



# Topic: Technology Development Needs



- ~~Topic: Technology Development Needs Common to~~ Exoplanet Exploration Program

## All/Most Teams

- Common denominator across the teams, however may not be a lot of overlap. And may force a lower priority technology dev that is common to all
- **Make progress on top  $n$  mission enabling technologies for each team, to avoid red risk**
- Red risk likely if well beyond state of art, not yet demonstrated (low trl <3 and maybe <4), no development plan, no backup. The more of these types of technologies are in the concept, the more likely a red risk, criticality
- What is a development plan? Does this imply an active program

## ~~What are examples of the common needs?~~

- Teams top 2 technologies – next page
- What are priorities of the common needs to the four studies?
- Are needs being addressed by SAT/APRA funding? What is the phasing of the development? Timing for Decadal/timing for mission.
  - Can influence process prior to decadal
  - Duration of the process – is it right sized?
- What are possible additional actions going forward?
  - Each team needs to assess and how much (technical gap, \$, time) to get techn needs to TRL 3



# Top 2 Technology Needs from each team



Exoplanet Exploration Program

OST	XRS	LUVOIR	HabEx	Other APD Investments	
Far IR detectors	X ray Optics	Segmented aperture coronagraph	Starshade model performance	LISA, WFIRST, ATHENA, SAT, STP, APRA	
Large format far IR arrays	Large format microcalorimeters	Ultra stable opto-mechanical systems	Large aperture monolithic primary mirror		



BACKUP



# Technology Concern



Exoplanet Exploration Program

- **Aki's Concern (more accurately: Matt Bolcar's Concern):**
  - *Technology gap funding for certain LUVOIR technology needs such as telescope stability may fall through the funding cracks (in between the APD Programs)*
- **Concern Background**
  - Telescope stability is a tall technology tent pole for LUVOIR, HabEx, and the ExEP. It was ranked lower by PCOS/COR.
  - Proposals for SAT research funding for telescope stability technology has traditionally not been requested by the ExEP SAT program but rather re-directed to PCOS/COR (there may be others)
  - If PCOS/COR ranked telescope stability technology low because it was exoplanet driven and ExEP ranked it high but won't receive proposals, funding proposals risk not getting selected within the PCOS/COR programs.
- **Note: the top LUVOIR technology needs are all covered between two of the APD Programs' technology gap lists.**
  - This implies that the process of identifying and prioritizing the technology needs works.



# Possible Solution



Exoplanet Exploration Program

- **To avoid technology proposals “falling through the crack” (mismatch between permitted proposal topics and Program technology priorities), the three APD Programs and HQ can work collaboratively.**
  - APD Program Technologists and Scientists can work with the SAT Program Officers (e.g. Perez, Hudgins) to inform them of the top technology needs from the other Programs.
  - The Program Officers can then decide if they want to broaden the Call language to ensure the top technology needs are eligible for proposals.
- **The Program Officers reserve the right to not include some top technology needs for a variety of reasons.**
  - An example may be the technology need is highly systems or architecture dependent and not sufficiently mature.
  - For example, telescope stability is considered a technology gap for the ExEP. Despite its high impact, its systems nature has resulted in a “wait and see” position and has not been included in the SAT/TDEM call to date.
  - However, a more narrow component level telescope stability technology proven to be a likely common component across a variety of architectures (e.g. edge sensors) may be considered as a step forward and made eligible.



# Another Possible Funding Approach



Exoplanet Exploration Program

- **Currently:**
  - Three APD Programs have their own SAT budget lines for proposals
  - Each Program has their own prioritized technology gap list
  - Each Program tries to mature their top technology needs
- **Alternative Paradigm:**
  - APD has a single SAT budget line for proposals
  - APD has a single facilitated prioritized technology gap list
  - APD endeavors to mature the overall top technology needs of the Division
- **Benefits:**
  - Less sub-optimizing technology needs within Programs; more focus on top APD technology needs
- **Challenges:**
  - Need clear evaluation criteria stretching over a very large science and wavelength range
    - How is the #1 X-Ray technology need assessed with respect to the #3 technology need of LUVOIR, for example?