



# GOMAP Update

**NASA Astrophysics Great Observatory Maturation Program (GOMAP)**

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**October 20, 2023**

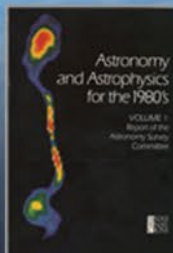


# Astrophysics

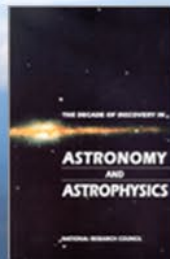
## Decadal Survey Missions



**1972**  
Decadal  
Survey  
*Hubble*



**1982**  
Decadal  
Survey  
*Chandra*



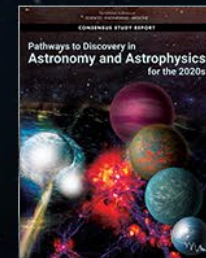
**1991**  
Decadal  
Survey  
*Spitzer*



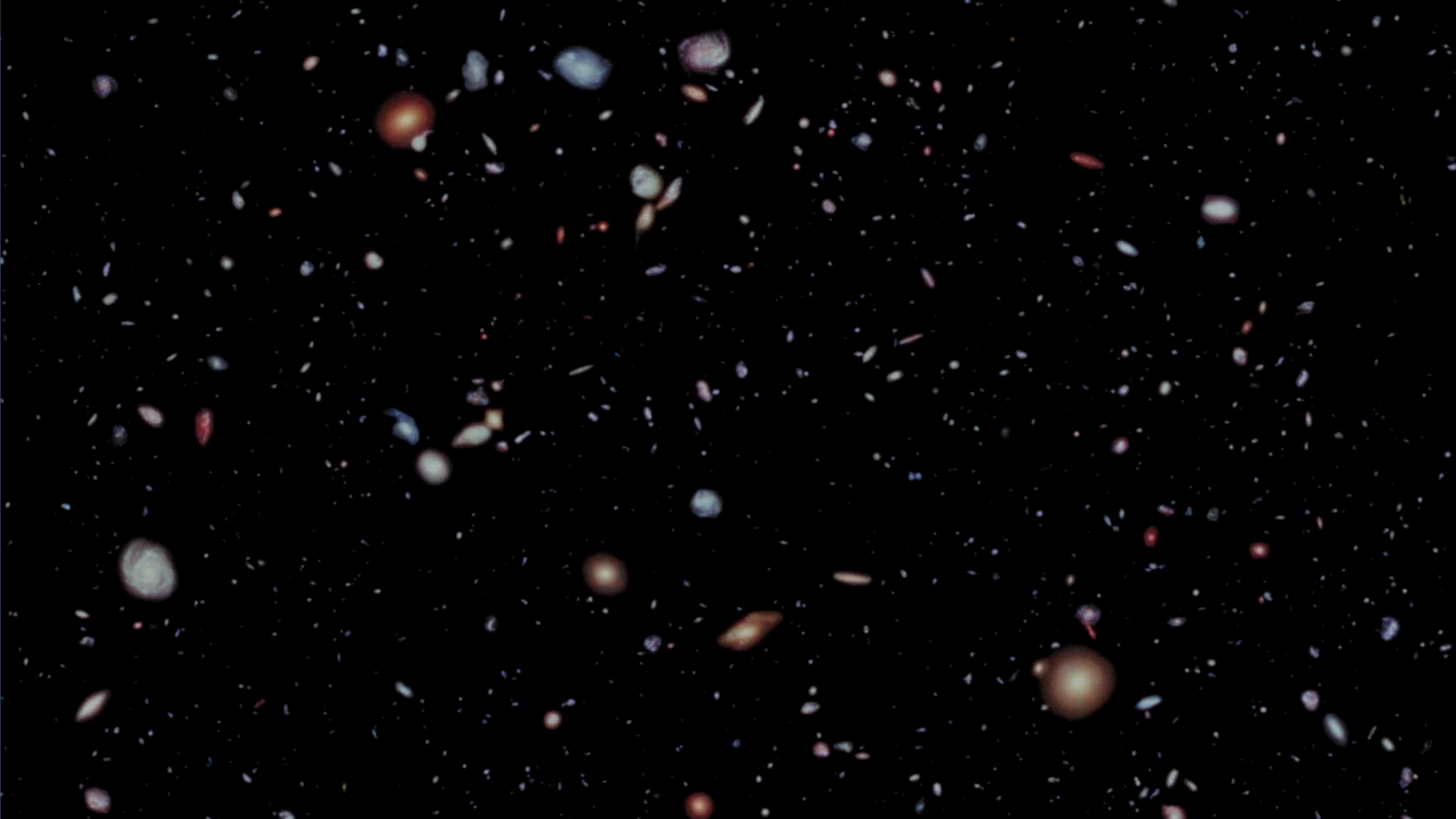
**2001**  
Decadal  
Survey  
*Webb*



**2010**  
Decadal  
Survey  
*Roman*

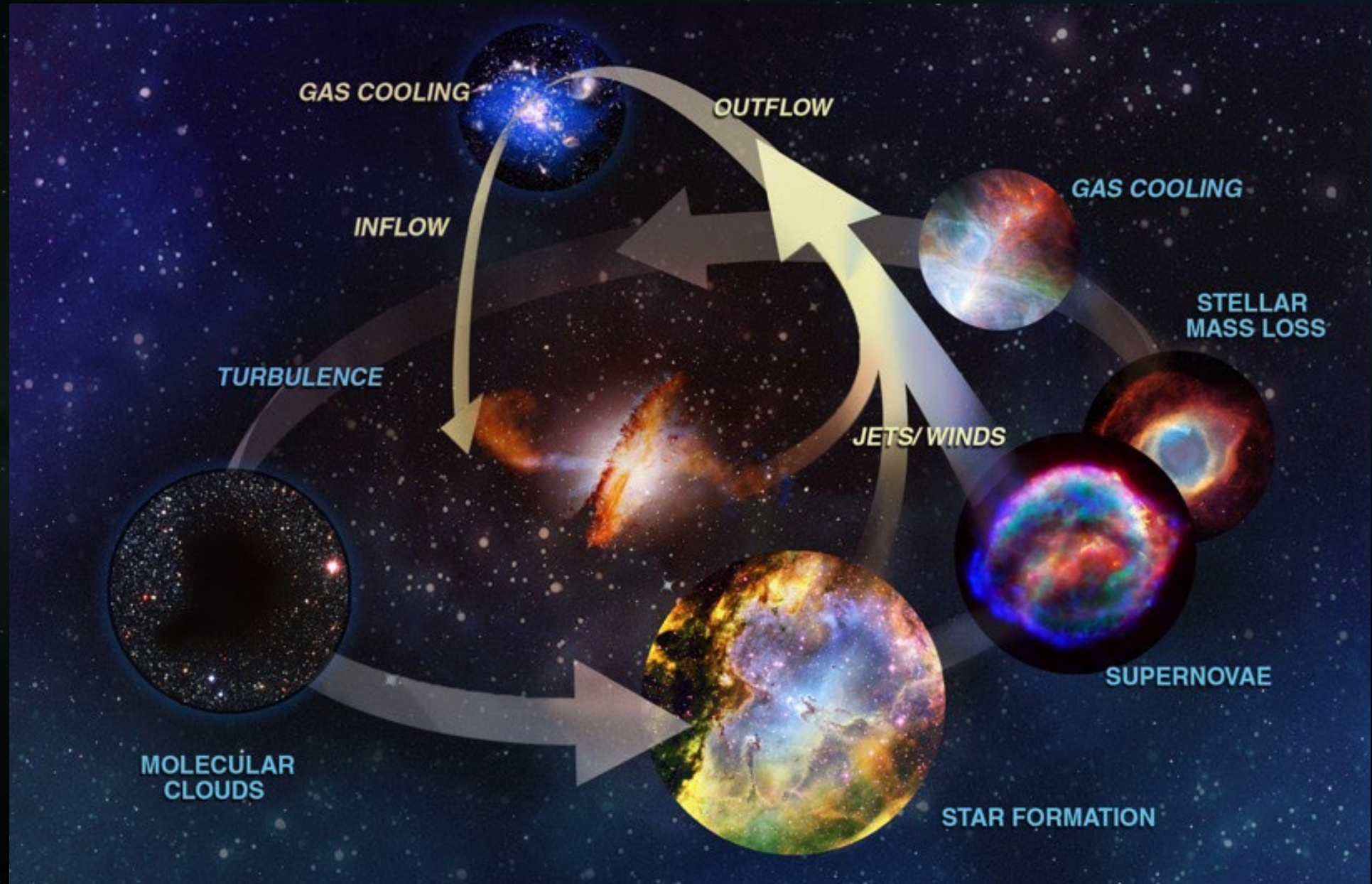


**2021**  
Decadal  
Survey





# STUDYING THE LIFECYCLES OF GALAXIES



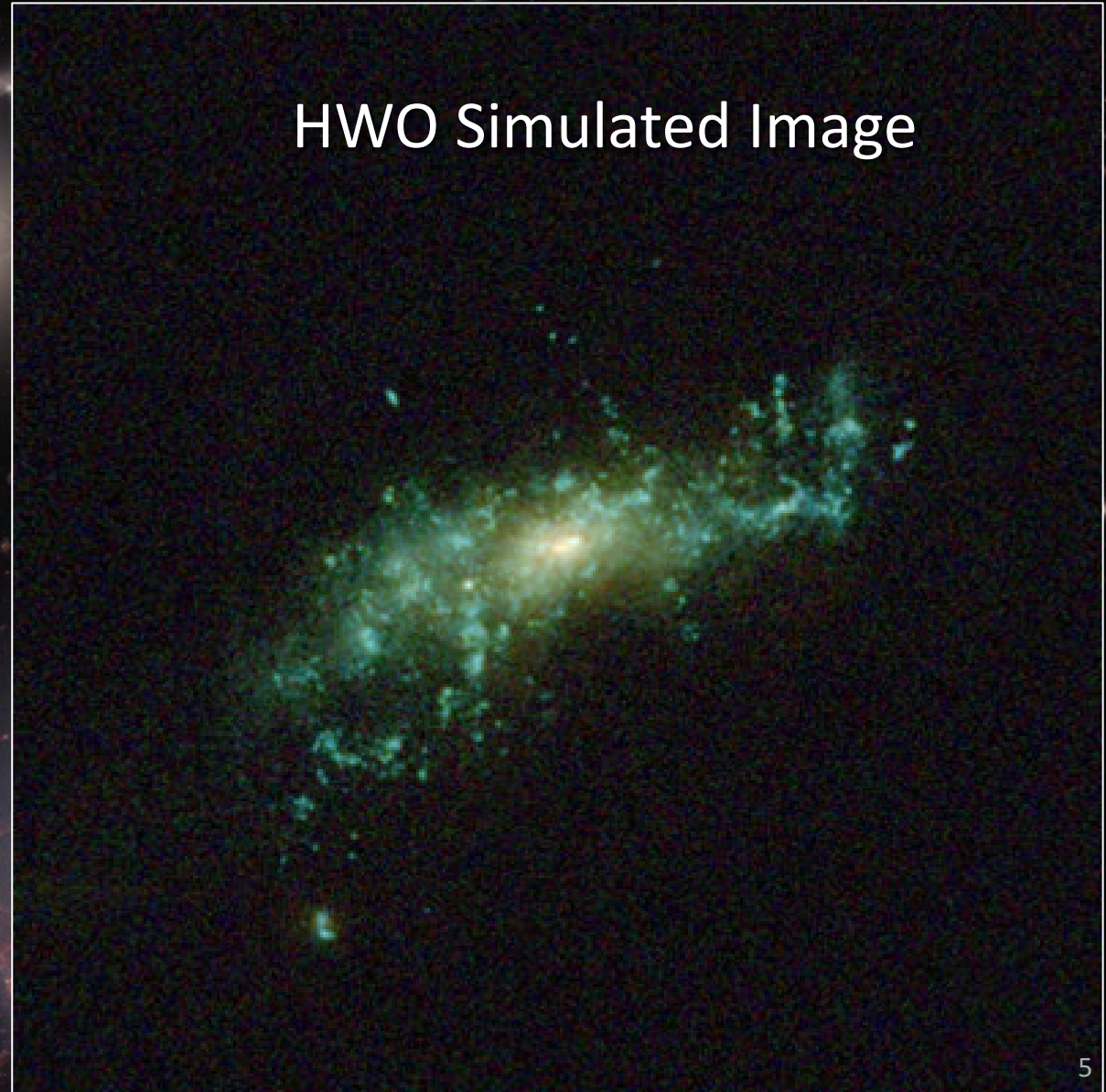


# PROBING THE PROPERTIES OF DARK MATTER WITH DWARF GALAXIES

Hubble

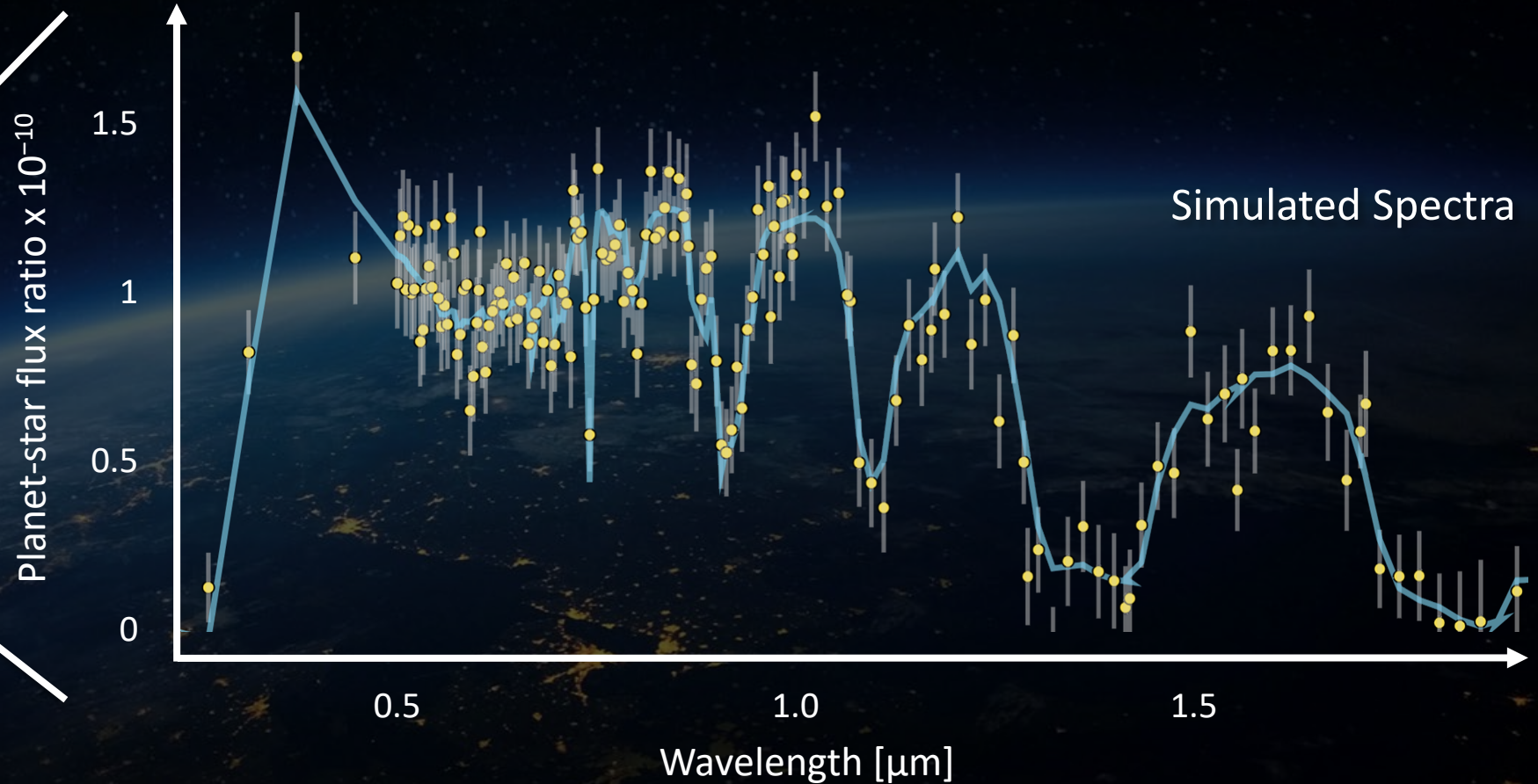
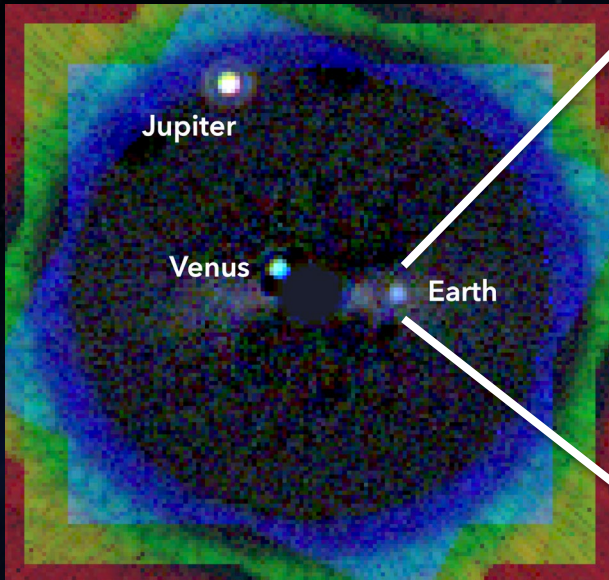


HWO Simulated Image



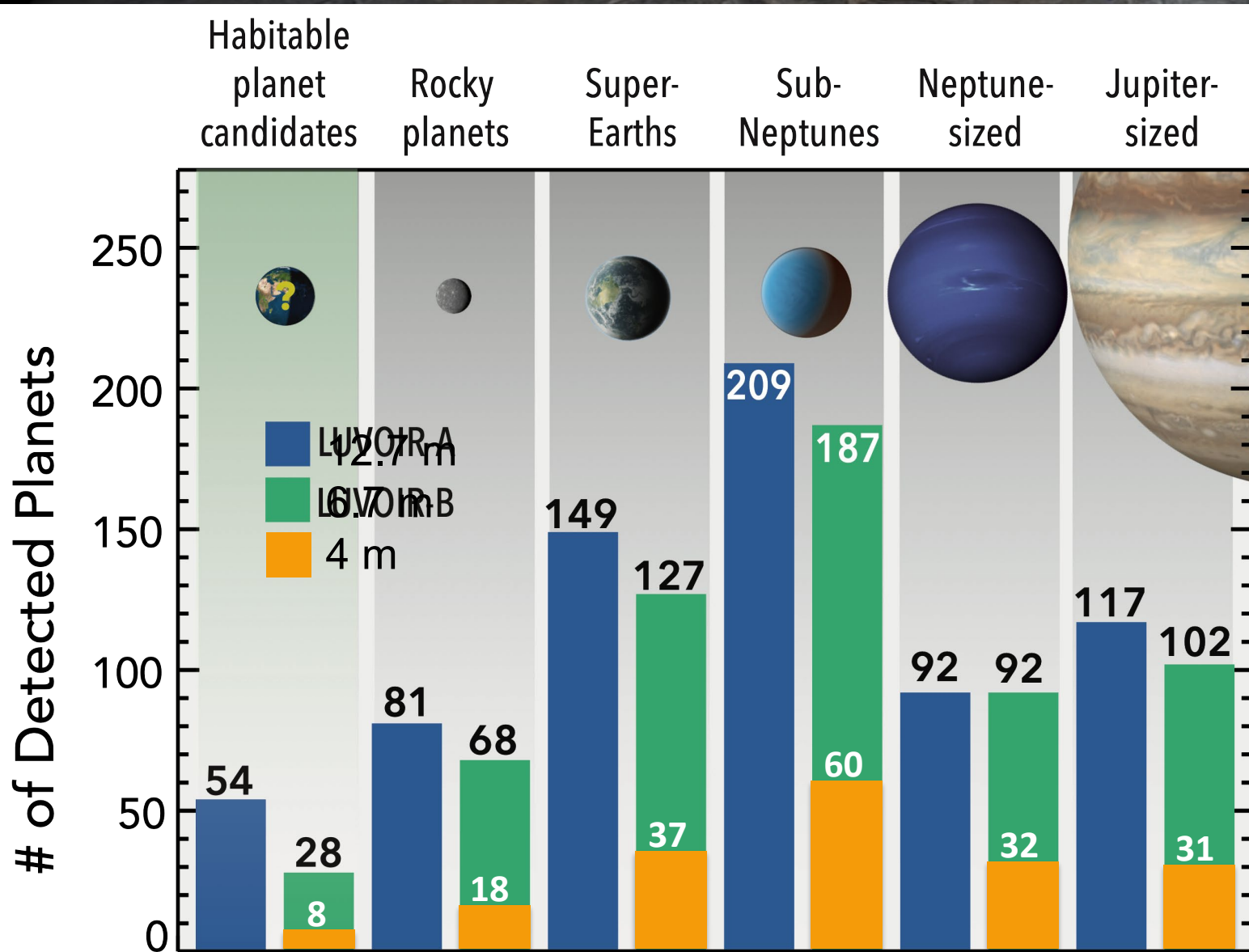


# SEARCHING FOR LIFE OUTSIDE THE SOLAR SYSTEM



Analyze light directly reflected by the planet, with little or no starlight mixed in

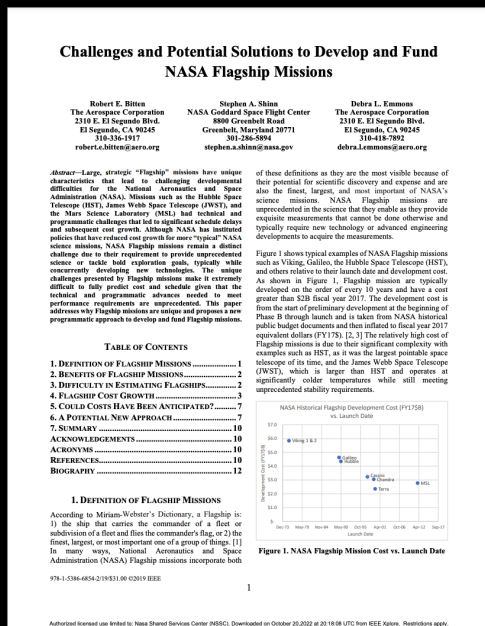
# EXPLORING THE DIVERSE RANGE OF EXOPLANETS



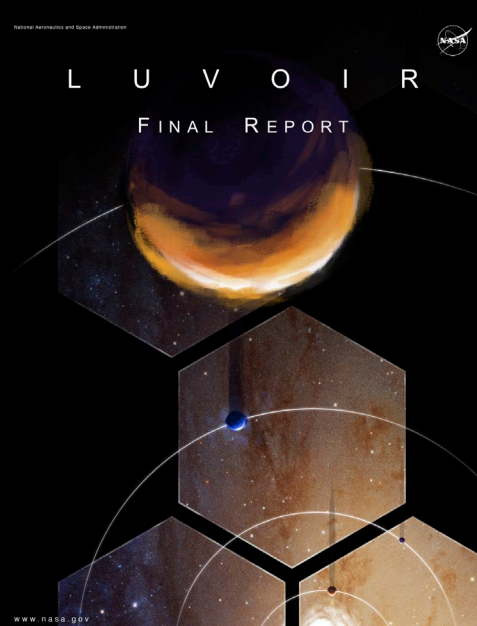
HWO can reveal what  
these exotic worlds  
are really like



## Independent Research Papers



## Mission Concept Reports



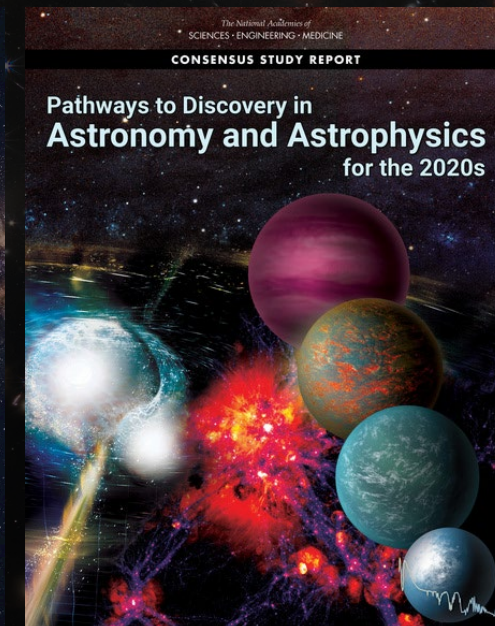
## GAO Report on Major Projects



## SMD Internal Study on Flagship Projects



## National Academy Recommendations



A variety of documents from internal, external, and oversight groups all point to a consistent set of problems & solutions for large/flagship projects, across sectors



# The Habitable Worlds Observatory:

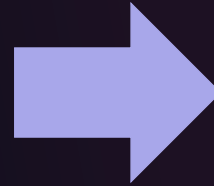
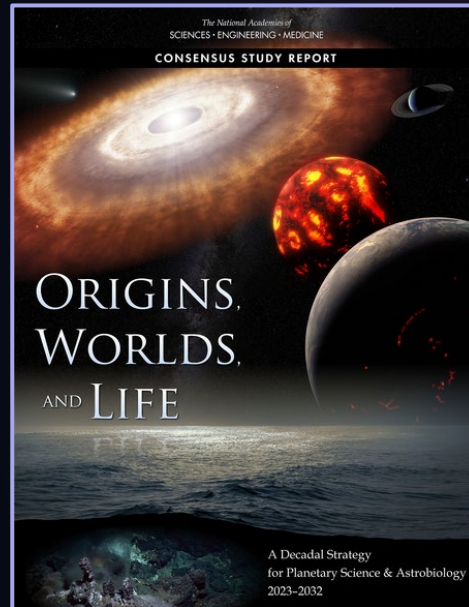
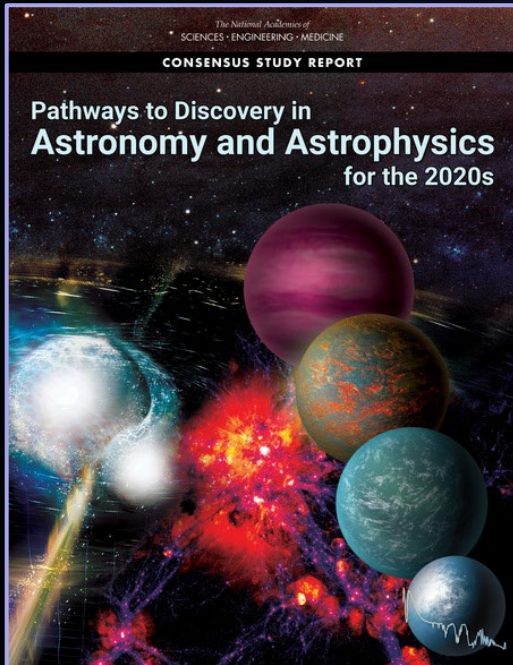
## *Big Picture Strategy*

- **Build to schedule:** Mission Level 1 Requirement - like planetary
- **Evolve technology from what we have done before:**
  - Build upon current NASA investments and TRL-9 technology
  - Segmented optical telescope system from JWST
  - Coronagraph from Roman's coronagraphic imager program
- **Next Generation Rockets:**
  - Larger telescope aperture sizes
  - Leverage opportunities for mass & volume trades
- **Planned Servicing:** Robotic servicing at L2
- **Robust Margins:** Large scientific, technical, and programmatic margins
- **Mature technologies first:** Reduce risk by fully maturing the technologies prior to development phase.



# The Science, Technology, Architecture Review Team (START) : Involve the Community

Responsibility: HWO Scope



## Objectives:

HWO Goals, objectives, & observations

Quantify all science objectives

Identify performance breakpoints

Build in robust margins

Roadmap Science Traceability Matrix (STM)

## Additional Activities:

Mentoring

Super START: Science Analysis

Precursor Science



# The HWO START Selection Process

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## START Co-chair required expertise:

- Leading diverse/inclusive teams
- Leading community-facing initiatives
- Demonstrated knowledge of mission studies
- Experience in HWO-related science/engineering
- Diversity of intellectual expertise and of demographic backgrounds.

## SELECTED CO-CHAIRS



•Courtney Dressing



•John O'Meara

•University of California, Berkeley •W. M. Keck Observatory

## START Member required expertise:

- Demonstrated commitment to fostering diverse and inclusive teams
- Commitment to community-facing activities
- Capability to conduct analyses outside team meetings
- Capable to serve as a mentor
- Expertise in HWO-related science/engineering/technology
- Achieve “team balance” with diverse institutions and knowledge base
- Self-identified diversity and input to diversify the START was considered



*Link to selection  
announcement*

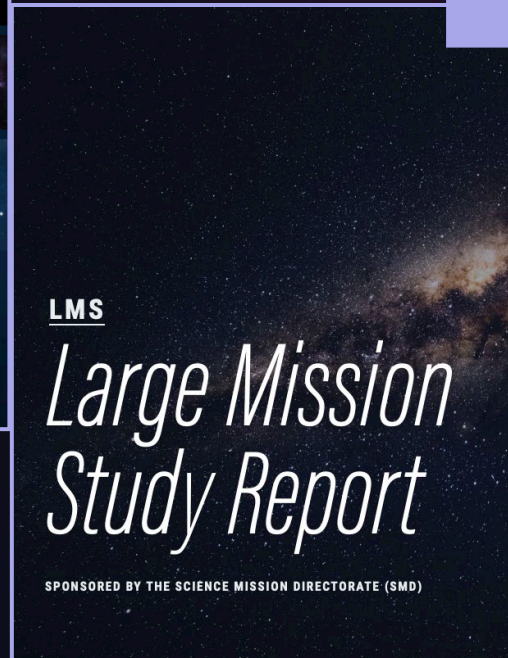
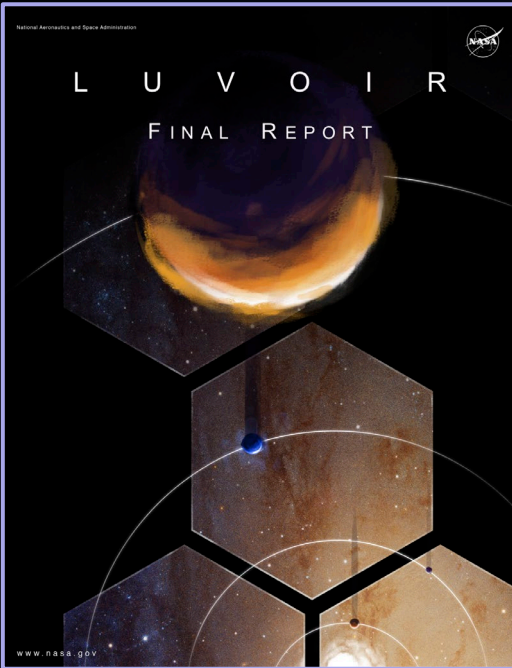


# START MEMBERSHIP

Name	Institution
Charlie Atkinson (ex-officio)	Northrop Grumman
Giada Arney	GSFC
Natasha Batalha	Ames
Eric Burns	LSU
Jessie Christiansen	NExScI
Courtney Dressing ( <b>Co-Chair</b> )	UC Berkeley
Matthew East (ex-officio)	L3Harris
Kevin France	CU-Boulder
Scott Gaudi	Ohio State University
Renyu Hu	JPL
Alina Kiessling	JPL
Janice Lee	STScI
Bruce Macintosh	UCO
Eric Mamajek (ex-officio)	ExEP

Name	Institution
Alison Nordt (ex-officio)	Lockheed Martin
John O'Meara ( <b>Co-Chair</b> )	W. M. Keck Observatory
Jim Oschmann	retired
Rachel Osten	STScI
Chris Packham	UTSA
Lynnae Quick	GSFC
Swara Ravindranath (ex-officio)	COR
Jason Rhodes	JPL
Jane Rigby	GSFC
Ty Robinson	U of A
Dmitry Savransky	Cornell University
Evan Scannapieco	ASU
Evgenya Shkolnik	ASU
Erik Wilkinson (ex-officio)	Ball Aerospace

# The Technical Assessment Group (TAG): Involve the Community



## Responsibility:

HWO Responsiveness

## Objectives:

Evolved Architecture Analyses  
Aerospace Landscape Survey  
Architecture Trade Deep Dives  
Build in Robust Margins

## Acting groups:

The TAG + Mentoring  
Super TAG: Engineering Analysis  
Aerospace Landscape Teams  
Architecture Trades Teams



## SELECTED NASA CO-CHAIRS

Goddard Space Flight Center Jet Propulsion Laboratory



•Lee Feinberg  
Co-Chair Engineer



John Ziemer  
Engineer Co-Chair



Aki Roberge  
Co-Chair Scientist



Bertrand Mennesson  
Co-Chair Scientist

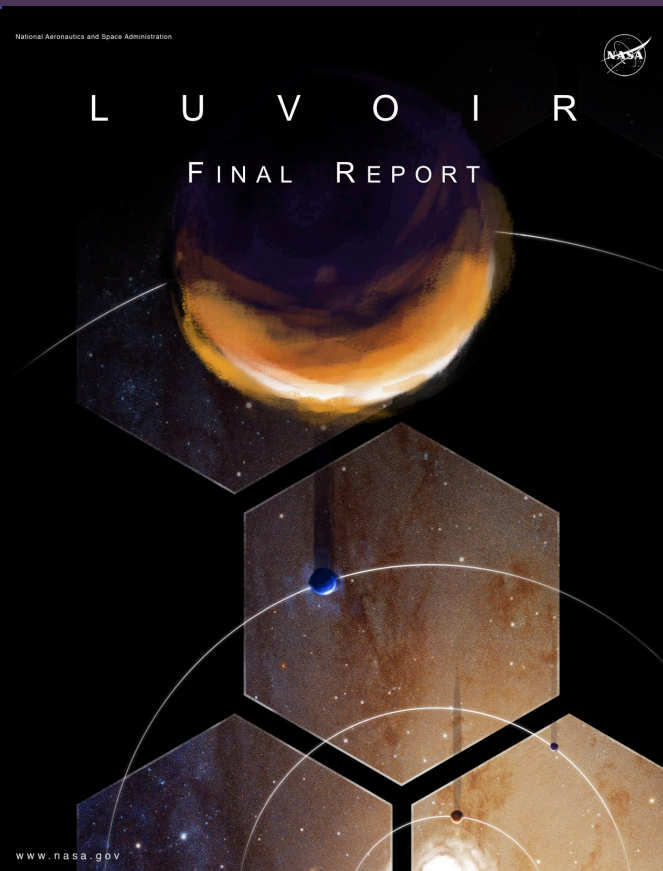
## The TAG Selection Process:

### TAG Co-chair required expertise:

- Leading diverse/inclusive teams
- Leading community-facing initiatives
- Demonstrated knowledge of mission studies
- Experience in HWO-related science/engineering
- Intellectual & demographic diversity

### TAG Member expertise:

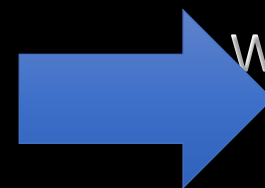
- Demonstrated commitment to fostering diverse and inclusive teams
- Commitment to community-facing activities
- Capability to conduct analyses outside team meetings
- Capable to serve as a mentor
- Expertise in HWO-related science/engineering/technology
- Intellectual & demographic diversity



What architecture trades remain?

How are those trades related/coupled to each other?

Which trades are the most important to study now?



What are the technologies associated with those trades?

What cost/schedule risks exist for those trades?

How might those risks be mitigated?

How can external partners be involved?



# TAG MEMBERSHIP

Name	Institution
Ruslan Belikov	ARC
Matthew Bolcar	GSFC
Jason Derleth (ex-officio)	COR
Lee Feinberg (Eng. Co-Chair)	GSFC
Kevin Fogarty	ARC
Jessica Gaskin	MSFC
Thomas Greene	ARC
Brian Kern	JPL
Marie Levine	JPL
Alice Liu	GSFC
Sangeeta Malhotra	GSFC
Dimitri Mawet	JPL
Michael McElwain	GSFC
Bertrand Mennesson (Sci. Co-Chair)	JPL

Name	Institution
Michael Menzel	GSFC
Patrick Morrissey	JPL
Niki Parenteau	ARC
David Redding	JPL
Aki Roberge (Sci. Co-Chair)	GSFC
Stuart Shaklan	JPL
Nick Siegler (ex-officio)	ExEP
Breann Sitarski	GSFC
Philip Stahl	MSFC
Christopher Stark	GSFC
Julie van Campen	GSFC
Feng Zhao	JPL
John Ziemer (Eng. Co-Chair)	JPL
TBA member - deferred start date	JPL

# HWO START/TAG FACE TO FACE MEETING

## OCT 31 – NOV 2

### Day 1:

- Welcome! Goals for START/TAG. Mission development and systems engineering intro. HabEx/LUVOIR review.  
Breakout: What excites you about HWO? What are our 1-year goals?

### Day 2:

- Lessons from JWST & Roman for HWO. Lessons from industry expertise.  
Breakout: Identify key questions across START/TAG & initial working groups.

### Day 3:

- Mentorship program and workforce development workshop.  
Breakout: What approaches, programs and resources do we have for IDEA?  
Breakout: What are our audiences, messages, and plans for communication?



# HWO SPLINTER SESSION @ AAS

## DATE/TIME TBD

“One-stop shopping for HWO breakouts”

We plan to invite talks from the following groups:

- START
- TAG
- Technology roadmap teams
- Other working groups (e.g., yields team)
- Lightning talks from relevant SAT grants
- Lightning talks from Precursor Science grants
- NGO-relevant SAG's
- PAG's

... plus lots of discussion time!

## Community Activities

- Program Analysis Groups
  - Science Analysis Groups
  - Science Interest Groups
- Public portions of START/TAG meetings

## NASA-formed groups

- Science, Technology, Architecture Review Team
- Technical Assessment Team
- START/TAG Working Groups
- Mentorship program (details TBD)

## Competed Calls

- Astrophysics Decadal Survey Precursor Science (ROSES)
- Strategic Astrophysics Technologies (ROSES)
- EPRV Foundation Science (ROSES)
- Future technology calls (ROSES)
- Future architecture deep dive calls (TBD)





## Now:

- Incorporate IDEA into START and TAG meetings and activities. Specific plans to be worked with co-leads and ultimately members of those groups. For details, tune into the face-to-face meeting. (Especially day 3!)

## Long-term:

- Develop IDEA plan for HWO. Would like to work with external partners on this to institute “one-team culture” on HWO, and to help ensure IDEA principles are present throughout project.



NASA Astrophysics Statement of Principles:  
[go.nasa.gov/3Kwn07s](https://go.nasa.gov/3Kwn07s)



NASA GOMAP website:  
[go.nasa.gov/4107ZzC](https://go.nasa.gov/4107ZzC)



[julie.a.crooke@nasa.gov](mailto:julie.a.crooke@nasa.gov)  
[shawn.goldman@nasa.gov](mailto:shawn.goldman@nasa.gov)





BACKUP:



