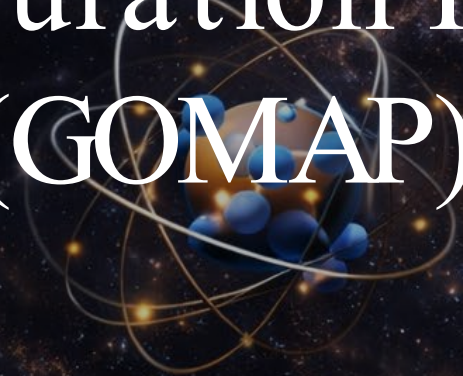
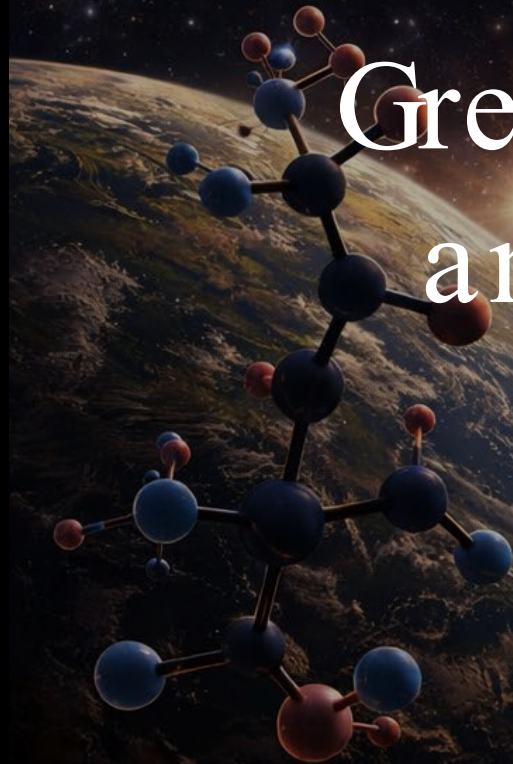


From Recommendation to Reality

Decadal → GOMAP → CSIT → Mission Architecture

Great Observatories Mission
and Maturation Program
(GOMAP)



The background of the entire page is a vibrant, multi-colored cosmic scene. It features a central bright yellow and orange starburst or galaxy core, surrounded by swirling nebulae in shades of red, blue, and purple. Several large, spherical planets or moons are visible, some with blue and white cloud patterns, others with reddish or brownish surfaces. The overall effect is a rich, detailed representation of the universe.

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

Pathways to Discovery in Astronomy and Astrophysics for the 2020s

nap.edu/astro2020

ORIGINS OF GOMAP

Optimizing the cadence and scale of strategic missions must recognize that evaluating strategic missions is a process that spans multiple decades. This optimization requires that:

- Decadal surveys set the scope for strategic missions presented to them, defining cost targets as deemed appropriate for the scientific return
- For compelling missions, a maturation program is established with significant investment is *co-developing the mission science, architecture, and technologies consistent with decadal advice*
- Clear gates are established prior to adoption accomplished through decadal surveys, mid-decadal reviews, or other independent reviews

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

GOMAP PROCESS: BURNDOWN GO PROGRAM RISK

Iterate Science Goals using teams to trade science and performance

Perform scientific simulations to define key objectives

Develop converging mission-specific technical capabilities using

development roadmaps,

subsystem-level demonstrations, and

demonstration of production processes of sufficient scale all with:

Multi-functional teams of scientists, technologists and industrial partners

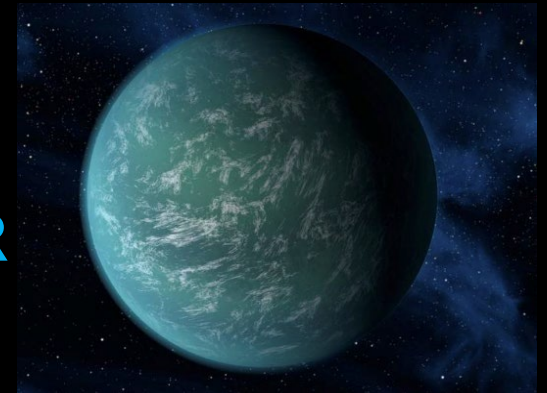
Define Mission Architecture. Trade achievable capabilities

GOMAP APPLICATIONS

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

First: the Habitable Worlds Observatory

Mid – late 2020s: Future strategic missions such as Far-IR spectroscopy and imaging, &/or a high spatial and spectral resolution X-ray mission



Select HWO Focused Resulting Actions

Science Technology Architecture Review Team (START) – '23-24

Technical Assessment Group (TAG) – '23 on

Technology maturation roadmap with architecture trades

Workshops: HWO Summer Meeting – July '25

–Results of over 1,000+ volunteers working science cases

Community Science and Instrument Team (CSIT) – '25 - present

HWO Assessment Board (HAB) – ramping up in '26

NASA, Academia, and Industry efforts producing results