



241st AAS Meeting

New Initiatives of NASA's Exoplanet Exploration Program (ExEP)

Pin Chen

Deputy Technology Manager, ExEP

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CL#22-6900

Preparing for the Habitable Worlds Observatory

1. Coronagraph Technology Roadmap (CTR) Development
2. DM Technology Roadmap (DMTR) Development
3. Coronagraph Architecture Survey (CAS)
4. Segmented OTA (optical telescope assembly) Simulator Study
5. Starlight Suppression Workshop

Coronagraph Technology Roadmap Working Group



Pin Chen
(NASA ExEP)

Primary Objectives:

1. Create a roadmap for coronagraph technologies to reach TRL 5 w/in this decade for the Habitable Worlds Observatory and describe path to TRL 6.
2. Inform NASA on prioritized investments in architectures, H/W, modeling, manufacturing capabilities, and test facilities to ensure coronagraph technology readiness.



Laurent Pueyo
(STScI)

- Will include coronagraph optics, WFS&C, detectors, and postprocessing
- Will encompass the observatory as part of the environment in which the coronagraph instrument must perform
- Will review HabEx/LUVOIR reports to identify any significant updates and changes for a ~ 6m observatory
- Will incorporate lessons learned from the Roman Space Telescope's (RST) Coronagraph Instrument
- Will include 30+ experts from industry, academia, NASA Centers, gov't labs

Deformable Mirror Technology Roadmap Working Group



Eduardo Bendek
(NASA JPL)



Tyler Groff
(NASA GSFC)

Primary Objectives:

1. Create a roadmap for DM technologies to reach TRL 5 for the Habitable Worlds Observatory this decade and describe path to TRL 6.
2. Inform NASA on prioritized vendors, manufacturing needs, and test facilities to ensure DM technology readiness.

- Will treat the DM as system that also includes the control electronics, cables, and connectors
- Will update DM plans as described in the HabEx/LUVOIR reports
- Will update the 2021 ExEP DM Survey to capture the latest updates
- Will incorporate DM lessons learned from RST's Coronagraph Instrument
- Will include 15-20 experts from industry, academia, NASA Centers, gov't labs

Coronagraph Architectures Survey



Rus Belikov
(NASA ARC)



Chris Stark
(NASA GSFC)

Primary Objectives:

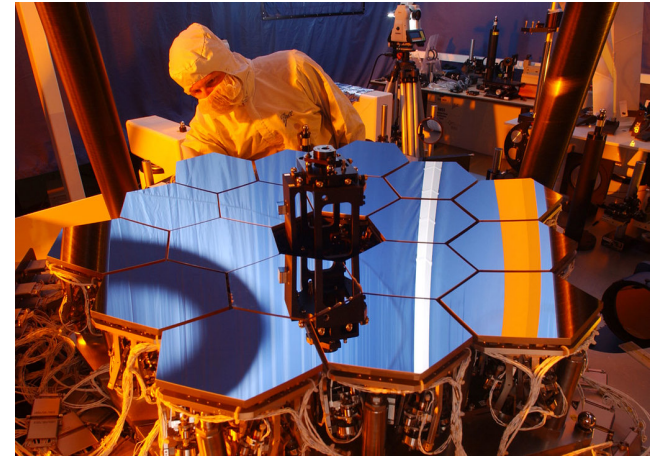
1. Survey and document viable coronagraph architectures across the world to inform the Habitable Worlds Observatory about their capabilities and technology readiness.
2. Identify novel coronagraph technologies that could mature rapidly for which NASA's technology development investments could be efficiently leveraged.

- Will inform NASA which architectures to prioritize in maturation.
- Will include both the opportunities that emergent options may offer along with their risks and challenges.
- Will include 15-20 experts from industry, academia, NASA Centers, gov't labs

Segmented Optical Telescope Assembly Simulator Study

Primary Objectives:

1. Determine a simulator's functionalities and performance levels
2. Estimate cost and schedule to assemble and test



1/6th scale JWST OTA simulator

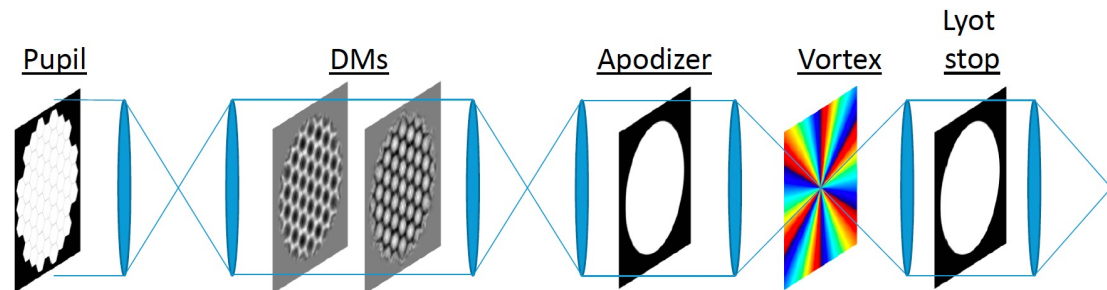
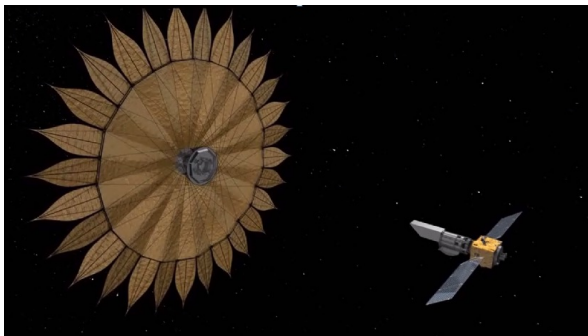
- Necessary for future coronagraph demonstrations with segmented pupils
- Intended to be integrated into the ExEP's High Contrast Imaging Testbed facility
- Formulation of this effort is underway, expected to include 10-15 experts from industry, academia, NASA Centers, and gov't labs

Starlight Suppression Workshop (hybrid)

Primary Objectives:

1. Offer a primer on how coronagraphs and starshades work
2. Present the state-of-the-art (lab demonstrations, modeling, hardware) vis-à-vis what performance levels are likely needed for the Habitable Worlds Observatory
3. Communicate plans, concerns, challenges, and risks moving forward

- Date: Tentatively Aug 8 – 10, 2023
- Let us know if you'd like to be part of the organizing committee



Volunteers Welcome

Interested participants please contact one of the following POCs:

- **Coronagraph Technology Roadmap:**
 - Pin Chen (pin.chen@jpl.nasa.gov), Laurent Pueyo (pueyo@stsci.edu)
- **Deformable Mirror Technology Roadmap:**
 - Eduardo Bendek-Selman (Eduardo.bendek@jpl.nasa.gov), Tyler Groff (tyler.d.groff@nasa.gov)
- **Coronagraph Architectures Survey:**
 - Rus Belikov (ruslan.belikov-1@nasa.gov), Chris Stark (christopher.c.stark@nasa.gov)
- **Segmented OTA Simulator Study:**
 - Nick Siegler (nicholas.siegler@jpl.nasa.gov)
- **Starlight Suppression Workshop:**
 - Brendan Crill (Brendan.P.Crill@jpl.nasa.gov)