GOMAP Update

NASA Astrophysics Great Observatory Maturation Program (GOMAP)
Program Executive: Julie Crooke (julie.a.crooke@nasa.gov)
Program Scientist: Shawn Domagal-Goldman(shawn.goldman@nasa.gov)
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Astrophysics

Decadal Survey Missions

1972
Decadal Survey
Hubble

1982
Decadal Survey
Spitzer

1991
Decadal Survey
Webb

2001
Decadal Survey
Roman

2010
Decadal Survey

2021
Decadal Survey
STUDYING THE LIFECYCLES OF GALAXIES
PROBING THE PROPERTIES OF DARK MATTER WITH DWARF GALAXIES

Hubb...
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
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.
We are here.
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.
Advancing the HWO Concept

Timeline
Advancing the HWO Concept
What 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?
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?

Technical Assessment Group (TAG)
We are here.
Near-Term HWO

Goal:  
• Efficient project ready for funding

Objectives:  
• Ready for formal Pre-Phase A  
• Concept Maturity Level 3  
• Technologies at TRL4  
• Science goals & objectives explored

Roadmaps for:  
• Concept Maturity Level 5  
• Technology Readiness Level ≥ 6  
• Science Traceability Matrix Definition

HWO By Astro2030

Goal:  
• Successful independent assessment

Objectives:  
• Ready for mission formulation  
• Concept Maturity Level 5  
• Technologies ≥ TRL 5  
• Science Traceability Matrix finalized

Roadmaps for:  
• Concept Maturity Level 8  
• Technology Readiness Level ≥ 6
Near-Term FGOs 2,3

Goal:
• Continue advancing science/technology development via opportunities (probes, Explorers, suborbital missions, technologies)

Objectives:
• Technologies development
• Precursor science

FGOs 2,3 By Astro2030

Goal:
• Prepare and be ready for prioritization at Astro2030

Roadmaps for:
• Concept Maturity Level 5
• Technologies ≥ TRL 6
• Science Traceability Matrix definition

Range of opportunities to mature science and technologies:
• Probes
• Explorers
• Suborbital missions
• Technology development
### Before HWO Project

**HWO**
- Science, Technology, Architecture Review Team (START)
  - Develop left 2 columns of Science Traceability Matrix (STM)
- Technical Assessment Group
  - Explore trade space in context of current landscape opportunities
- Precursor science proposals
- SAT Competed Technology Calls
- Technology Roadmapping via Astrophysics Program Offices

#### FGO-2, FGO-3:
- Precursor science proposals
- SAT Competed Technology Calls

### With HWO Project

**HWO**
- Projectized Pre-Phase A and Phase A – managed by NASA HQ
  - Astrophysics Strategic Mission Program (ASMP)

**Pre-2030 Decadal: FGO-2, FGO-3**
- Technology Roadmapping
- Precursor science proposals
- SAT Competed Technology Calls
- Pre-Astro2030 Study Teams
## How who gets involve with HWO

### Community Activities
- Program Analysis Groups
  - Science Analysis Groups
  - Science Interest Groups
- START meetings (likely to be open)

### NASA-formed groups
- Science, Technology, Architecture Review Team
- Technology Roadmapping Groups
- Science Yields and Metrics Teams
- 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)
IDEA for GOMAP

Now:
• Selecting START co-chairs/members with objective criteria including ideas for inclusivity, and with diversity of team in mind

Soon:
• Incorporate IDEA into START and TAG meetings and activities. Specific plans to be worked with co-leads and ultimately members of those groups.

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.
How who gets involve with HWO

GOMAP HWO PE and PS

GOMAP Support from Program Offices

START & TAG Co-chairs

International Partners

Science, Technology, Architecture Review Team (START)

Precursor Science

Roadmapping Groups

Technical Assessment Group (TAG)

PAG/SA

Color Key
NASA formed groups
NASA only
Competed Work
Community Activities

Design/Architecture
Technology
Roadmapping
Groups
Questions and more information

NASA Astrophysics Statement of Principles:
go.nasa.gov/3Kwn07s

NASA GOMAP website:
go.nasa.gov/4107ZzC

julie.a.crooke@nasa.gov
shawn.goldman@nasa.gov