



# **ExEP Resources Available to Strategic Astrophysics Technology (SAT)-2023 PIs**

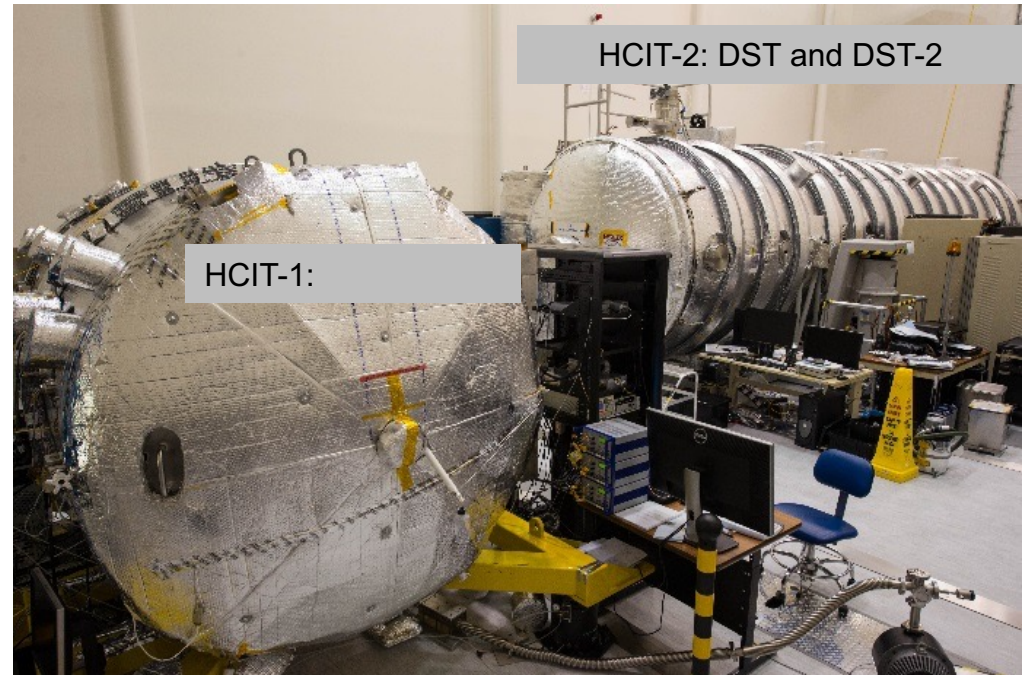
**Brendan Crill**  
**Deputy Program Chief Technologist**  
**NASA Exoplanet Exploration Program (ExEP)**  
**Jet Propulsion Laboratory/California Institute of Technology**

**11/14/23**

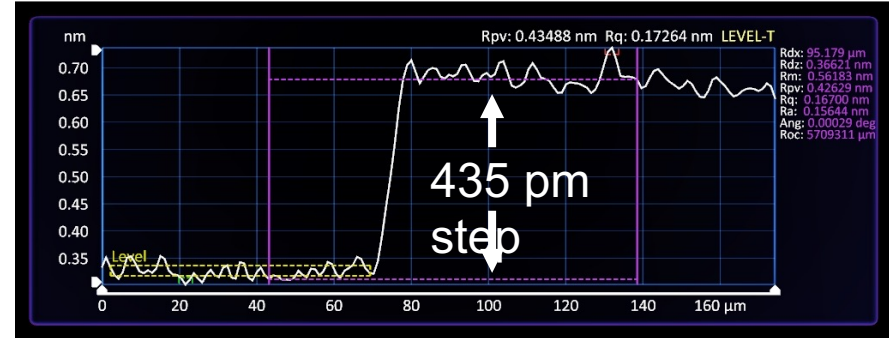
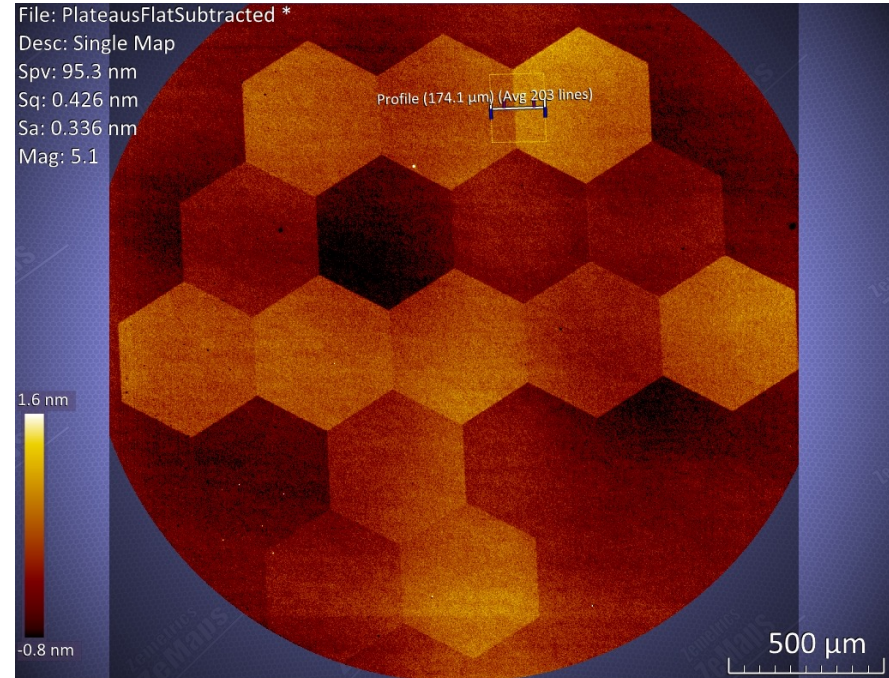
- This presentation provides an overview of the ExEP resources located at JPL available to support a Strategic Astrophysics Technology (SAT) proposal.
- The available resources, if appropriate for your needs, may help you more efficiently meet your milestone goals and reduce your proposal costs and schedule.

## Resources available on request:

- **High Contrast Imaging Testbed (HCIT) laboratory:**
  - Vacuum coronagraph testbeds:
    - Decadal Survey Testbed (DST)-1
    - DST-2
    - Vacuum Surface Gauge (for metrology)
    - HCIT-1
  - In-air coronagraph testbed
  - Reflectometry/polarimetry for mask characterization.



- ExEP has developed a reflective optic to simulate static sub-nm phase errors introduced by a hex-segmented telescope mirror.
- While the optical path differences of the hexagons have been measured, the masks have not yet been commissioned in a coronagraph testbed. Their use is being made available to SAT PIs for coronagraph demonstrations in the HCIT but on a shared risk basis.
- Additional masks with a range of optical path differences can now be manufactured at JPL's Microdevices Laboratory.



Optical path difference error measured across two segmented hexagons from Prototype 1 (2.5 mm); Prototype 2 (50 mm) has just been fabricated and is being optically mounted. Step size differences are produced through multiple overlapping rounds of photolithography and e-beam deposition. (image credit: Dr Dan Shanks, JPL)



# Gaining Access to the ExEP Resources at JPL



# How to Request Use of ExEP Resources at JPL



- **Submit preliminary Statement of Work (SOW) for use of ExEP resources to Brendan Crill no later than January 8, 2024.**
  - Follow SOW questionnaire on next page.
- **Schedule telecon with Brendan Crill before Jan 9, 2024 to discuss use of the resources of interest and to obtain costing guidelines.**
  - We will evaluate with the PI workforce, labor, and infrastructure access required across all received SOWs.
  - Proposal due date is January 31, 2024
- **Brendan Crill will supply the proposal PI a Letter of Commitment for use of any ExEP resources.**
  - PIs are to include both the SOW and the Letter of Commitment in their proposal (due January 31, 2024).
  - HCIT will provide workforce cost to set up testbeds; additional labor and unique procurements must be costed within the proposal.
- **The Letter of Commitment does not assure selection of the proposal; lack of a SOW or Letter in a submitted proposal could adversely affect proposals intended to utilize ExEP resources.**



## SOW Questionnaire for Use of ExEP Testbed Resources



- 1. Brief description of the proposed SAT**
- 2. What resources are requested?**
- 3. Milestone(s) to be accomplished and performance goals**
- 4. Brief description of how the work will be conducted**
- 5. Period(s) and preferred dates, if any, over which the resource is requested, stating whether in vacuum or air for testbeds. Include any time required for preparatory work.**
- 6. A list of the personnel, expertise, and level of effort (if any) who will assist in the use of the resource.**
- 7. Any anticipated changes to the resource needed to accommodate your demonstrations.**
- 8. List of items needed for all testbed modifications. Identify items you will be procuring within your proposal's budget and provide approximate cost of needed items.**
  - a. Otherwise, state that no additional procurements will be necessary for the use of the infrastructure under consideration.
- 9. Provide any other relevant information or constraints.**



# Strategic Astrophysics Technology Timeline



- The timeline for requesting access to ExEP resources is based on the dates specified in [ROSES SAT-2023](#)
- Mandatory notice-of-intent (NOI) to propose to SAT-2023 is due on [December 15, 2023](#)
- The proposal deadline is [January 31, 2024](#)



# ExEP Technology Resources POC



For questions concerning use of ExEP technology resources or requests for more detail contact:

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**Pasadena, CA 91109**

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## Additional Slides

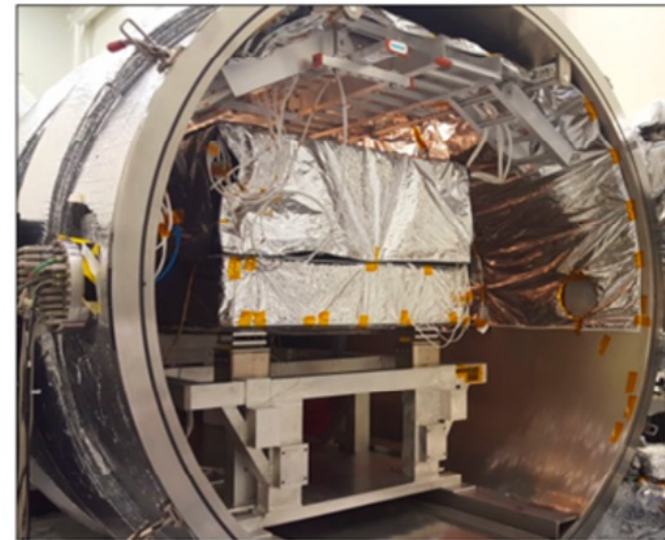
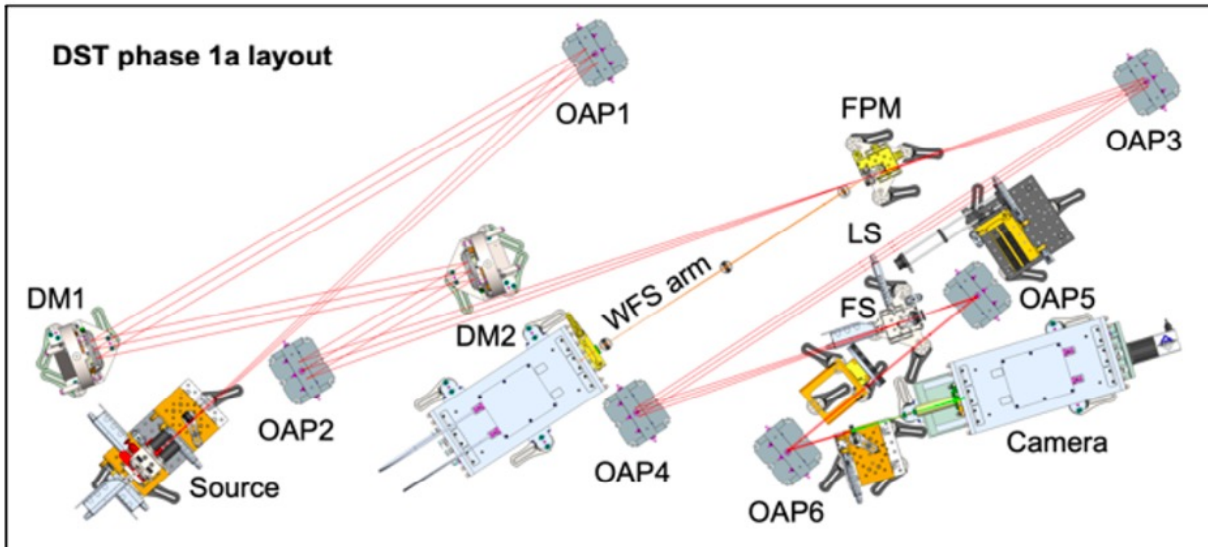


Figure 1: (Left) DST phase-1a commissioning layout.

(Right) The DST bench in the HCIT2 vacuum chamber, covered in multi-layer insulation (MLI) and resting atop a support frame, Minus-K isolators, and Vespel platforms.

(Right) The DST bench in the HCIT2 vacuum chamber, covered in multi-layer insulation (MLI) and resting atop a support frame, Minus-K isolators, and Vespel platforms.

# Decadal Survey Testbed 2 bench layout

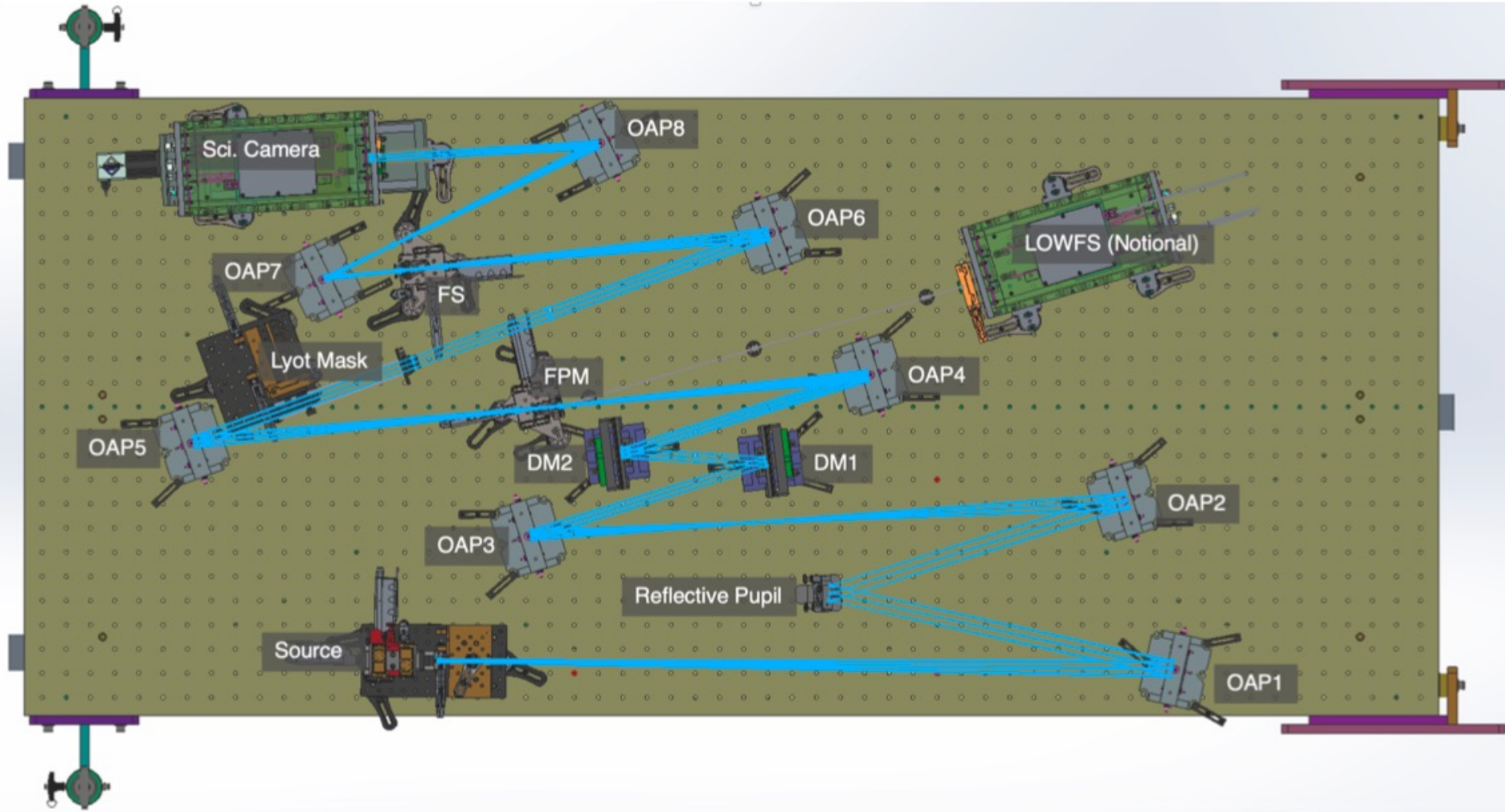


Figure 6: Top-down view of the DST2 bench CAD model with Zemax raytrace overlaid. Key elements are labeled.

Meeker et al. 2021 SPIE proceedings