

# Updates from the HLWAS Definition Committee

Presenters: Aaron Yung, Chris Hirata  
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# HLWAS Definition Committee Members



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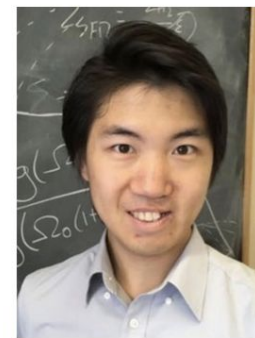
Ismael Tereno  
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Anja von der Linden  
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David Weinberg  
(Ohio State)



Aaron Yung  
(STScI)

# Themes / Questions

- The HLWAS serves a dual role as a cosmology "experiment" and a broader astronomical survey.
- We received 38 science white papers ranging from the Solar System to high-z galaxies and covering many topics in between.
- Science drivers span the full range of the depth — filter/grism coverage — area axes.
  - Roman can push on any one of the (depth,  $N_{\text{filter}}$ , area) axes, but in a given survey tier one comes at the expense of the other two.
- There are many synergies with other observatories, including those in a particular hemisphere, or past missions that surveyed specific footprints.
- The overall trade space is very complex!

# Work done

- The committee has met (almost) weekly since Feb 2024
- Ingested all white papers submitted back in mid-2023
  - All white papers were assigned to presenters and presented at our meetings.
  - This includes the Early Definition Survey white papers that were relevant to the HLWAS.
- We are familiarized with the Design Reference Mission.
  - However, the DRM is not the "default" plan — we can consider very different survey designs.
- Based on the white papers submitted, we split the requests into 3 tiers:
  - **Deep** — tens of  $\text{deg}^2$ , much deeper (e.g., cosmology sample calibration fields).
  - **Medium** — multiband imaging & spectroscopy, hundreds to  $\sim 2000 \text{ deg}^2$ .
  - **Wide** — single filter, extend footprint to  $\gg 2000 \text{ deg}^2$ .
- We have been on the current Roman mission status and updated performance estimates.
- Received baseline and overguide/underguide time allocations.

# Trade space

The baseline time allocation for the HLWAS (imaging + spectroscopy) is 505 days.

For the medium and wide tiers, most science cases benefit more from area than depth, pushing to shortest exposure time at which overheads do not dominate.

The main trade considerations given fixed total observing time are:

- Time allocation to deep, medium, wide tiers
- Spectroscopic vs. imaging area. (Spectroscopy takes more time than one-filter imaging but less time than four-filter imaging.)
- **For medium tier:** exposure time vs. # of filters vs. total area  
1 medium tier vs. 2 ("Medium-Deep" + "Medium-Wide")
- **For deep tier:** exposure time, # of passes, filter choice, cadence, imaging vs. spectroscopy, total area
- Footprint locations

# On-going work

- The committee is split up into 4 subgroups to work on:
  - (1) Med/Deep survey depth/area/bands (includes discussion of adding K band)
  - (2) Med/Deep survey field choice (includes North vs. Equatorial vs. South, as well as specific fields with external data)
  - (3) Med/Deep survey observing strategy (includes cadence & dithering)
  - (4) Wide Survey strategy
- Generate options for deeper study, which will include:
  - Scientific assessment against the white papers
  - Forecast cosmological constraints
  - Technical assessment of data processing/systematics issues

*This will involve collaboration with the PITs*
- Community report to be produced in August.
  - This will be an update, not a final report. It will discuss the trades and show options we are studying in more detail, but will not have a final recommended strategy.

# Ideas & Inputs

- The Roman HLWAS science [pitch form](#) is still active
- Email us at: [roman-surveys@lists.nasa.gov](mailto:roman-surveys@lists.nasa.gov)



## QUESTIONS?