

National Aeronautics and
Space Administration



EXPLORE SOLAR SYSTEM & BEYOND

Astrophysics Snapshot

Space Science Week, March 2022

Paul Hertz

Director, Astrophysics Division
Science Mission Directorate

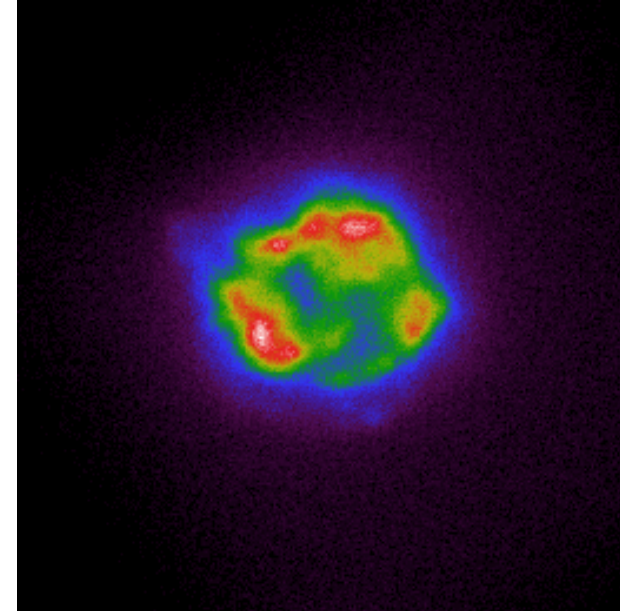
 [@NASAUniverse](https://twitter.com/NASAUniverse) [@NASAExoplanets](https://twitter.com/NASAExoplanets)

Imaging X-ray Polarimetry Explorer (IXPE)

Principal Investigator- Martin Weisskopf (MSFC)



A SpaceX Falcon 9 rocket launches with NASA's Imaging X-ray Polarimetry Explorer spacecraft onboard from Launch Complex 39A, Dec. 9, 2021, at KSC in Florida. Image Credit: NASA/Joel Kowsky



The supernova remnant Cassiopeia A. Colors ranging from cool purple and blue to red and hot white correspond with the increasing brightness of the X-rays. The image was created using X-ray data collected by IXPE between Jan. 11-18, 2022. Credit: NASA

<https://ixpe.msfc.nasa.gov/>

NASA Confirms 5,000 Exoplanets



<https://exoplanets.nasa.gov>

- More than 5,000 planets are now confirmed to exist beyond our solar system.
- Today, March 21, a batch of 65 exoplanets was added to the NASA Exoplanet Archive – bringing the total of confirmed exoplanets to more than 5,000.
 - Ø That batch includes planets discovered by NASA's TESS and K2 missions, and includes planets detected or confirmed via the transit and radial velocity methods.
- This represents a 30-year journey of discovery led by NASA space telescopes with professional and citizen scientists, engineers, and enthusiasts around the world.

James Webb Space Telescope

Recent Accomplishments

- Completed integration and test
- Shipped to Kourou Space Center
- Launched 25 Dec 2021
- Completed deployments 8 Jan 2022
- L2 orbit insertion 24 Jan 2022
- First segmented mirror images 2 Feb
- Alignment evaluation image 16 March

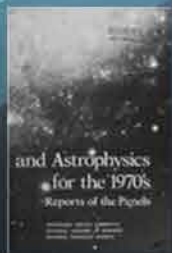


TELESCOPE ALIGNMENT EVALUATION IMAGE

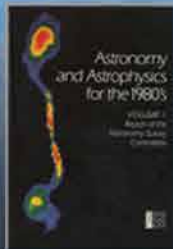


Astrophysics

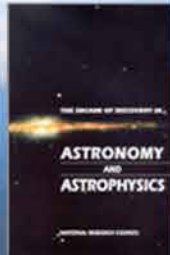
Decadal Survey Missions



1972
Decadal
Survey
Hubble



1982
Decadal
Survey
Chandra



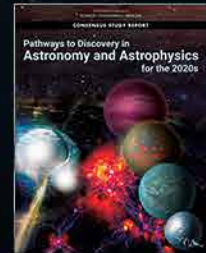
1991
Decadal
Survey
Spitzer



2001
Decadal
Survey
Webb



2010
Decadal
Survey
Roman



2021
Decadal
Survey

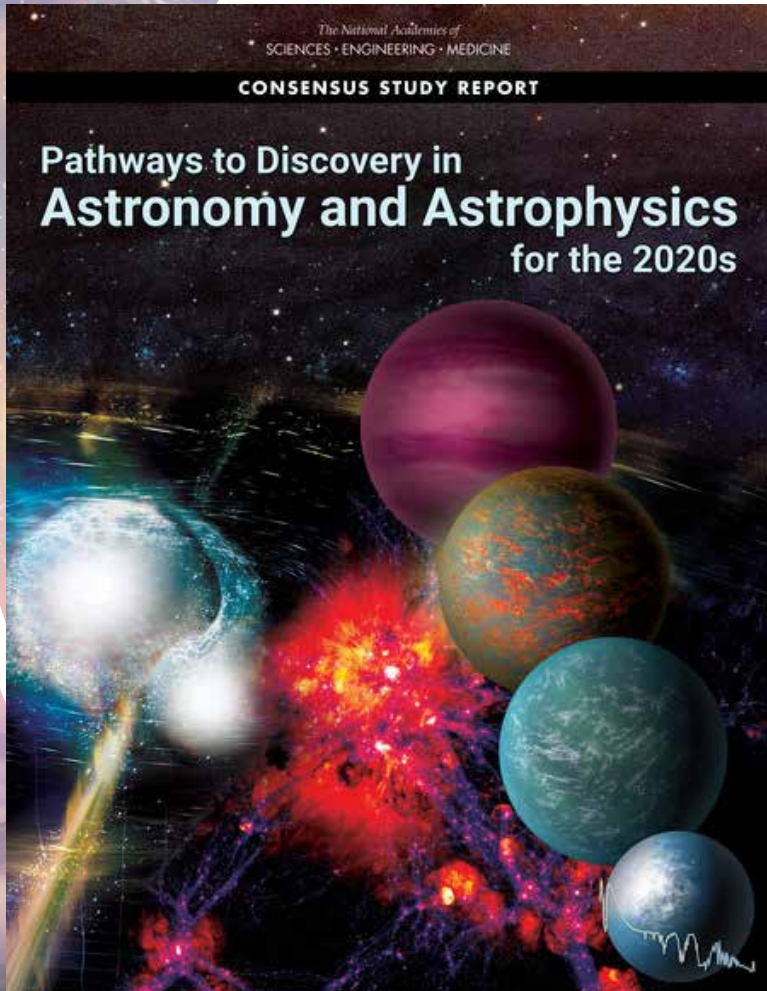
NASA and Astro2020

This is an exciting and ambitious plan for the next decade and beyond

- Foundations of the Profession: Addressing inclusion, diversity, training, and the profession
- Research Foundation: Improvements to research and analysis and data centers
- Sustaining the Operating Portfolio: End SOFIA operations by 2023
- Technological Foundation: Improvements to technology development programs and the balloon program
- New Medium Initiative: Time Domain Astrophysics and Multi-Messenger Program
- New Medium Initiative: Astrophysics Probes
- New Large Initiative: Great Observatories Science, Mission and Technology Maturation Program for IR/O/UV, FIR, and X-ray Next Generation Great Observatories
- New Large Initiative: Next Generation Great Observatories, starting with an IR/O/UV Large Mission optimized for exoplanets and astrophysics

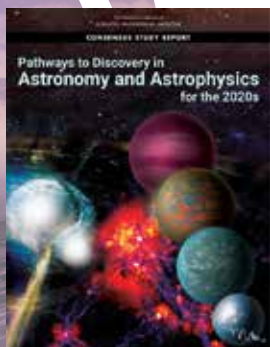
We are bound by the budgets that we have

- o First budget that is fully informed by the Decadal Survey will be the FY24 budget proposal which will be submitted to Congress in February 2023



Decadal Survey Implementation Snapshot

Page	Recommendation	NASA Actions
3-22	IDEA workforce	SMD bridge program proposed for FY22
3-23	Postdoc fellowships	Independent review conducted of NASA Hubble Fellowship Program to improve inclusion and diversity
3-29	Proposal demographics	National Academies study on the “ Foundation for Assessing the Health and Vitality of the NASA Science Mission Directorate’s Research Communities ” will be completed Spring 2022
3-30	IDEA evaluation criteria	Inclusion plans required in 7 astrophysics ROSES elements
5-12	SOFIA	SOFIA withdrawn from 2022 Senior Review
6-8	Balloon program review	APAC task force to be discussed at March APAC meeting
7-11	Great observatories program	Precursor science workshop planned for April 2022
7-19	Time domain program	Time domain workshop planned for August 2022
7-20	Astrophysics probes	AO announced for early 2023
7-35	Roman science program review	CAA working group is conducting a non-advocate review



Future Great Observatories

Large observatories are a critical component of NASA's astrophysics portfolio

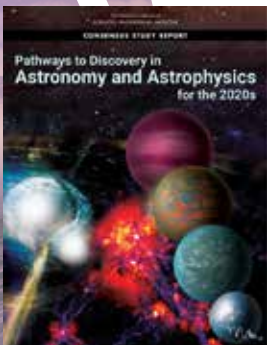
- The Decadal Survey recommends a compelling, feasible, timely portfolio of future great observatories that is part of a balanced Astrophysics program

Today NASA's priority is ensuring mission success for Webb and Roman

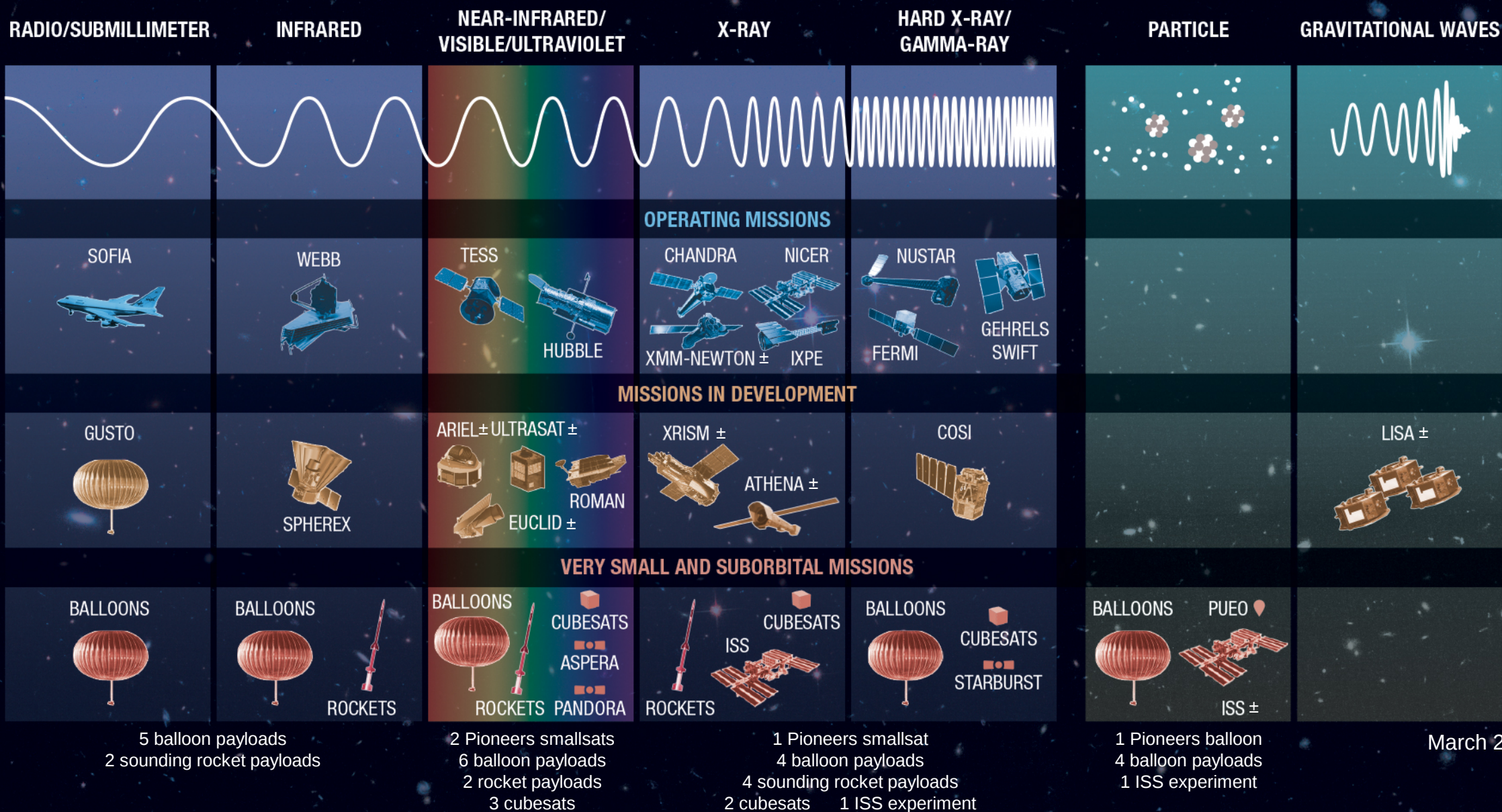
- Webb has been launched and has begun its 6-month commissioning phase
- Roman successfully passed its Critical Design Review (CDR) and has been replanned to account for COVID impacts; the new launch commitment date is mid-2027 (7 month delay due to COVID)

Now is not the time to start a Future Great Observatory; now is the time to prepare NASA will take a deliberate, multi-stage planning and strategy approach to the next large observatory mission

- Stage 1 – Focus on enabling science and technology; begin Stage 1 now
- Stage 2 – Begin the Decadal Survey recommended “Great Observatories Maturation Program”; conduct Analysis of Alternatives (AoA) and science / technology / architecture trades; begin Stage 2 in a few years (driven by planning and budget availability)
- Stage 3 – Pre-formulation and decision to start the next Great Observatory; begin after Stage 2 AoA complete (Decadal Survey estimates 6 years for Stages 2 and 3)



ELECTROMAGNETIC SPECTRUM



March 2022