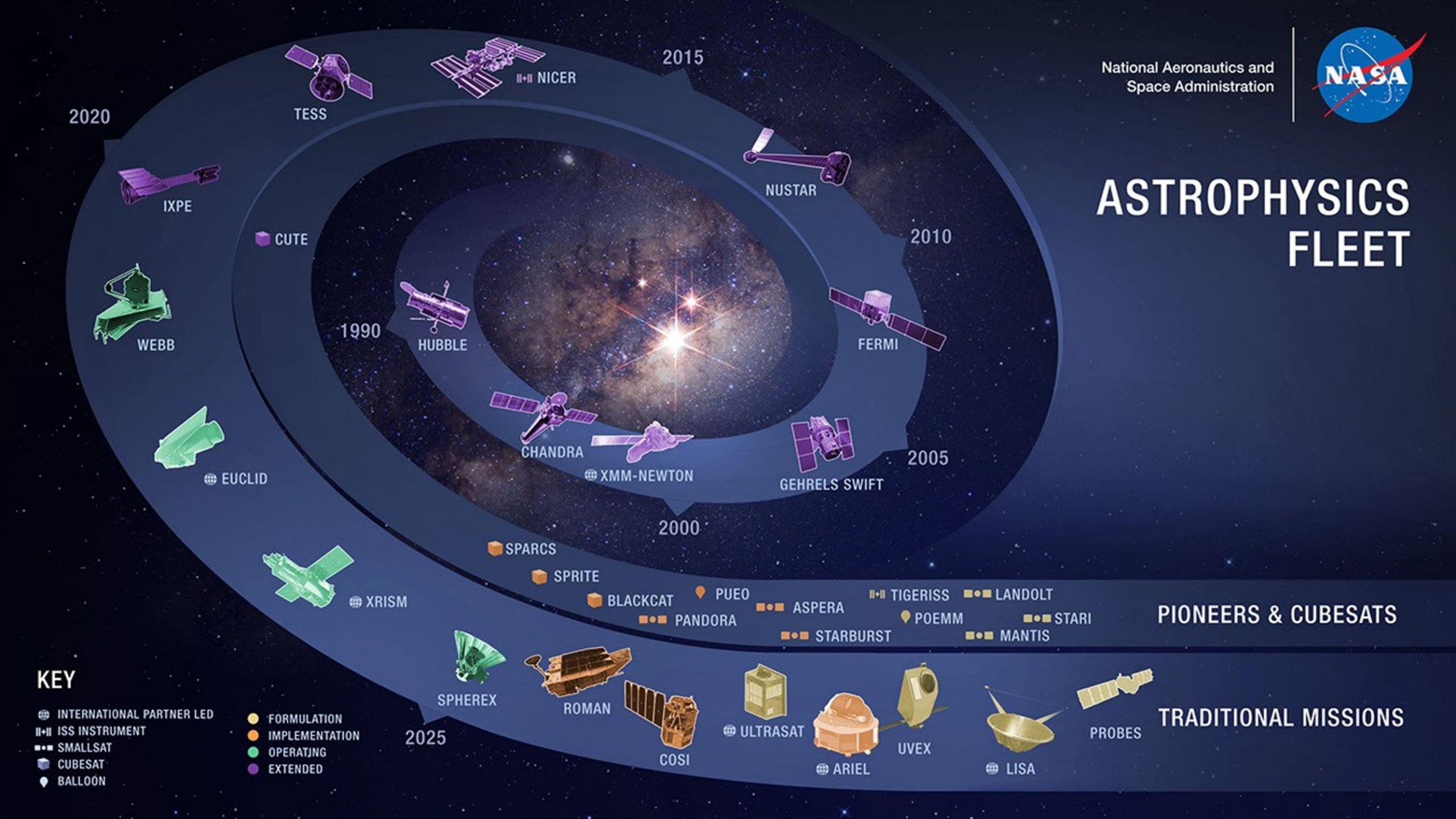
Astrophysics in the Age of Artemis: Building Discovery, Economy, and Leadership from the Moon to Mars

How science, infrastructure, and exploration converge in the Artemis Era

Dr. Shawn Domagal-Goldman

NASA's Acting Astrophysics Division Director


How does the Universe Work?
How did we get here?
Are we Alone?


National Aeronautics and Space Administration
NASA
ASTROPHYSICS FLEET
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HUBBLE
FERMI
CHANDRA
XMM-NEWTON
GEHRELS SWIFT
EUCLID
XRISM
SPARCS
SPRITE
BLACKCAT
PUEO
ASPERA
TIGERISS
LANDOLT
PANDORA
POEMM
STARI
STARBURST
MANTIS
PIONEERS & CUBESATS
SPHEREX
ROMAN
COSI
ULTRASAT
ARIEL
UVEX
LISA
PROBES
TRADITIONAL MISSIONS
KEY
INTERNATIONAL PARTNER LED
ISS INSTRUMENT
SMALLSAT
CUBESAT
BALLOON
FORMULATION
IMPLEMENTATION
OPERATING
EXTENDED

APD 2026 and Beyond Timeline

National Aeronautics and Space Administration

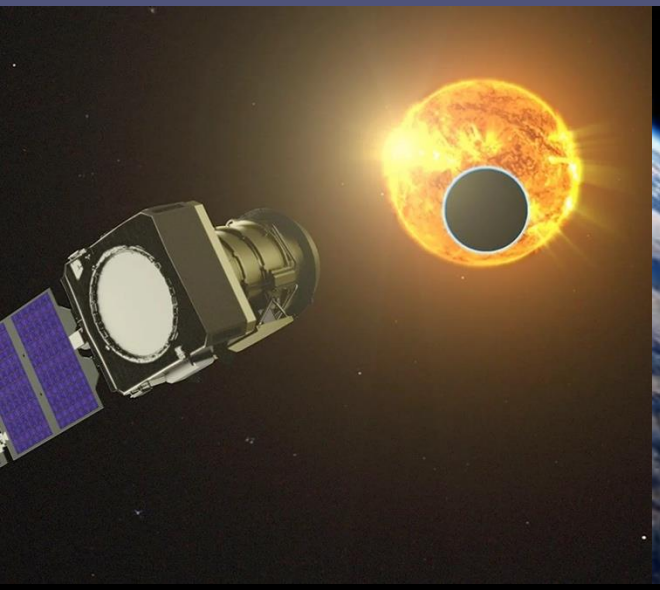
Cubesat · Satellite · International Partner

2025	2026	2027	2028	2029	2030	2031	2035
SPRITE	ASPERA	TIGERISS	LANDOLT	STARI	UVEX	PRIMA	LISA
PUEO	PANDORA	STARBURST	MANTIS	POEMM		AXIS	
SPHEREX	BLACKCAT	ULTRASAT		ARIEL			
	SPARCS	COSI					
	SWIFTLY						
	ROMAN						


COMING SOON

PUEO Launching December 2025 from Antarctica

Smallsats and CubeSats



Pandora

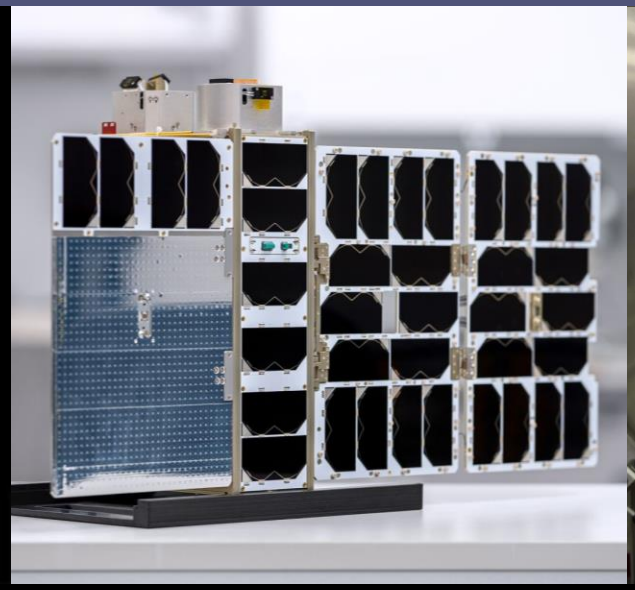
Launching January 2026

A small satellite designed to characterize exoplanet atmospheres and their host stars. It is slated to observe at least 20 different planets during its one year of science operations.

Star-Planet Activity Research CubeSat (SPARCS)

Launching January 2026

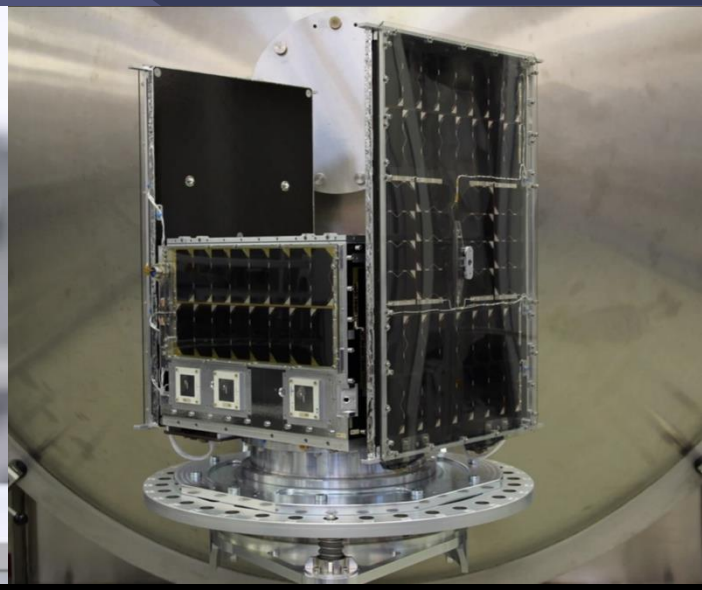
The first mission dedicated to monitoring energy radiation environments of exoplanets throughout their lifetimes by continuously and simultaneously measuring the FUV and NUV emission of low-mass stars from young to old.



The BlackCAT CubeSat Wide-Field X-Ray Transient Monitor

Launching January 2026

Will will be used to search for transient objects such as early universe stars collapsing to form black holes and will enable studies of early universe star formation.



Aspera

Launching August 2026

The first mission to gather and map the incredibly faint ultraviolet light signatures that come from nearby galaxies.

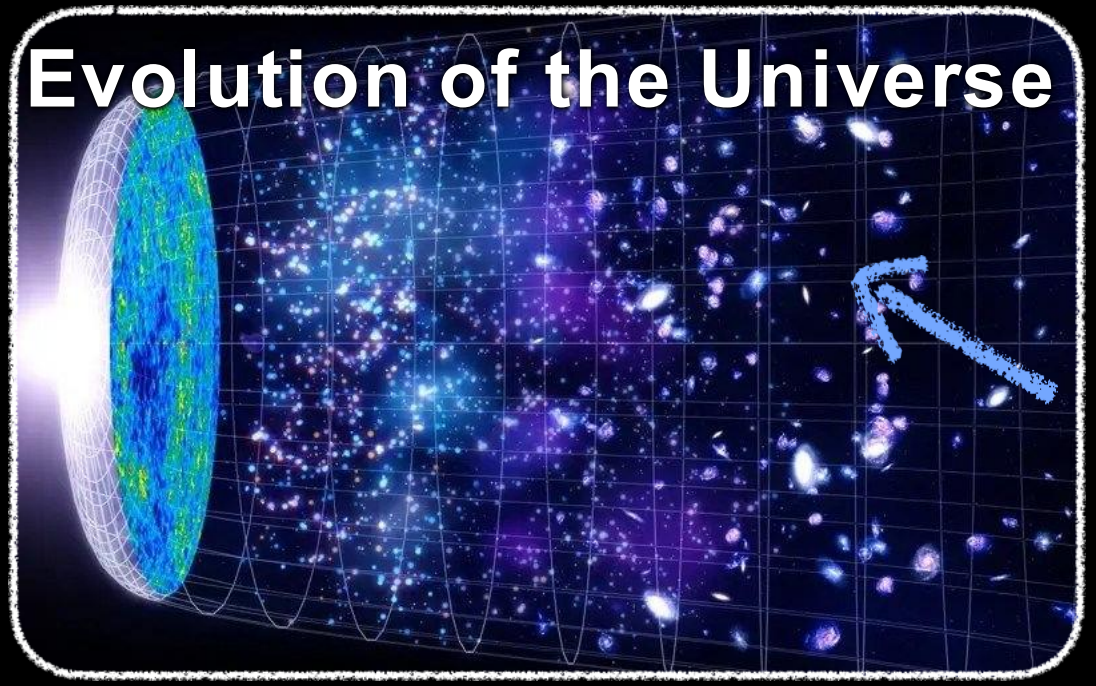
SWIFT Boost: A Collaborative Effort

Northrup Grumman

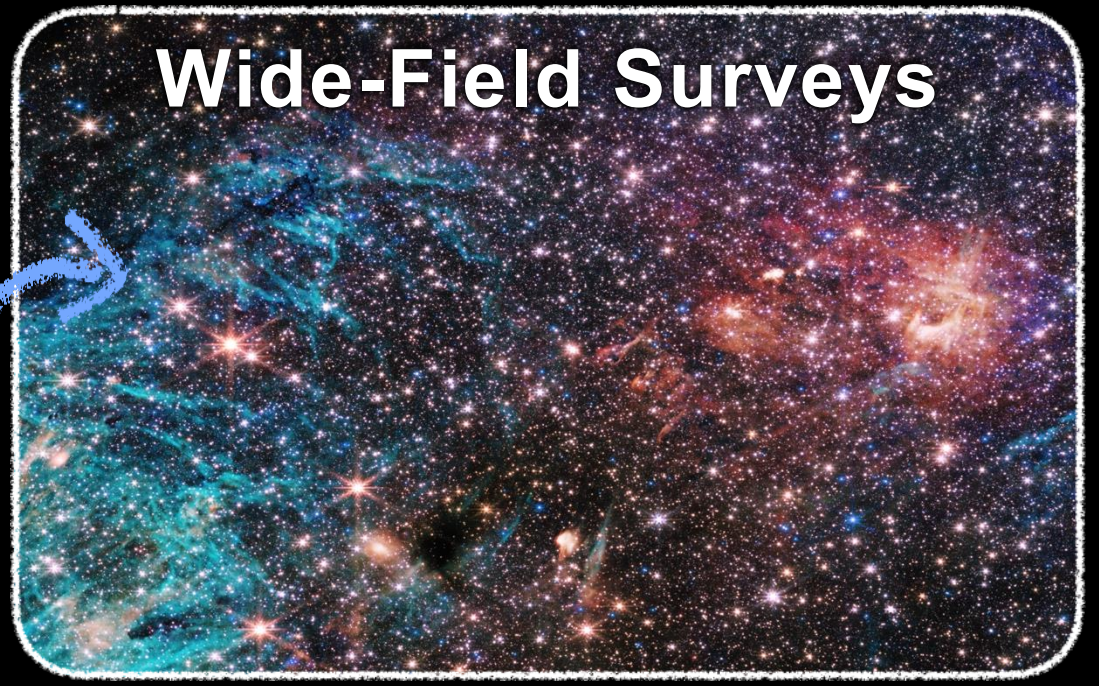
Katalyst

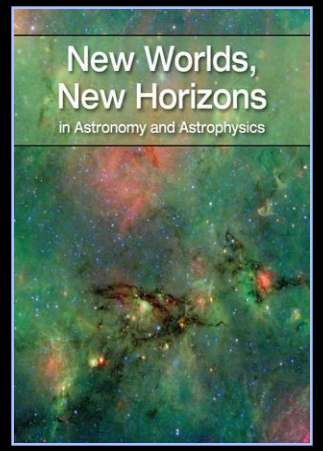
The Roman Space Telescope: A Breakthrough in the Making

Evolution of the Universe

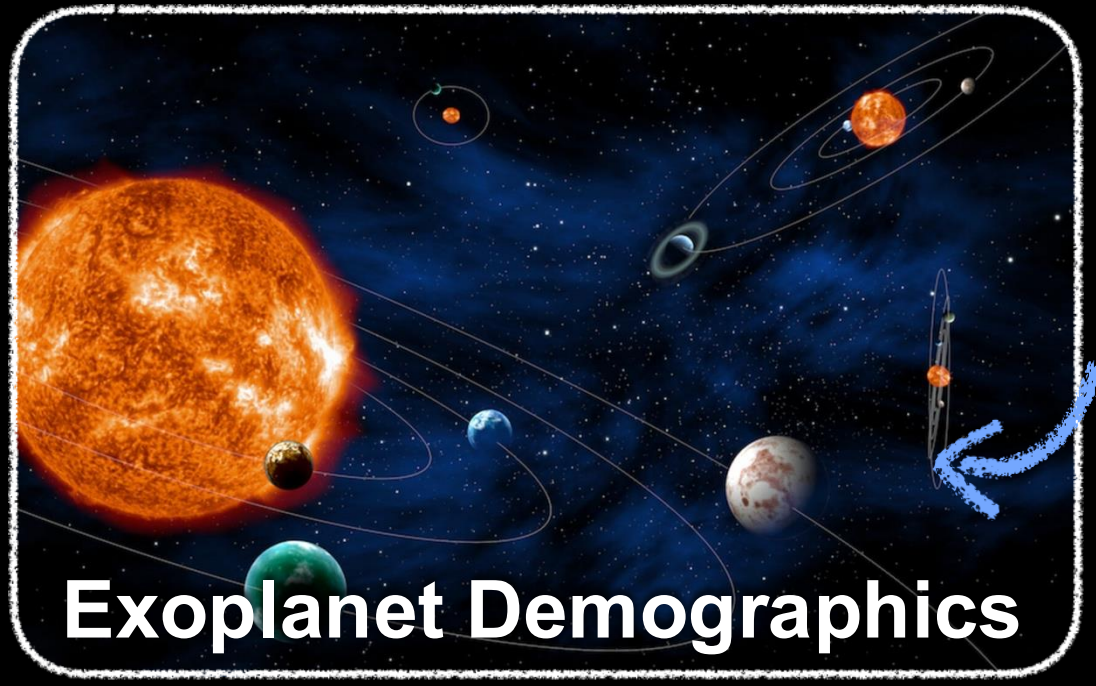


Wide-Field Surveys





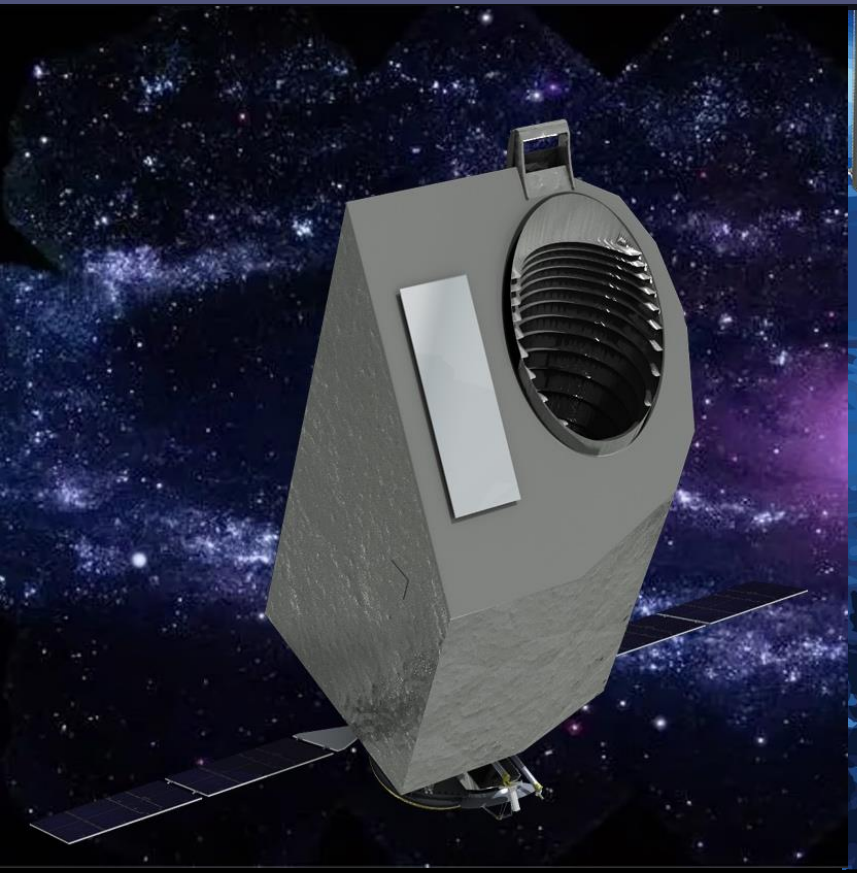
National Academy of Sciences 2010



Exoplanet Demographics

Seeing New Worlds

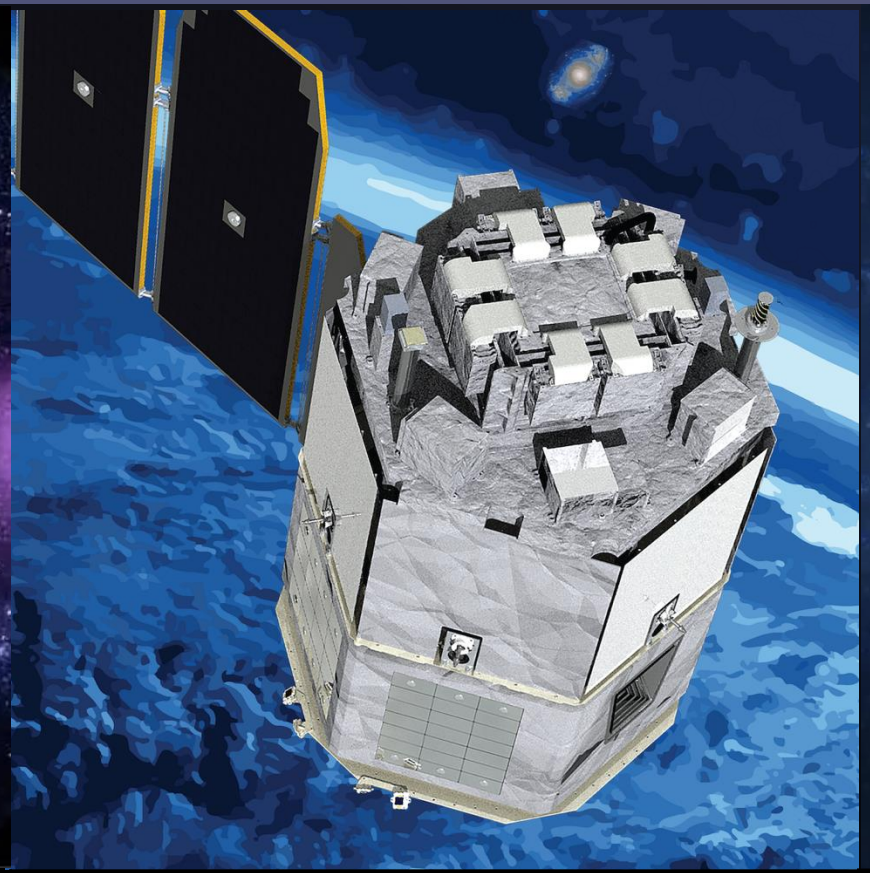
Explorers



UltraViolet Explorer (UVEX)

Launching 2030

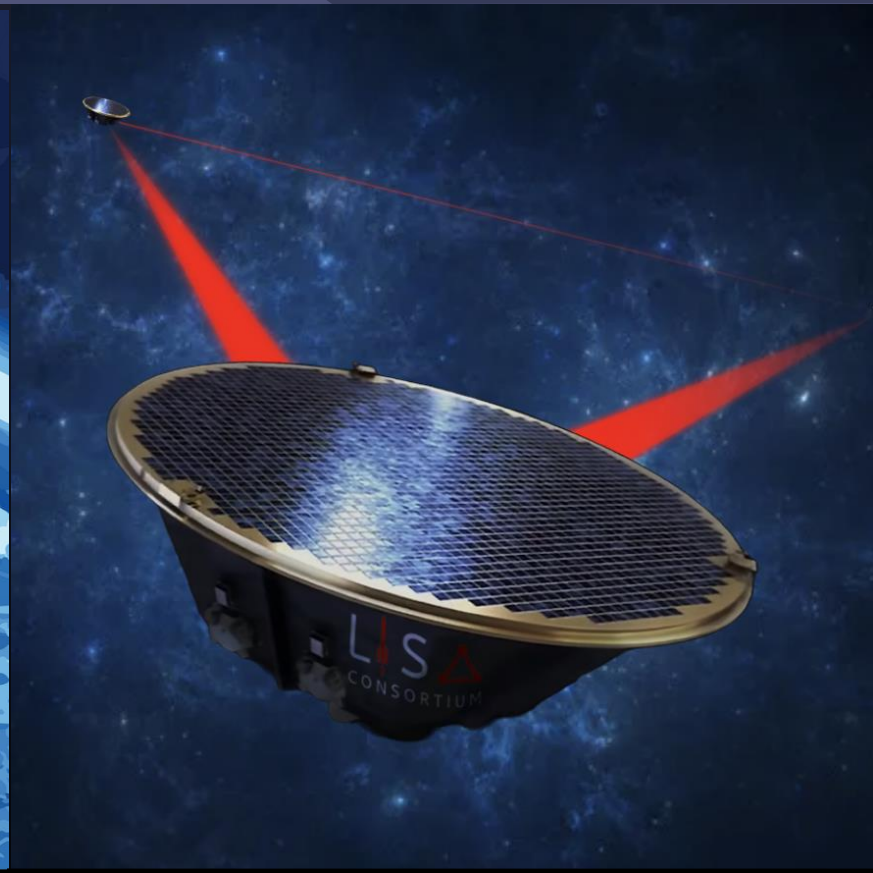
Will address outstanding questions in our understanding of the Universe, including the nature of the low-mass, low-metallicity galaxy population and the early ultraviolet emission of explosive transients.



The Compton Spectrometer and Imager (COSI)

Launching NET August 2027

Will study energetic phenomena in the Milky Way and beyond, including the creation and destruction of matter and antimatter and the final stages of the lives of stars.



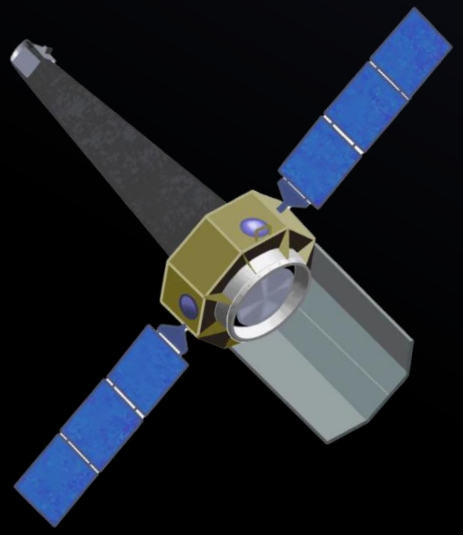
Laser Interferometer Space Antenna (LISA)

Launching 2035

Will be the first dedicated space-based gravitational-wave observatory. It aims to measure gravitational waves directly by using laser interferometry.

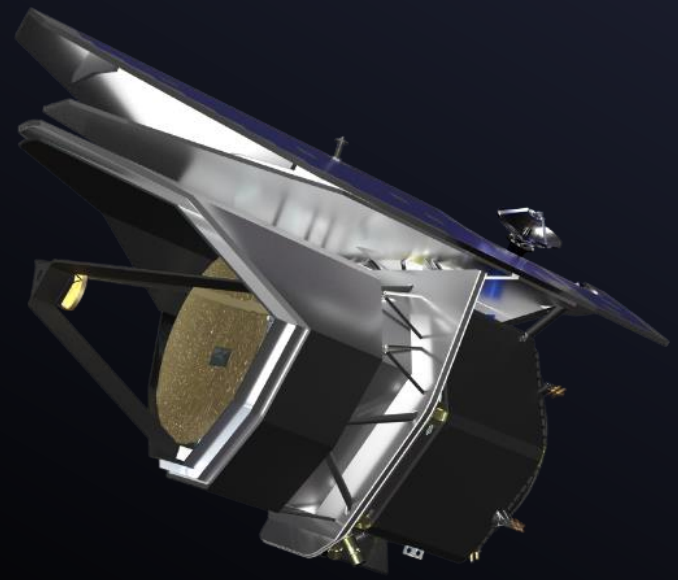
Probe Explorer Missions

Advanced X-ray Imaging Satellite (AXIS)



1. What seeds supermassive black holes and how do they grow?
2. How do gas, metals, and dust flow into, through and out of galaxies?
3. What powers the diversity of explosive phenomena?

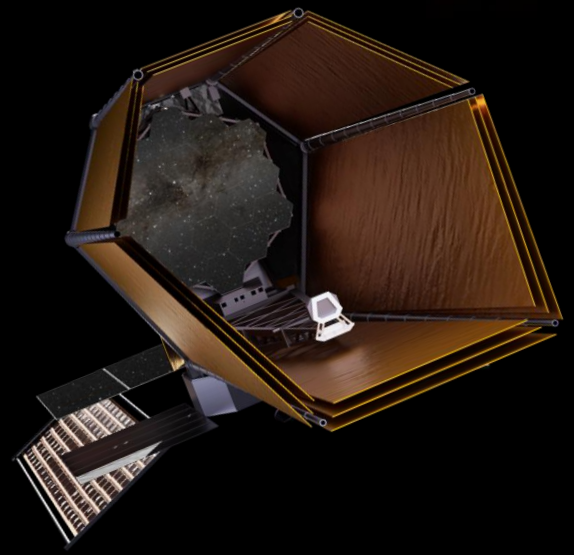
Probe far-Infrared Mission for Astrophysics (PRIMA)

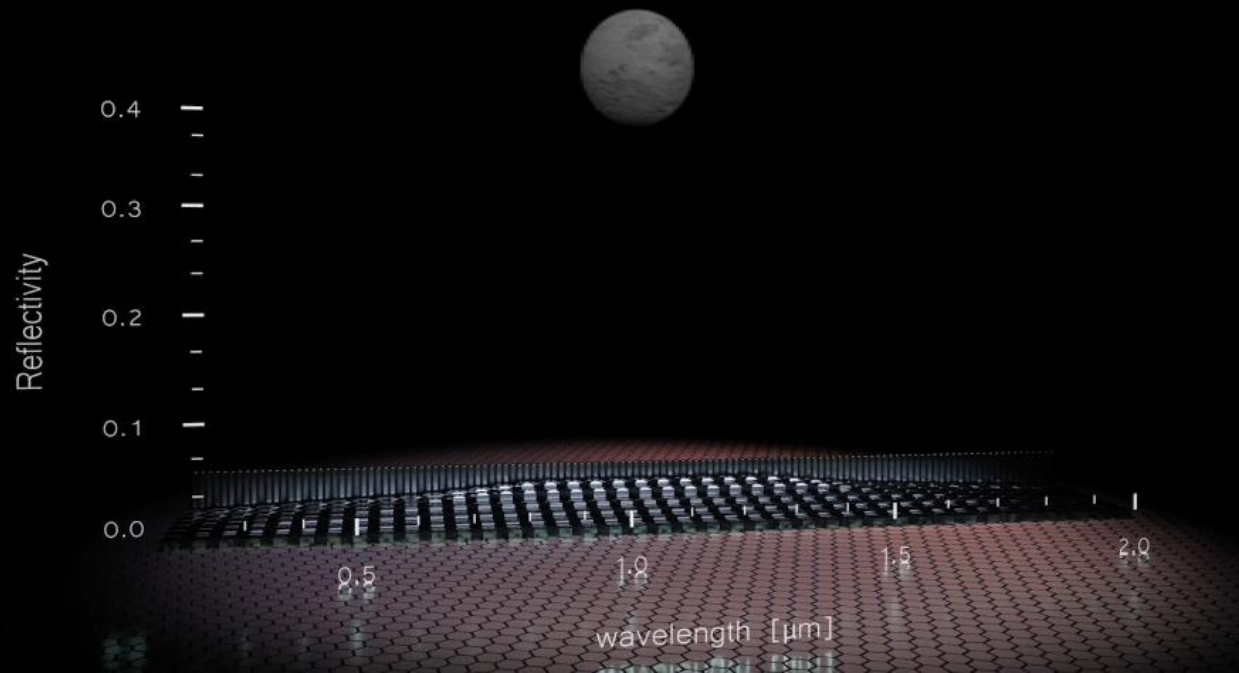


1. Origin of Planets and their Atmospheres
2. Co-Evolution of Galaxies and Supermassive Black Holes Since Cosmic Noon
3. Buildup of Dust and Metals

Habitable Worlds Observatory

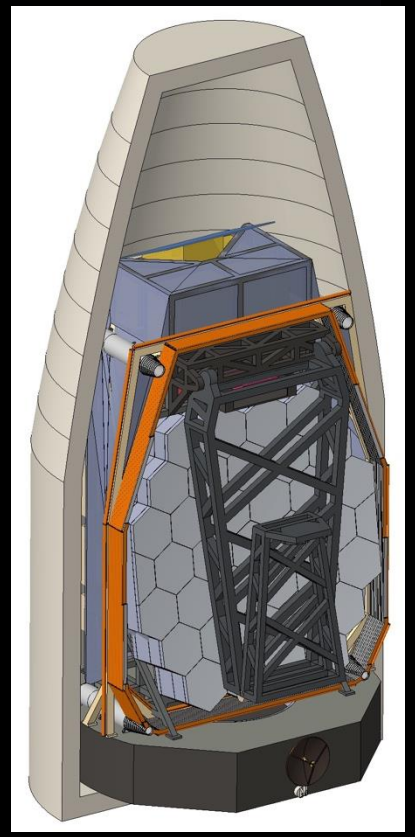
Habitable Worlds Observatory
Simulated Solar System Time-lapse
Observed from 33 light-years away
Time = 10 years, 1 second = 72 days





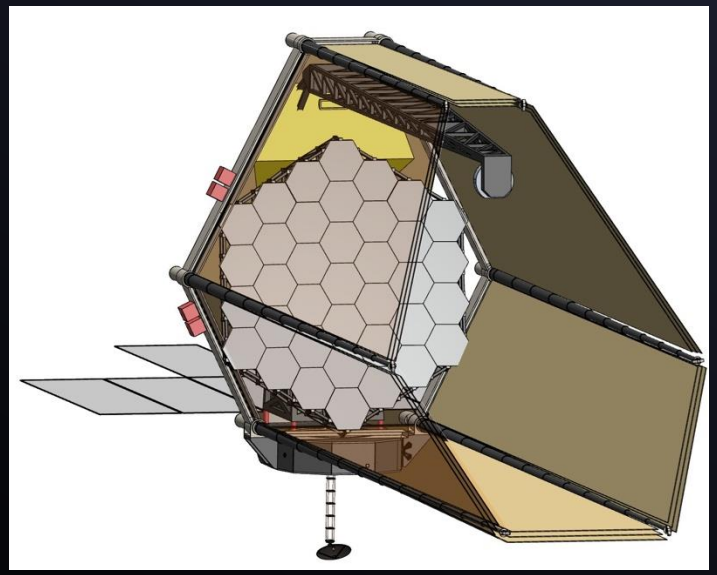
HWO Preliminary Concepts and Descriptions

EAC4



- Off axis, >6.5m
- Volume dual rocket compatible
- 5 instruments w/UV IFU
- 2 channel Vis+NIR Coronagraph

EAC5



- Off axis, >8m (8.3m ID/10m OD)
- Volume dual rocket compatible
- 5 instruments w/UV IFU
- 3 channel Vis/Vis+NIR coronagraph

Habitable Worlds Observatory In-Space Servicing Concept

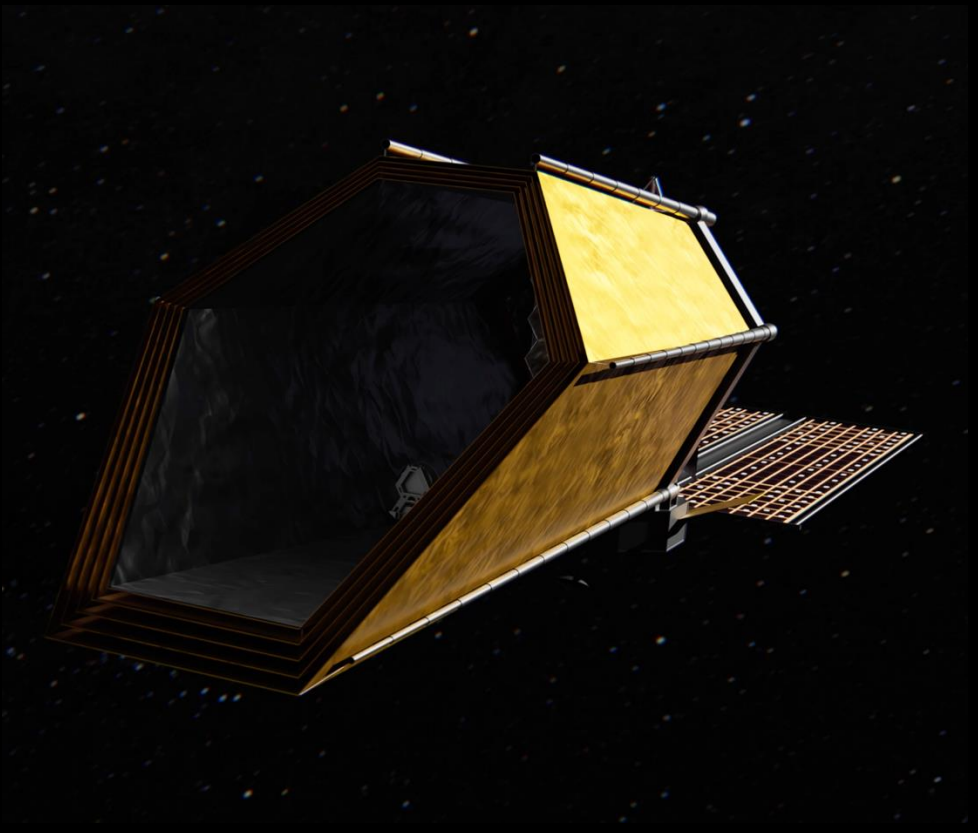
Shuttle/Hubble Approach

Separate Servicer with Carrier

- Allows multiple generations of Instruments
- Enables earlier launch date by focusing on minimum needs initially
- Architecting for Serviceability helps Integration and Testing

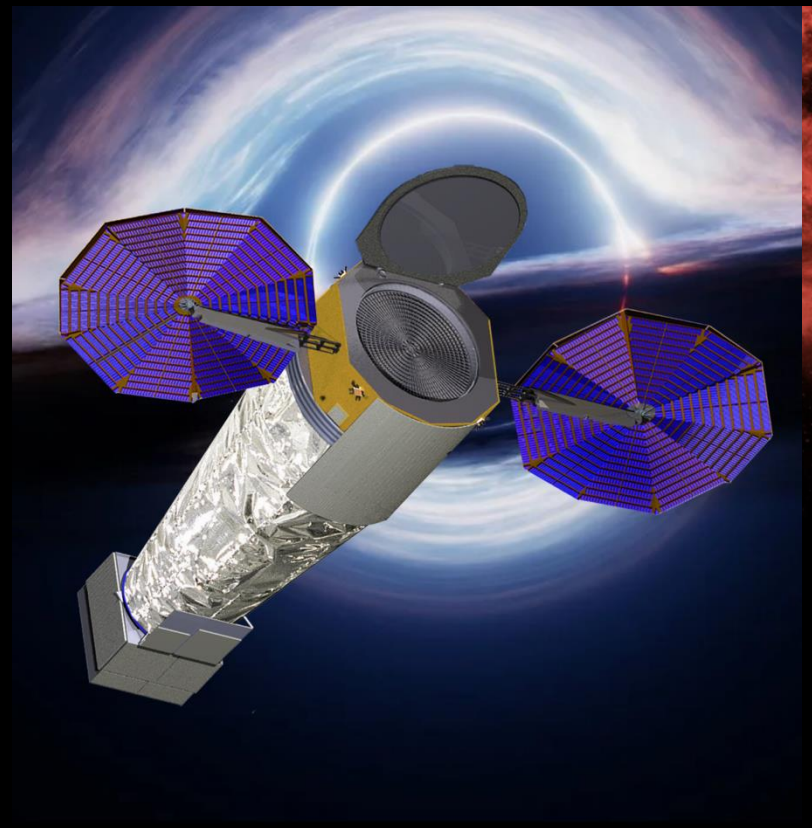
New Great Observatories

Habitable Worlds Observatory



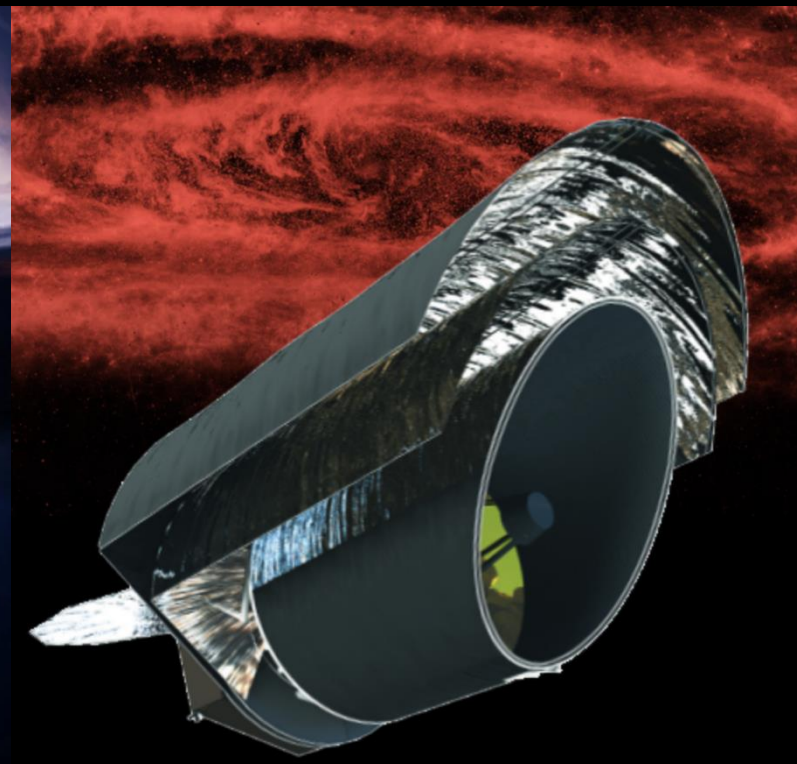
The first observatory designed to find and characterize Earth-like exoplanets.

The X-Ray Great Observatory



A future X-ray telescope with a large field of view and greater sensitivity than current observatories, it will study high-energy events like those around black holes and supernovae.

The Far-Infrared Observatory



A future observatory to study the infrared universe and expand our understanding of the origin of solar systems, stars, and galaxies.

NASA's Astrophysics Fleet is Entering a New Era


QUESTIONS?