National Aeronautics and Space Administration

NASA Astrophysics Research & Analysis Update

Astrophysics Advisory Committee | Nov 8th, 2024

Roopesh Ojha

R&A Lead, Astrophysics Division
Science Mission Directorate

Astrophysics R&A Program Officers:

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Hannah Jang-Condell
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Mario Perez
Linda Sparke
John Wisniewski

Astrophysics by the NUMBERS

RESEARCH

~365 U.S. Science PIs Funded currently
~130 Individual Institutions Selected
~$145M Awarded Annually

TECHNOLOGY DEVELOPMENT

~$160M Invested Annually

REFEREED PUBLICATIONS

>21,361 Hubble Publications (1991-Current)
>1,745 Webb Publications (July 2022-Current)
>10,091 Chandra Publications (1999-Current)

MISSION SUMMARY

15* Missions Operating
17* Missions in Development
2 Tech. Demos
***Including international partnerships**

SMALLSATS/CUBESATS

4 Science Missions Launched
1 Mission complete
3 Operating/commissioning
1 ISS-attached Science Mission
10 Science Missions in Development
8 Free-flying CubeSats
1 ISS-attached Science Mission
1 Supporting Technology Development Project

SOUNDING ROCKETS

19 Science Missions Launched (Suborbital)
7 In Development

BALLOONS

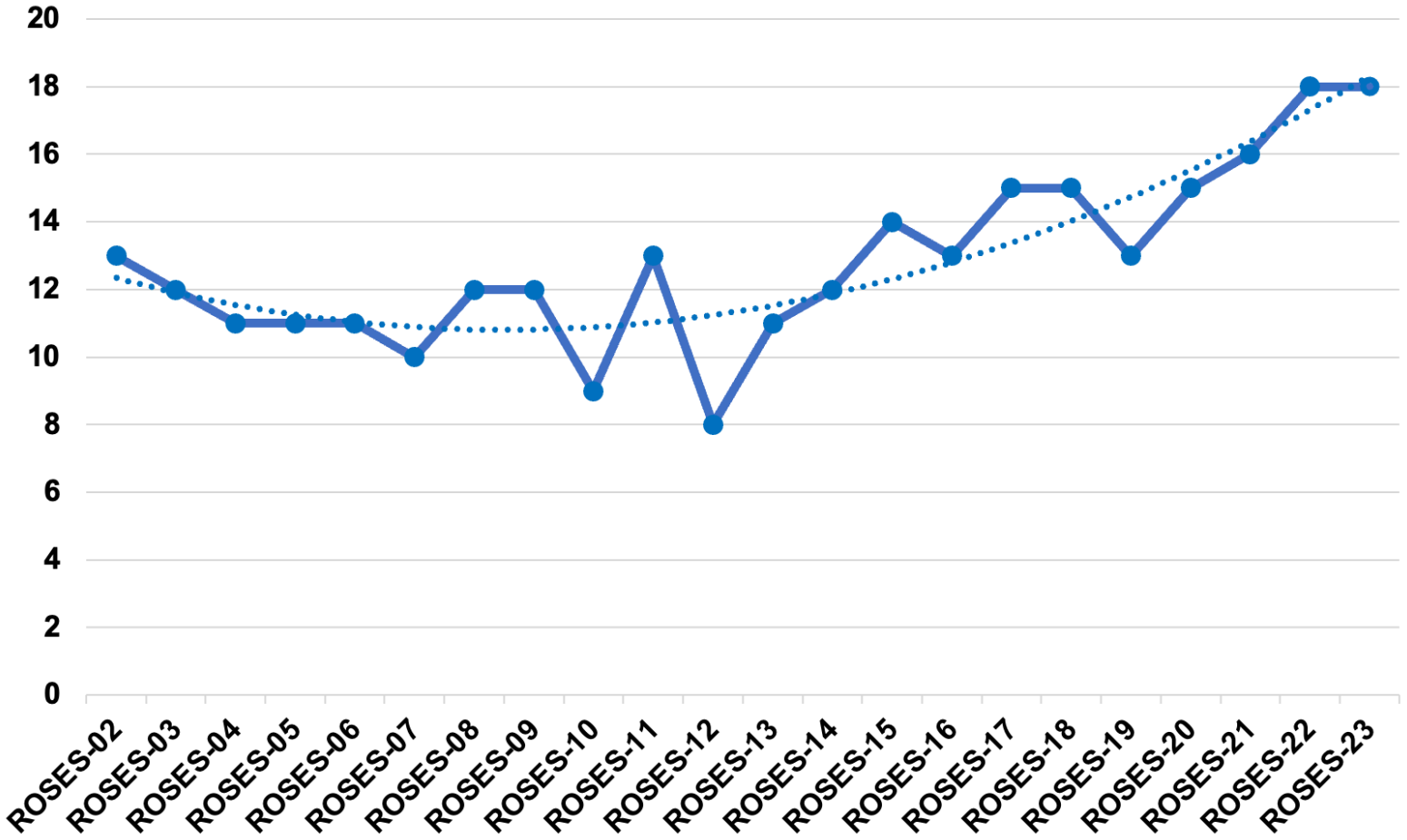
32** Suborbital Balloons Launched
***Includes APD, HPD, PSD, ESD, educational, & engineering missions*
21 Missions in Development

Astrophysics R&A FY24 Highlights

FY24 was a record-breaking year for the Astrophysics R&A Program:

- The number of ROSES Astrophysics solicitations is at an all-time high (see slide below)
- We evaluated 1,252 proposals in R&A peer reviews (ROSES programs only), 5231 proposals, including JWST, HST, and Chandra – more than ever
- Despite high proposal pressure, selection rate was 21% R&A wide
- We notified 80% of all PIs within 133 days, exceeding internal 150d/180d goals
- We disbursed ~$130M in community funding – the largest amount in APD history
- We expanded the Inclusion Plan pilot program to all (non-GO/GI) ROSES elements
- Proposals were evaluated using dual-anonymous peer reviews for most ROSES elements
- We keep reevaluating all R&A programs for better efficiencies, communication, in alignment with APD's strategic and programmatic goals.
- Highest diversity in type of funded institution
- **ADAP:** augmentation to accommodate the analysis of Euclid data

Number of Astrophysics ROSES Solicitations
(not including cross-divisional solicitations)



18 Astrophysics solicitations.

Additional Cross-divisional solicitations with Astrophysics support:

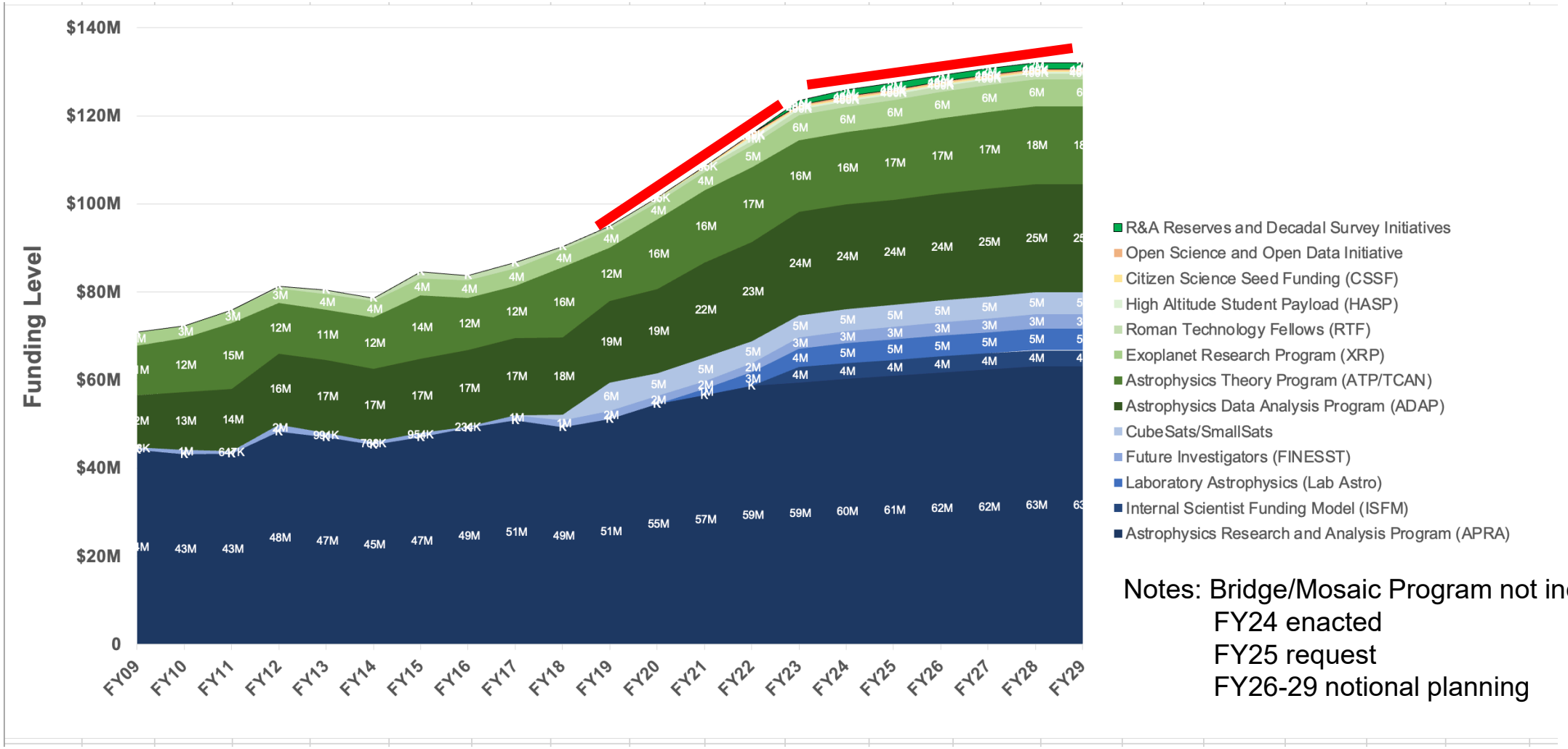
- **Topical Workshops, Symposia and Conferences (TWSC)**
- **Exoplanets Research (XRP)**
- **Citizen Science Seed Funding (CSSF)**
- **Graduate Student Research Awards (FINESST)**

NEW

- **Euclid GI Cycle 1**

Past, Current, and Notional Planning for R&A

Starting in FY23, the planned growth of R&A funding is significantly slowing down. The notional R&A funding growth is now below the projected inflation rate. Consequently, R&A selection rates will fall in future years.



Notes: Bridge/Mosaic Program not included.
FY24 enacted
FY25 request
FY26-29 notional planning

2024 Astrophysics Research Solicitations

Supporting Research and Technologies			
Astrophysics Research & Analysis	APRA	IP	
Strategic Astrophysics Technology	SAT	IP	
Theoretical and Computational Astrophys. Networks	TCAN	IP	
Nancy Grace Roman Technology Fellowships	RTF		

Data Analysis			
Astrophysics Data Analysis	ADAP		DAPR
Fermi, Swift, NuSTAR, NICER, TESS, IXPE, XRISM	GO/GI		DAPR
Euclid	GI		DAPR

Mission Science and Instrumentation			
Astrophysics Pioneers (suborbital science)	Pioneers		DAPR
Suborbital payloads solicited through APRA	APRA	IP	
Roman Research and Opportunities	Roman	IP	DAPR
LISA Preparatory Science (last solicited in 2022)	LPS	IP	
HWO Maturation (only for-profit organizations)			

Solicited Separately			
JWST, Hubble, Chandra GO/GI/Archive/Theory programs	GO/GI		DAPR
NASA Hubble Fellowship Program	NHFP		
NASA Postdoctoral Program	NPP		
Support for XMM-Newton U.S. PIs (selected by ESA)	XMM GO		

Not Solicited in ROSES-23			
Astrophysics Theory Program (every other year, alternating with TCAN)	ATP	IP	DAPR

Cross Divisional			
Exoplanets Research Program	XRP		DAPR
Topical Workshops, Symposia and Conferences	TWSC		
Citizen Science Seed Funding Program	CSSFP		
Graduate Student Research Awards	FINESST		

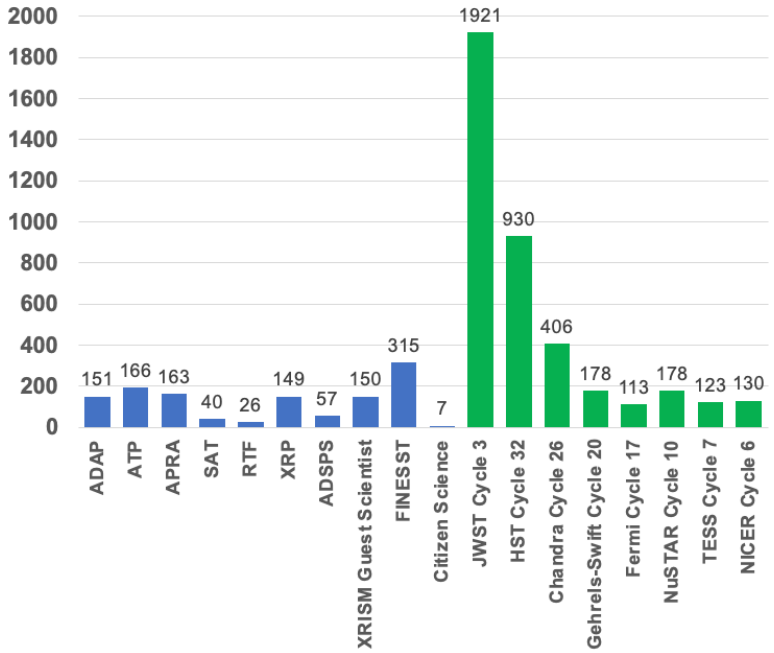
IP: Proposals require an Inclusion Plan for creating and sustaining a positive and inclusive working environment. The assessment of IP is not part of adjectival rating and does not inform selection of proposals. However, funding can be withheld until after a satisfactory IP is accepted.

DAPR: Proposals are evaluated using dual-anonymous peer reviews.

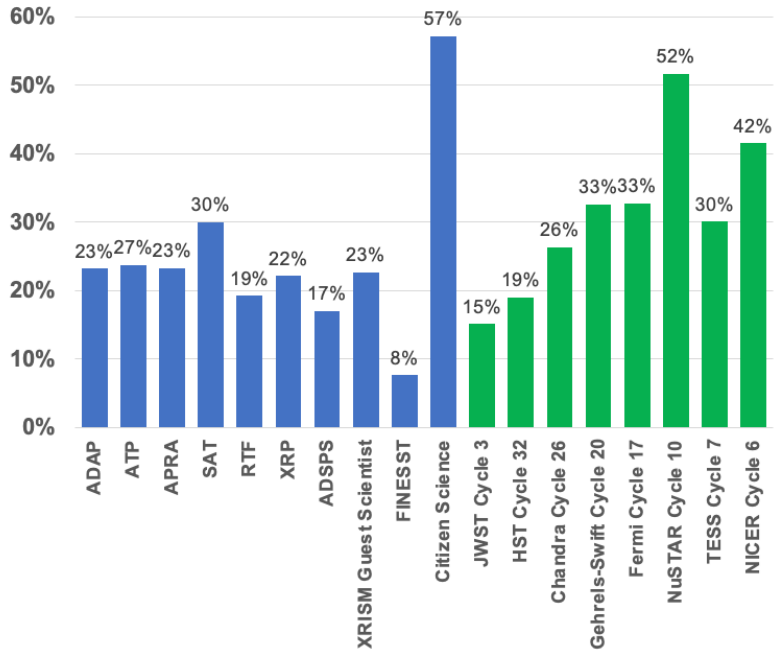
Astrophysics R&A Selection Rates

Sept 2023-2024

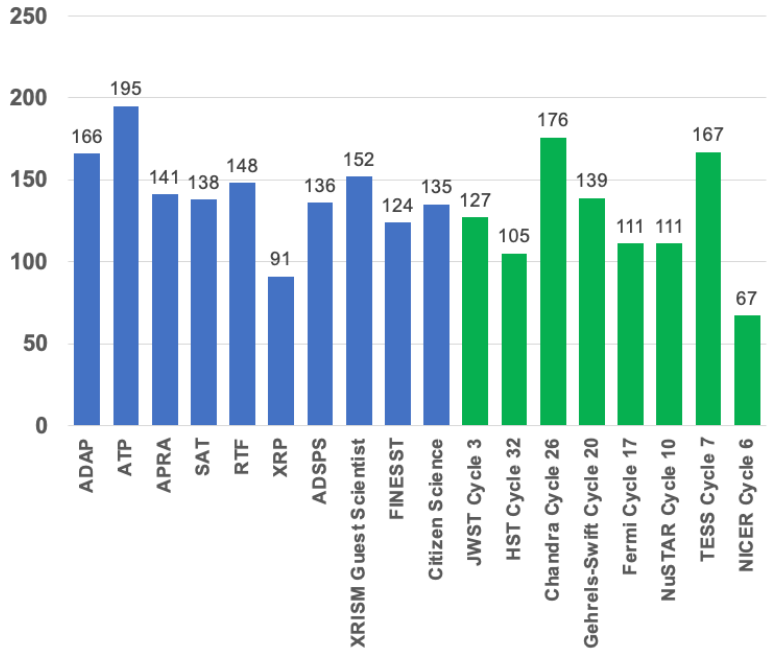
Number of Proposals



Selection Rates



PI Notification (Days)



R&A: 1,252 proposals
GO/GI: 3,979 proposals
Total: 5,231 proposals

R&A: 20%
GO/GI: 21%
Average: 21%

80% of PI notification:
R&A: 143 days
GO/GI: 125 days

* Only programs with selections made.

Euclid Guest Investigator Program

The Euclid General Investigator (GI) Program (EGIP) solicits proposals for basic research focused on data from the ESA Euclid mission to which NASA contributed infrared detectors.

The EGIP solicits research based on the analysis of data from the Euclid mission that is publicly available by the start of the selected project.

The EGIP is intended to encourage broad scientific utilization of the mission by providing funding to carry out investigations using Euclid data, to conduct supporting observations, to develop data analysis techniques applicable to the Euclid data, and to carry out theoretical investigations in support of Euclid observations.

Proposals to EGIP are evaluated using the dual-anonymous peer review process.

Expected program budget for first year of new awards	$4 M
Number of new awards pending adequate proposals of merit	10-15
Maximum duration of awards	3 years
EGIP24 Mandatory NOIs Due Date	Aug 22, 2024
EGIP24 Anonymized Proposals Due Date	Oct 03, 2024

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Balloon Program Overview

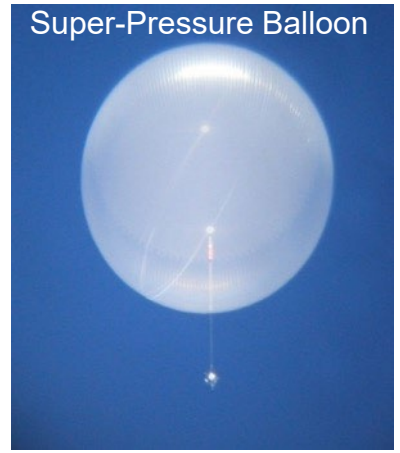
Strategic Objective:

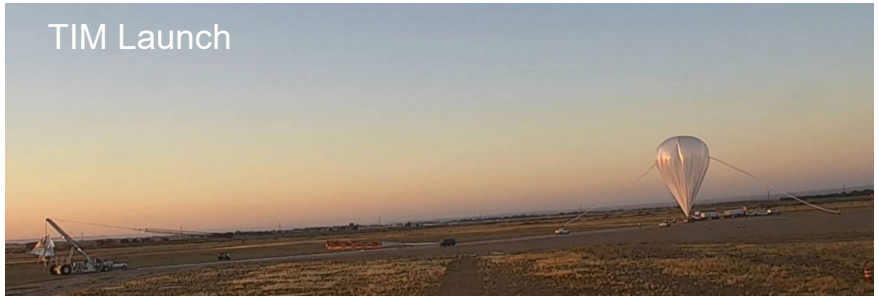
Enable discovery through conduct of frequent scientific balloon flight opportunities for NASA scientific, technology development, and educational investigations.

Balloons provide low-cost, quick response, near space access for:

- Conducting cutting-edge research.
- Developing technologies to enable future spacecraft science missions.
- Advancing lighter-than-air platform technologies.
- Providing Calibration and Validation of on-orbit instrumentation.
- Enabling Hands-on Training of the next generation of scientists and engineers.

Annual Program Snapshot
8-12 Launched
3+ campaigns
300+ undergrad/grad students participate
40+ Research Institutions





Sounding Rockets

Upcoming

Feb 2, 2026, Off-plane Grating Rocket Experiment (OGRE), PI R McEntaffer, PSU, Poker Flat

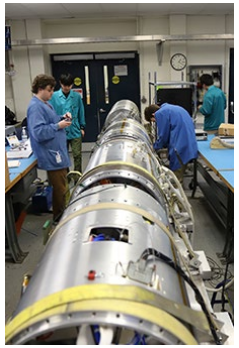
Oct 12, 2025, INtegral-Field Ultraviolet Spectroscopic Experiment (INFUSE-2), PI B Fleming, U Colorado, Boulder, White Sands Missile Range

Flown

May 8, 2024, Off-Axis Far-UV Off Rowland-circle Telescope for Imaging and Spectroscopy (OAx-FORTIS), PI S McCandliss, JHU, White Sands Missile Range

Feburary 15, 2024, Cosmic Infrared Background ExpeRiment (CIBER), PI M Zemcov, RIT, White Sands Missile Range

October 29, 2023, INtegral-Field Ultraviolet Spectroscopic Experiment (INFUSE), PI B Fleming, U Colorado, Boulder, White Sands Missile Range



CIBER integration at WFF

OAx-FORTIS at WSMR

INFUSE at WFF

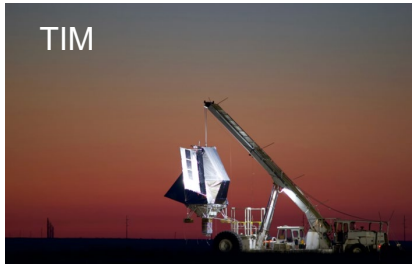
Balloon Launches

McMurdo, December 2023 – January 2024
December 31, 2023, **GUSTO**, PI C Walker, UoA
January 9, 2024, **AESOP-Lite**, PI J Clem, U Del

Sweden May-July 2024
May 27, 2024**, HELIX**, PI S Wakely, U Chicago
July 8, 2024**, XL-Calibur**, PI H Krawczynski, Wash U StL
July 9, 2024**, SUNRISE-III**, PI S Solanki, Max-Planck
July 13, 2024, **BOOMS**, PI J Sample, Montana State U

Ft Sumner August-September 2024
August 21, 2024, **TINMAN**, PI S Wender, LANL
August 22, 2024, Salter Test Flight, CSBF/BPO
August 28, 2024, **HASP 2.0**, PI D Grainger, LSU
August 31, 2024, **EXCITE**, PI P Nagler, GSFC
September 4, 2024, **HASP**, PI D Grainger, LSU
September 23, 2024, **TIM**, PI J Vieira, U Illinois
September 24, 2024, **DR-TES**, PI H Krawczynski, Wash U StL
Rescheduled, **THAI-SPICE**, PI E Young, SWRI

McMurdo, December 2024 – January 2025
December, 2024, **GAPS**, PI C Hailey, U Columbia



Delayed-Budget Pilot in ADAP24

ADAP24 did not require full budgets, just a Work Effort table, 1-page budget justification, award duration, and budget category

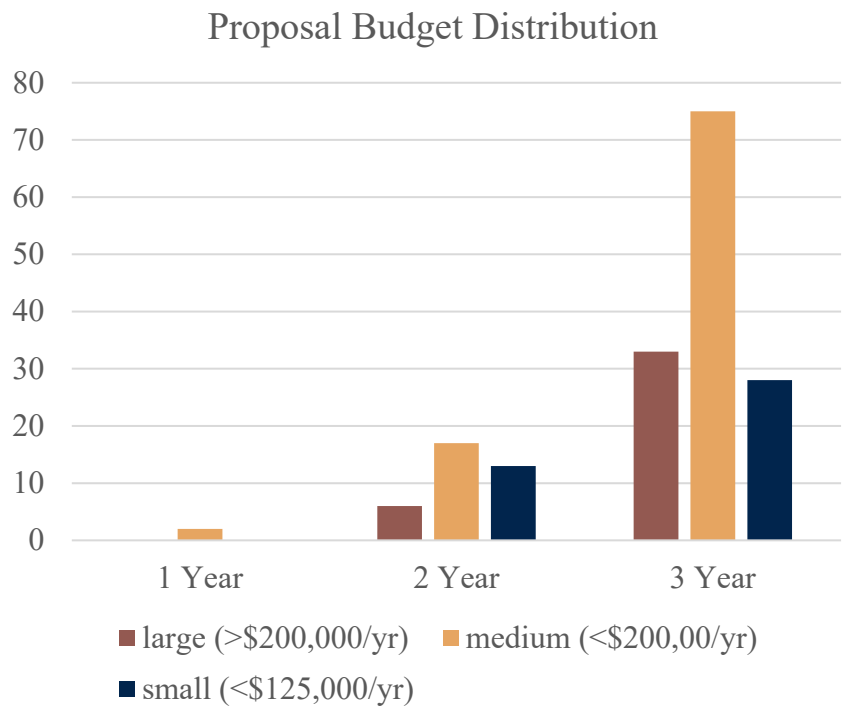
Categories: Small <$125K/yr; Medium < $200K/yr; Large >$200K/yr

Objective: Make preparation simpler, especially for PIs at smaller institutions

Results

- No significant issues with submission
- Review panels did not report trouble with evaluating cost reasonableness
- After (provisional) selections, we require full budgets from selected PIs that must adhere to the budget categories and justifications
- Resulted in a larger fraction of "selectable" vs "selected" proposals due to uncertainty about final award costs
- We have not yet investigated whether this approach saved the PIs significant time in proposal preparation

➢ All indications are that the pilot went well. We plan to continue this for ADAP25, and see no obstacle to expanding this to other programs.



NASA APRA PI Review


MISSION OPERATIONS C
LASP
Laboratory for Atmospheric and
University of Colorado Boulder

THANK YOU


Neutron star Interior Composition Explorer (NICER)
NASA

BACKUP

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The EGIP solicits research based on the analysis of data from the Euclid mission that is publicly available by the start of the selected project.

The EGIP is intended to encourage broad scientific utilization of the mission by providing funding to carry out investigations using Euclid data, to conduct supporting observations, to develop data analysis techniques applicable to the Euclid data, and to carry out theoretical investigations in support of Euclid observations.

The Euclid GI Program solicits proposals that include the following areas:

a) The analysis of data from the beginning of science operations or the development of data analysis techniques and tools. Investigators will be required to make software and other resources supporting such new analysis techniques publicly available.

b) Supporting observations that are directly relevant to the Euclid science objectives and would augment the science return of the mission and the selected investigations. Such investigations must specifically address how the anticipated results will advance Euclid science objectives and/or the broader astrophysics applications of Euclid data.

c) Theoretical investigations that will advance the science return of the Euclid mission. Such investigations must specifically address how the anticipated results will advance Euclid science objectives.

Proposals to EGIP are evaluated using the dual-anonymous peer review process.