivery Site: Haworth Crater **Provider: TBD** TO19C | 2024?

Delivery Site: Schrödinger Basin Provider TBD CP-12 | 2025

Key Ingredients to Leadership

- Consistency of purpose with alignment, bi-partisan support
- Focus on entire stakeholder communities not just within NASA, but focused on commercial, international partners and eventually the science and application communities
- Drive towards new technologies and approaches each mission should enhance the space new missions are conceived in
- Keep learning from mistakes. We will make mistakes, but please (!) not the same ones
- Bring the World along for the ride to inspire the next generation of explorers

Habitable Worlds Observatory



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