PI-Led Mission Proposal Process

Space Studies Board of the National Academies

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S. Lipscy

Deputy Director

Civil Space

New Business

CIVIL SPACE -
COMPETING AND PERFORMING FOR NASA TO DELIVER SCIENCE AT ANY SCALE

NASA
Science Mission Directorate (SMD)

Helio

Flagship
- Large, once-in-a-decade missions, >$1B
- Directed from HQ to NASA centers

Other Directed Programs
- Living With a Star
- Solar Terrestrial Probes
- Instrument Opportunities
- Missions of Opportunity/ Rideshares

Explorer *
AO, PI-led, cost-capped ~$150M-$250M
- Small scale (SMEX)
- Medium scale (MIDEX)
- MoO

Operational *
- *Space weather:* NOAA pays, NASA GSFC executes; other programmatics TBD

Earth

Flagship
- Large, once-in-a-decade missions, also known as 'Designated Observables', >$1B
- Directed from HQ to NASA centers

Explorer
AO, PI-led, cost-capped ~$350M
- New Program – details TBD

Earth Venture *
AO, PI-led, cost-capped ~$30M-$125M
- *Instrument (EVI):* hosted payload, e.g. TEMPO
- *Mission (EVM):* free flyer
- *Suborbital (EVS):* Airborne or balloon
- *Continuity (EVC):* Demo of a continuity measurement

Operational
- *Weather:* NOAA pays, NASA GSFC executes, e.g. JPSS
- *Land imaging:* USGS pays, NASA GSFC executes, e.g. Landsat

Astro

Flagship
- Large, once-in-a-decade missions, >$1B
- Directed from HQ to NASA centers
- e.g. JWST
- Instruments often competed e.g. WFIRST

Probe
New Program – details TBD, ~$750M-$1B

Explorer *
AO, PI-led, cost-capped ~$125M-$250M
- Small Scale (SMEX), e.g. IXPE
- Medium scale (MIDEX), e.g. SPHEREx
- MoO, SmallSat: ~$35M, e.g. GUSTO

Planetary

Flagship
- Large, once-in-a-decade missions, >$1B
- Directed from HQ to NASA centers
- e.g. Europa Clipper
- Instruments often competed, e.g. E-THEMIS

New Frontiers
AO, PI-led, cost-capped ~$750M
- e.g. New Horizons

Discovery *
AO, PI-led, cost-capped ~$500M
- e.g. Deep Impact

SIMPLEx *
AO, PI-led, cost-capped ~$100M
- Small sats, e.g. ≤BCP100
- e.g. Lunar Trailblazer

AO	Announcement of Opportunity: Similar to a request for proposal (RFP), but for science programs
PI	Principal Investigator: A scientist from any organization who is responsible for the program
MoO	Mission of Opportunity: A smaller cost capped program attached to an AO

GO BEYOND WITH BALL.®

CIVIL SPACE -
ROSES* Customer Funded R&D Opportunities (CRAD) SUPPORTING SCIENCE AT ANY SCALE

NASA
Science Mission Directorate (SMD)

Helio

H-TIDeS, ITD: Instrument Technology Development
- TRL 1-3 → 3-4
- $300K/year, 3 years

H-TIDeS, LNAPP: Laboratory Nuclear, Atomic and Plasma Physics
- TRL 1-3 → 3-4
- $100K/year, 3 years

H-FORT, LCAS: Low Cost Access to Space
- TRL 3-4 → 5-7
- $850K/year, 3-4 years
- (post-H-TIDeS)

H-FORT, SRO: SmallSat and Rideshare Opportunities
- TRL 3-4 → 5-7
- $2.25M/year, 3-4 years
- (post H-TIDeS)

Earth

ACT: Advanced Component Technology
- TRL 2-3 → 3-4
- $500K/year, 2-3 years

IIP: Instrument Incubation, Development and Demonstration
- TRL 1-3 → 3-5
- $500K-1.5M/year, 1-3 years

AIST: Advanced Information System Technology
- TRL any → advanced
- $600K/year, 2 years

AITT: Airborne Remote Sensing Upgrades
- TRL 4-5 → 6-7
- $600K/year, 2 years
- (post-IIP)

InVEST: In-Space Validation
- TRL 5-6 → 6-7
- $2-2.8M/year, 1-3 years

Astro

APRA: Astro Research and Analysis
- TRL any → advanced
- $200-300K/year, 4-5 years

AS3: Astrophysics Science SmallSat Studies
- TRL any → advanced
- $100-150K total, 6 months
- (post-APRA)

SAT: Maturation of Strategic Technologies to Mission Readiness
- TRL 3-4 → 6-7
- $650K/year, 3 years

Planetary

PICASSO: Proof of Instrument Concepts
- TRL 1-3 → advanced
- $300K/year, 3 years

MatISSE: Advance Instruments to Mission Readiness
- TRL 4-5 → 6
- $1M/year, 3-4 years
- (post-PICASSO)

DALI: Development and Demonstration of Lunar Science Instruments
- TRL 4-5 → 6
- $1M/year, 3-4 years
- (post-PICASSO)

LSITP: Lunar Surface Instrument and Technology Payloads
- TRL 6-7 → 9
- $3M/year, 1-3 years

What is ROSES?

* Research Opportunities in Space and Earth Sciences - A NASA Research Announcement (NRA) soliciting basic and applied proposals in support of NASA's Science Mission Directorate. Each program has its own topics and due dates, though general solicitations are released yearly.

TRL: Technology Readiness Level. (Reference: NPR 7123.1B)

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Civil Space at a Glance

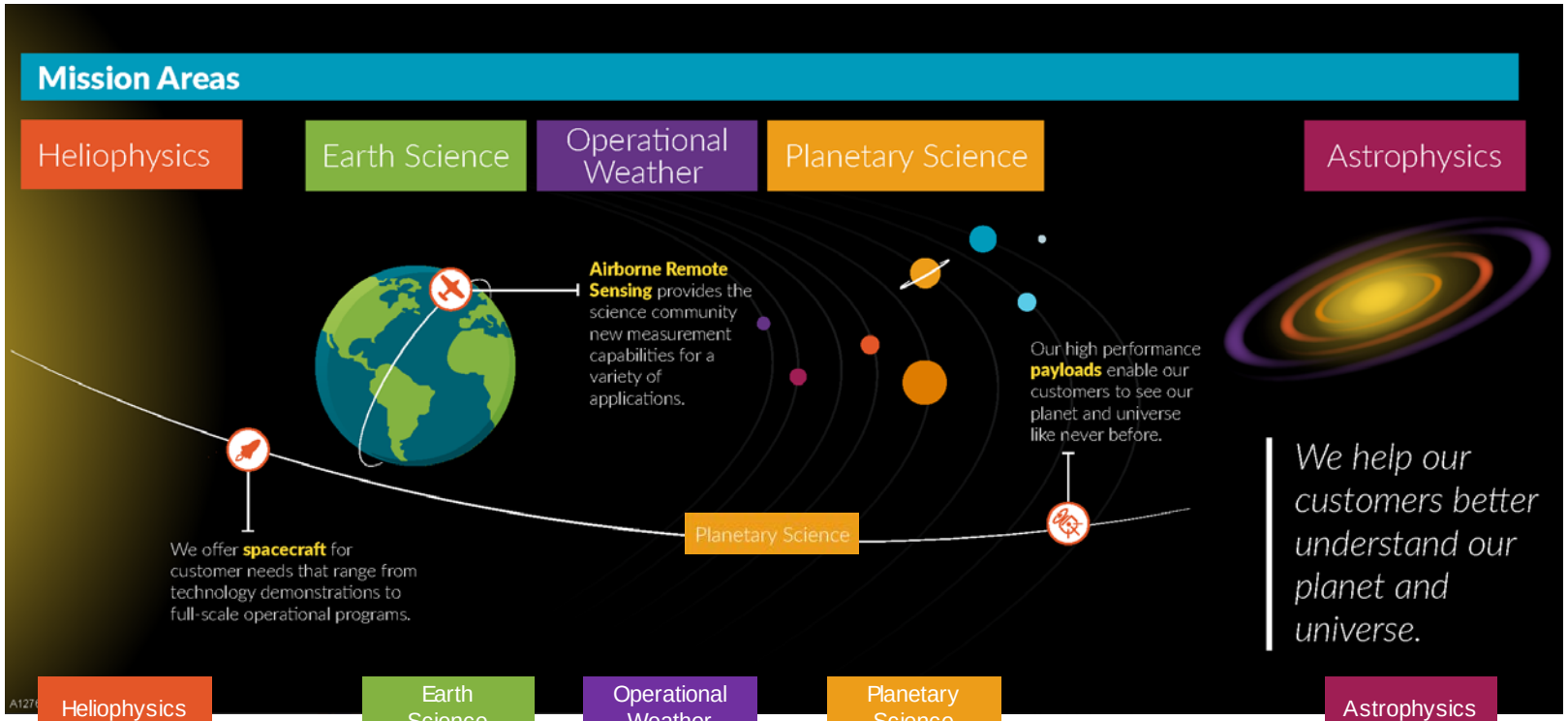
Dr. Makenzie Lystrup, VP & GM
Civil Space

Dr. Alberto Conti, Director
Civil New Business

Lisa Wood,
Director Strategic Initiatives

Cory Springer,
Director Weather & Environment

Dr Sarah Lipscy,
Deputy Director Civil New Business



Heliophysics

Dr. Nicole Duncan

Earth Science

Dr. Shelley Petroy

Operational Weather

Jessica Missun

Planetary Science

Dr. Bonnie Meinke

Astrophysics

Dr. Bonnie Meinke
(acting)

Leads for Mission Areas and primary POCs

Commentary

- Interdisciplinary science can be hard to propose
  - Stove-piped sciences
- Support PIs and their teams before they are ‘ready’
  - Diversity of acceptable backgrounds
- Emphasize diversity in engineering and management teams (not just science)
- Double-blind review process
- Demonstrate inclusivity