



# HWO START/TAG Scope

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

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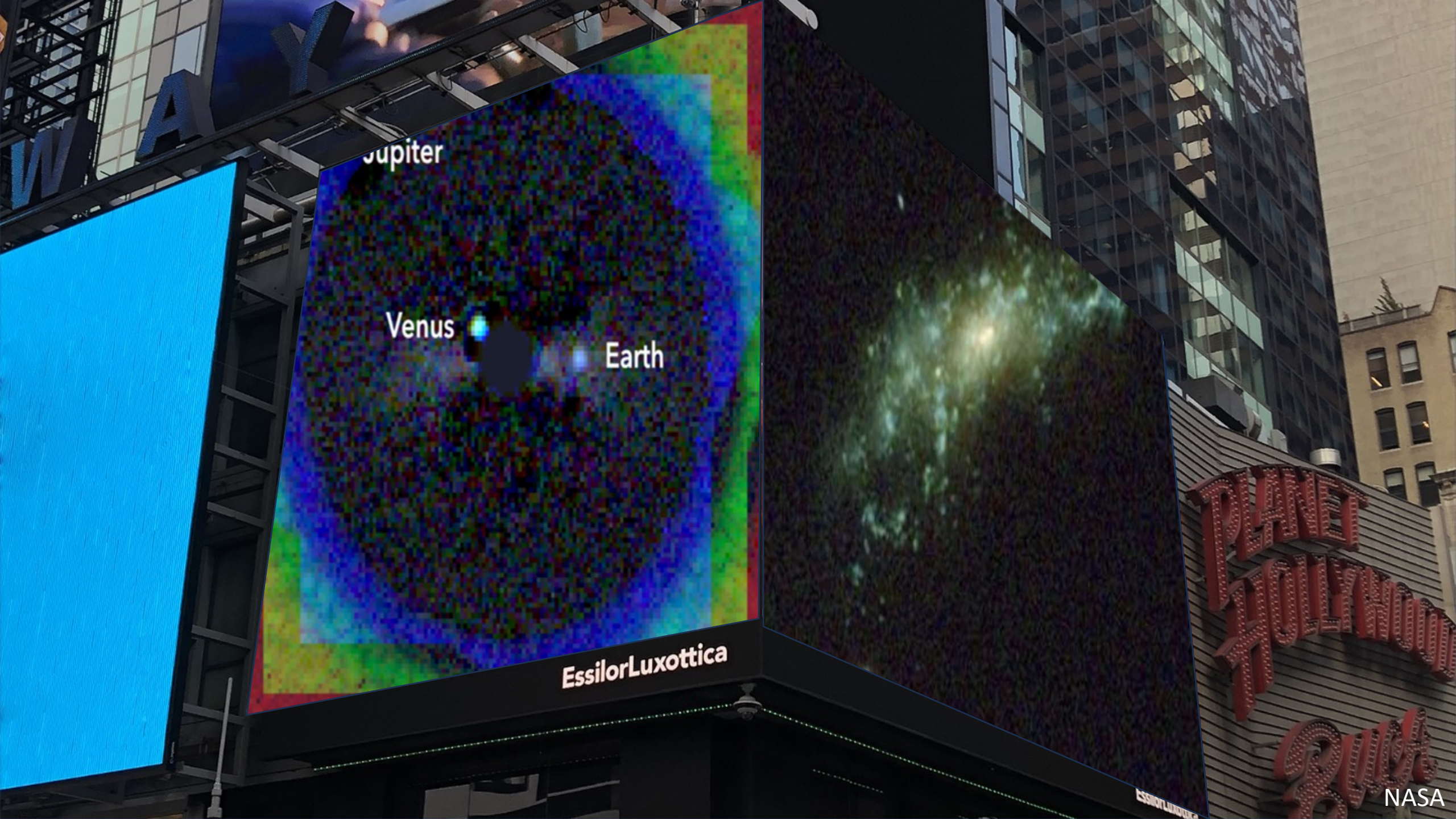
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Jupiter

Venus

Earth

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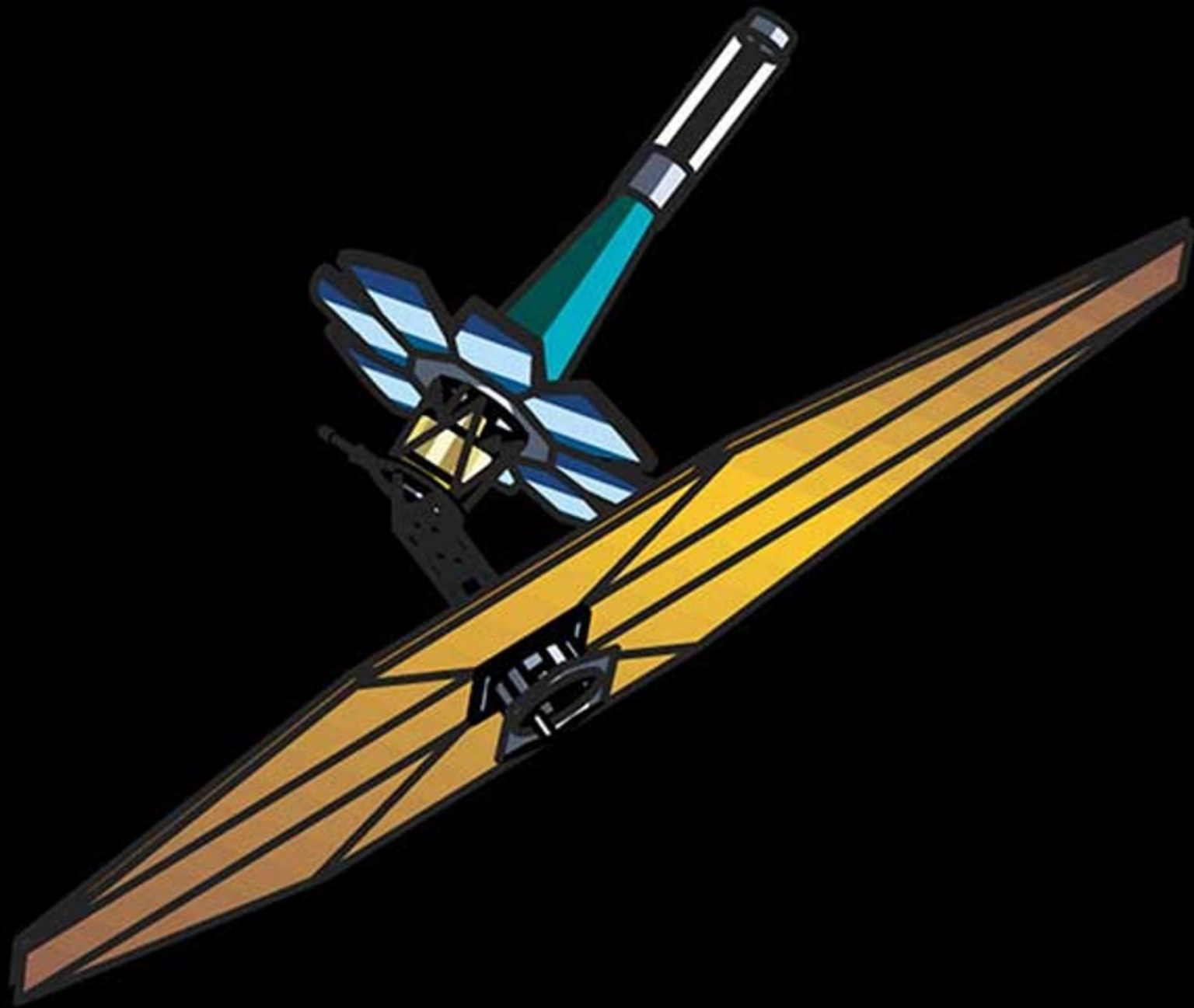




NORTHROP  
GRUMMAN







**Recommendation:** After a successful mission and technology maturation program, NASA should embark on a program to realize a mission to search for biosignatures from a robust number of about ~25 habitable zone planets and to be a transformative facility for general astrophysics. If mission and technology maturation are successful, as determined by an independent review, implementation should start in the latter part of the decade, with a target launch in the first half of the 2040's



**Recommendation:** The NASA Astrophysics Division should establish a Great Observatories Mission and Technology Maturation Program, the purpose of which is to co-develop the science, mission architecture, and technologies for NASA large strategic missions identified as high priority by decadal surveys

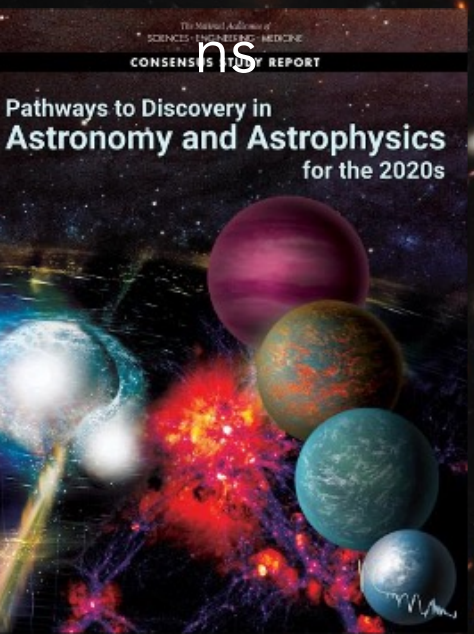
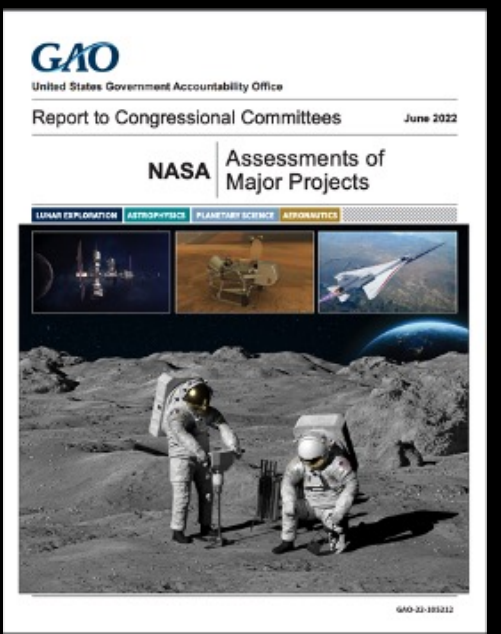
Independent Research Papers

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.

Think slow, act fast.



Set the scope.

Identify the architectures that achieve the scope.

Advance the technologies for the architectures.

Build it with a community.

All the while, keep the end goal in mind.

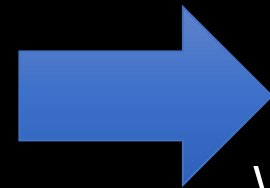
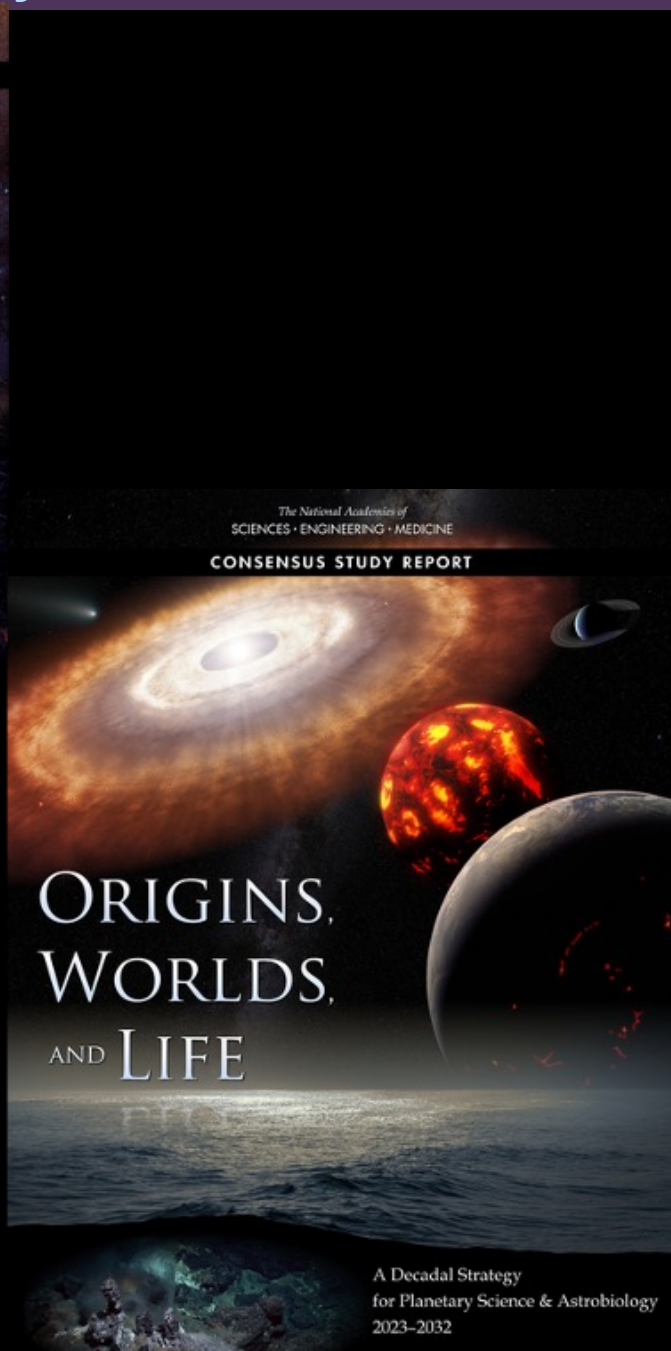
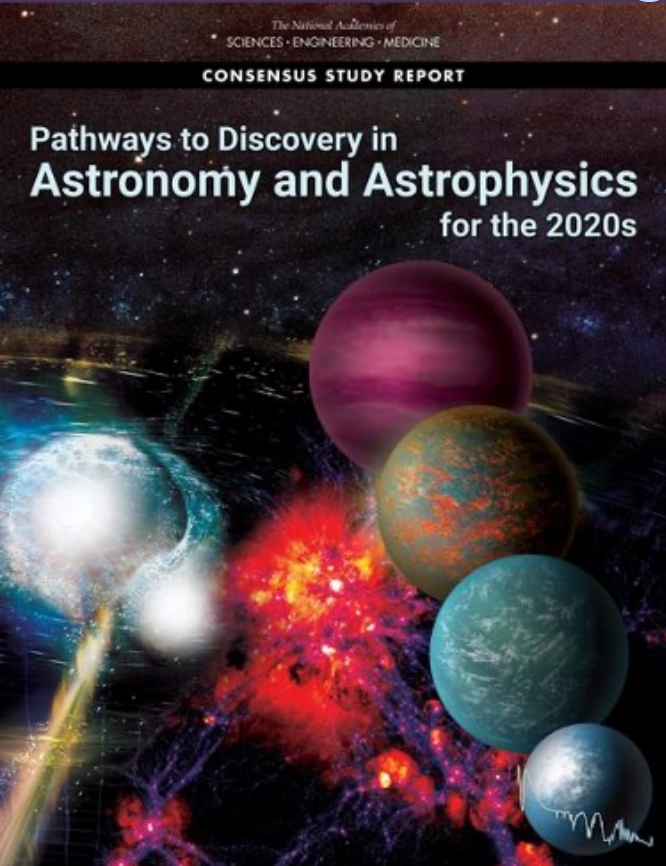
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Which decadal science questions can HWO help address?

What observations do we need to answer those questions?

What capabilities will deliver those observations?

What performance can we expect?

Where do performance breakpoints exist?

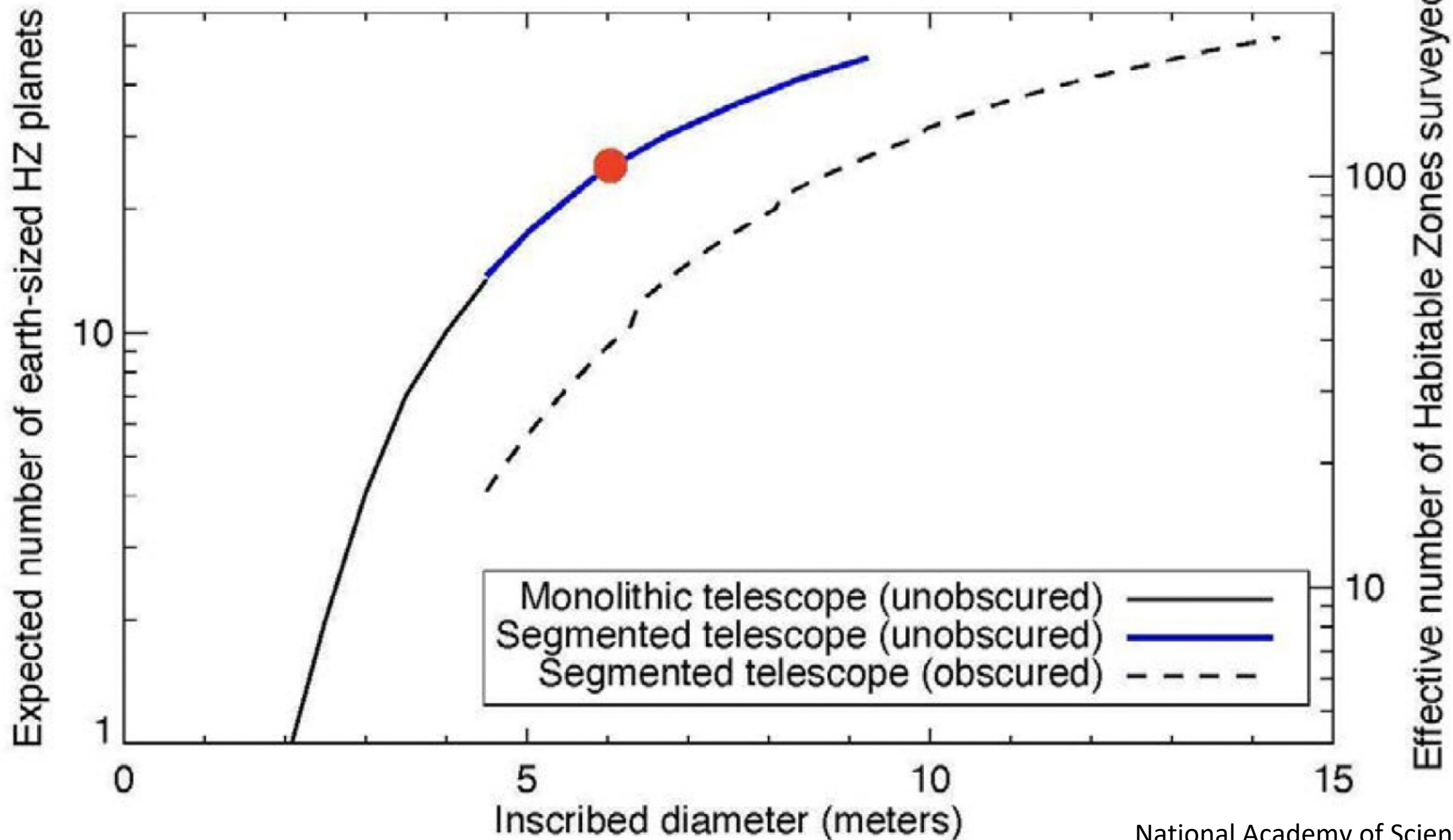
What models do we need to predict performance?

The simplest way to define the scope of the START:

Write down the parts of the science traceability matrix (STM) that don't have the word "requirements" in it.

For the parts of the STM with the word "requirements" in it, do the research that will let a future team define those requirements.





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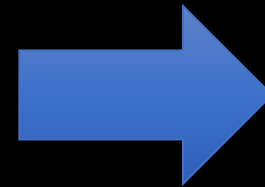
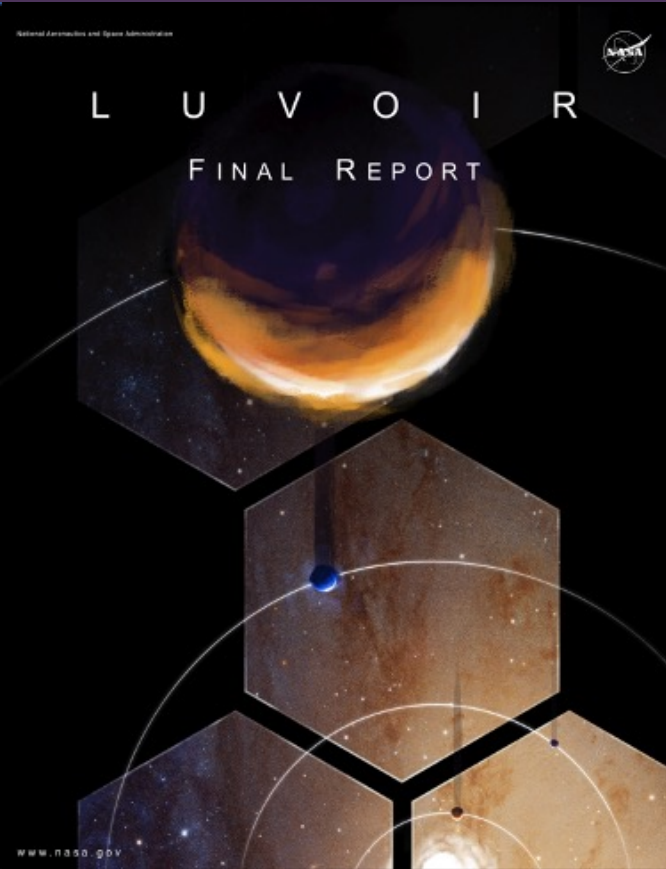
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The simplest way to define the scope of the TAG:

Take HWO to “concept maturity level 3 – “fully explore the trade space.”

Specifically, identify and study HWO architecture options, and develop a plan to advance HWO technologies.



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?

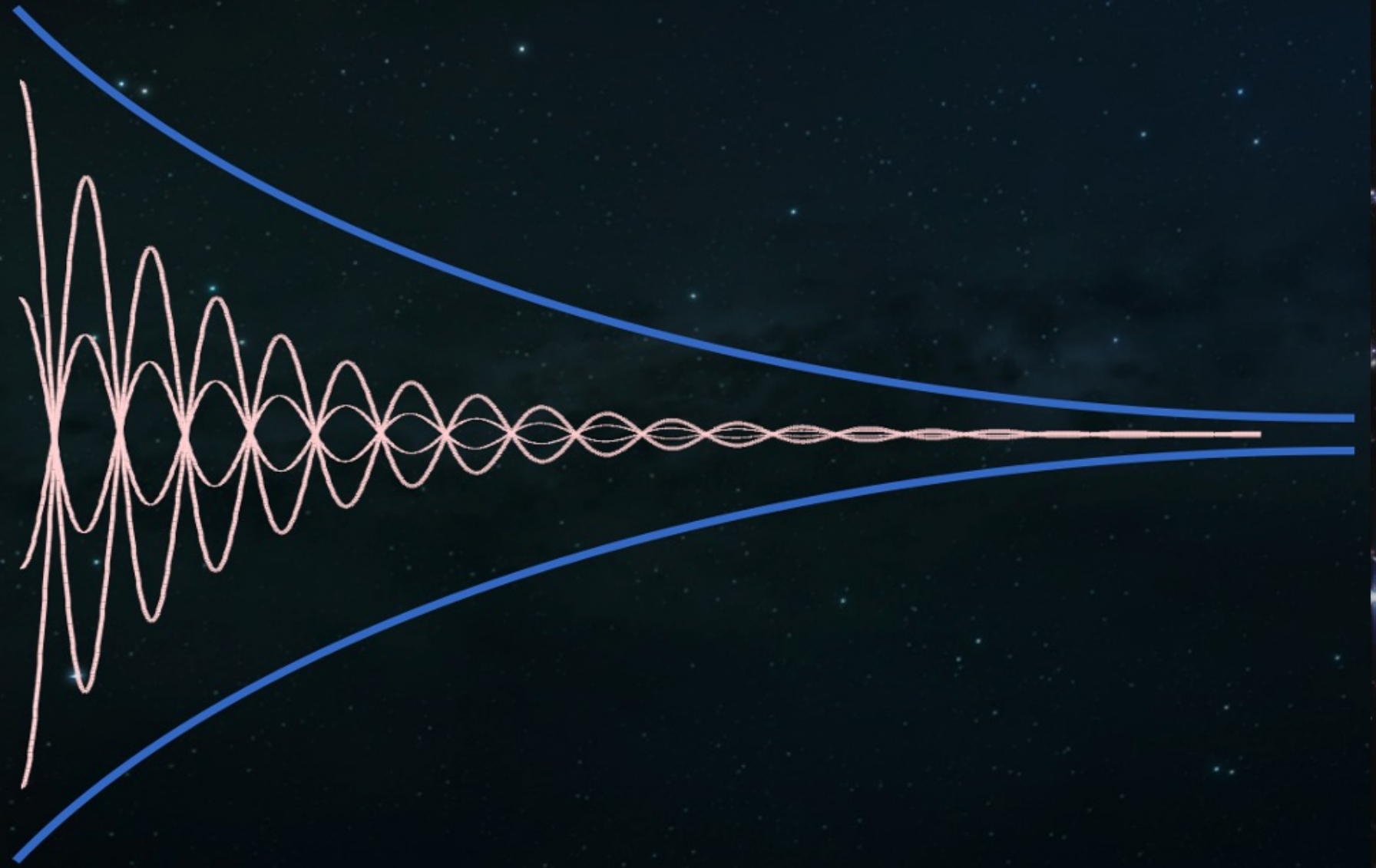
**Science  
Requirements**

**Mission  
Architecture**

**Technology**

**Mission  
Design**

**Timeline**



## START/TAG Timeline:

We want the scope above to be achieved in about one year.

After a year, we will reevaluate our scope and goals for the START/TAG, and we will open up a new call for new members.

The only way this will NOT happen is if a project office will be created soon after a year from now. In that case, we will start new teams to work with the project office.

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## NASA-formed groups and sub-groups

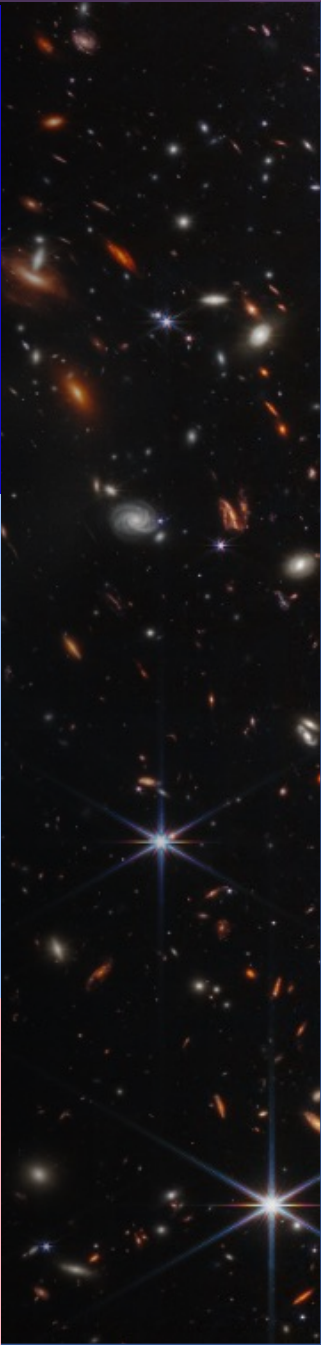
- Science, Technology, Architecture Review Team
- Technical Assessment Team
- START/TAG Working Groups
- START/TAG meetings
- Mentorship program (details TBD)

## Competed Calls

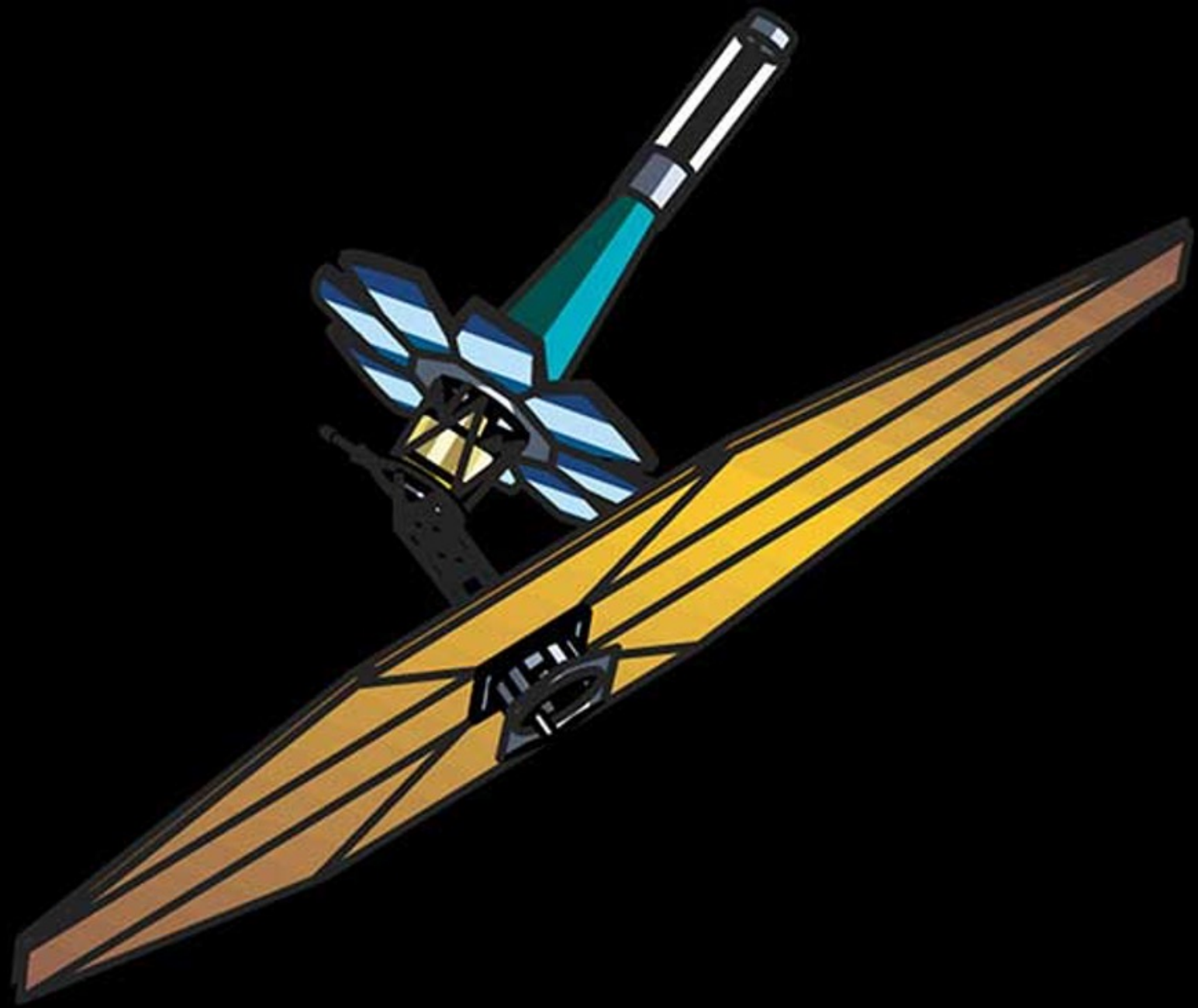
- Astrophysics Decadal Survey Precursor Science (ROSES)
- Strategic Astrophysics Technologies (ROSES)
- EPRV Foundation Science (ROSES)
- Future technology calls (ROSES)
- Future architecture deep dive calls (TBD)

## Community Activities

- Program Analysis Groups
  - Science Analysis Groups
  - Science Interest Groups









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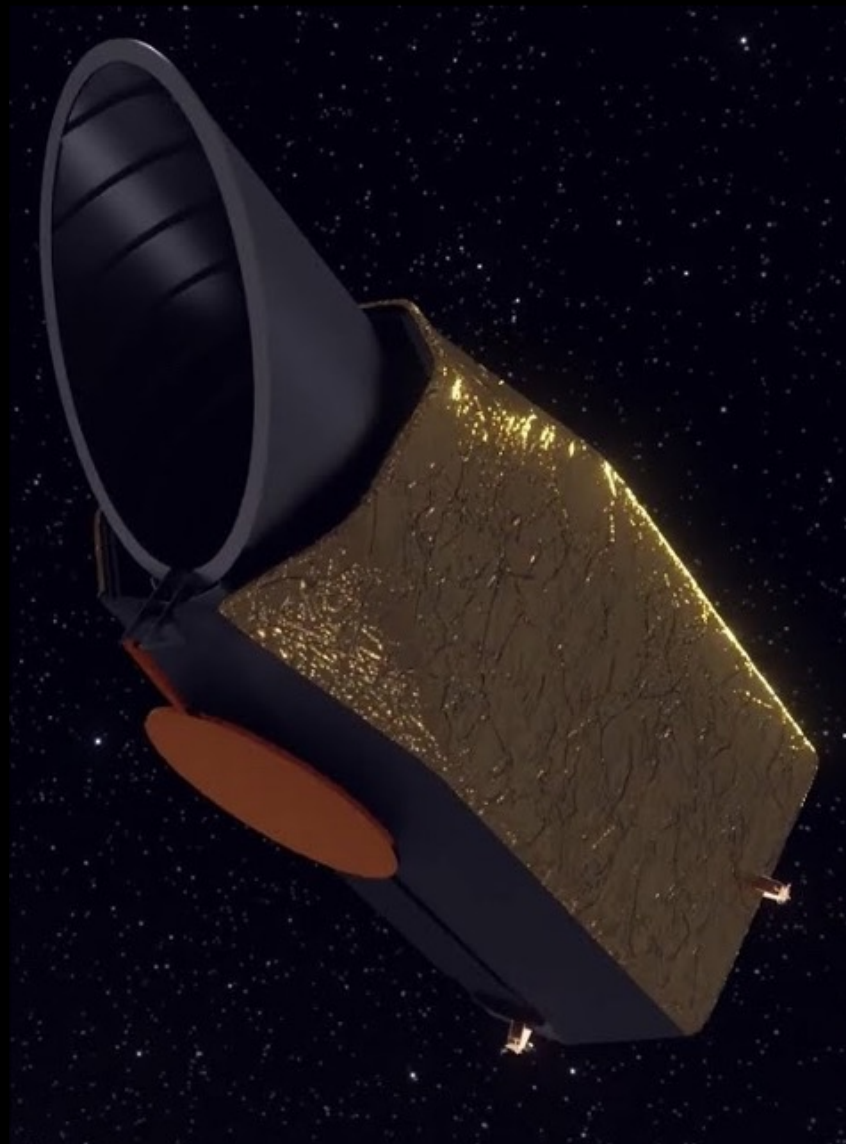
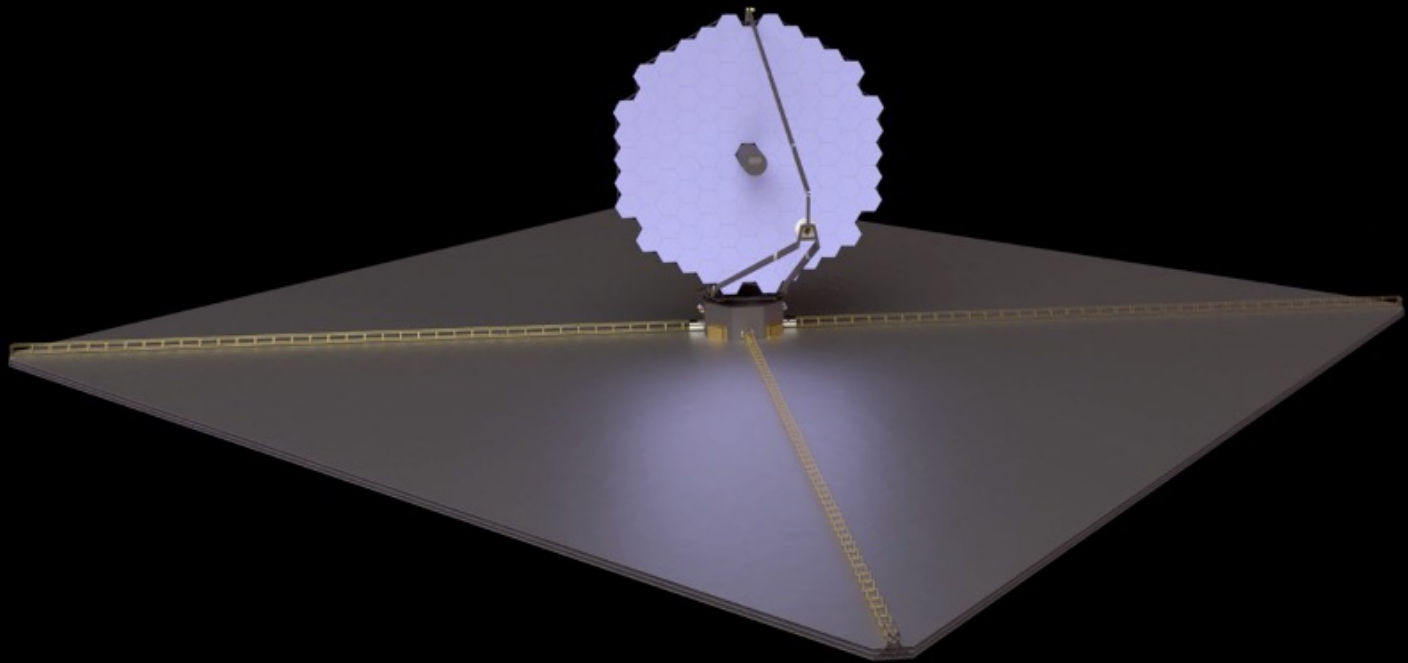
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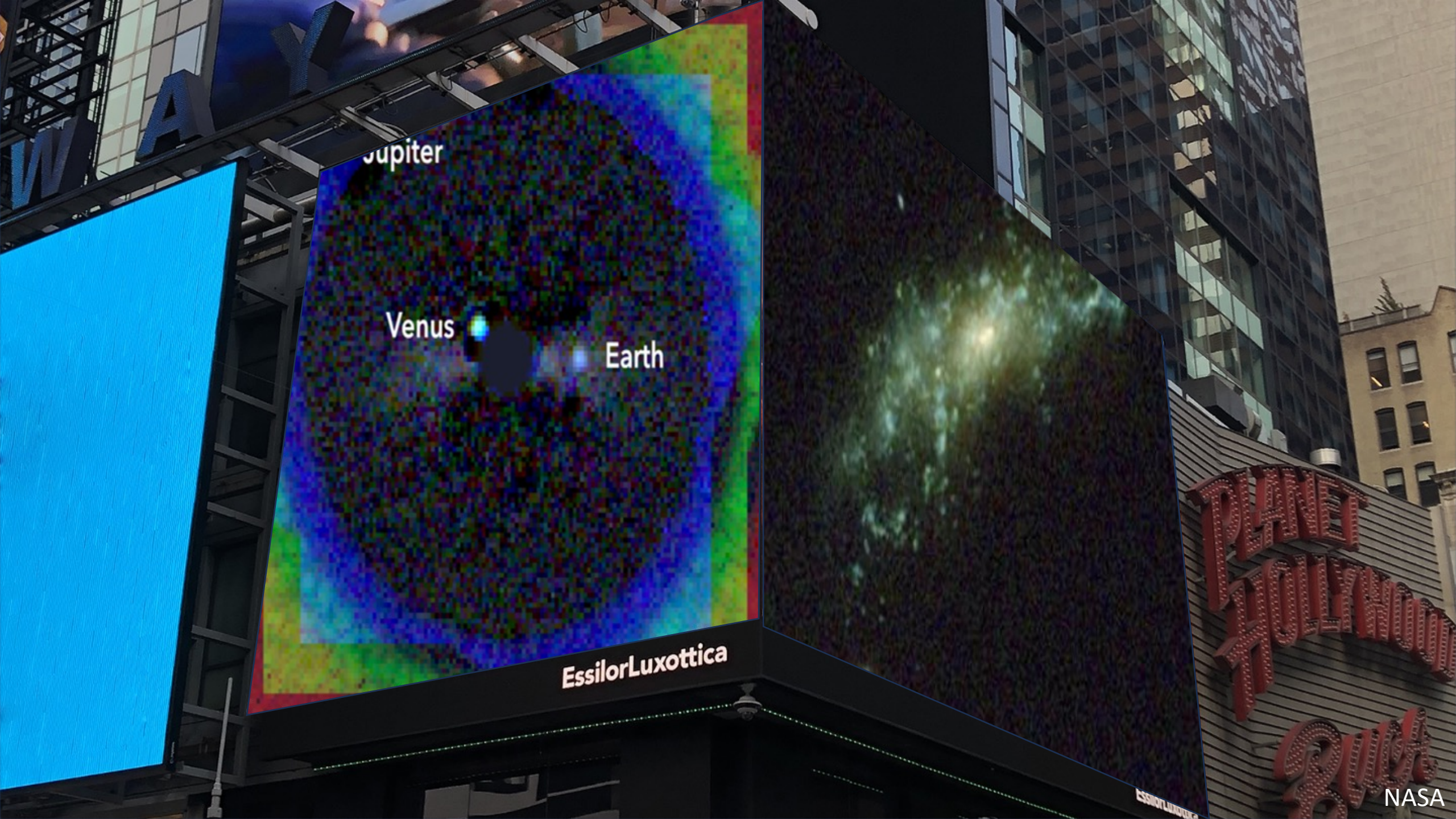
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WAY

Jupiter

Venus

Earth

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BELIEVE



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)



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BACKUP:



