



Mission Accessible Near-Earth Object Survey “Walk-on” Update

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Two Recent Updates

MANOS is a physical characterization survey based at Lowell, primarily interested in the the properties of “mission accessible” (low delta-V) objects and in furthering their study.

Two Brief Updates:

1. Astrometric capabilities of the Lowell Discovery Telescope
2. Recent LDT+IRTF observations of 2024 PT5

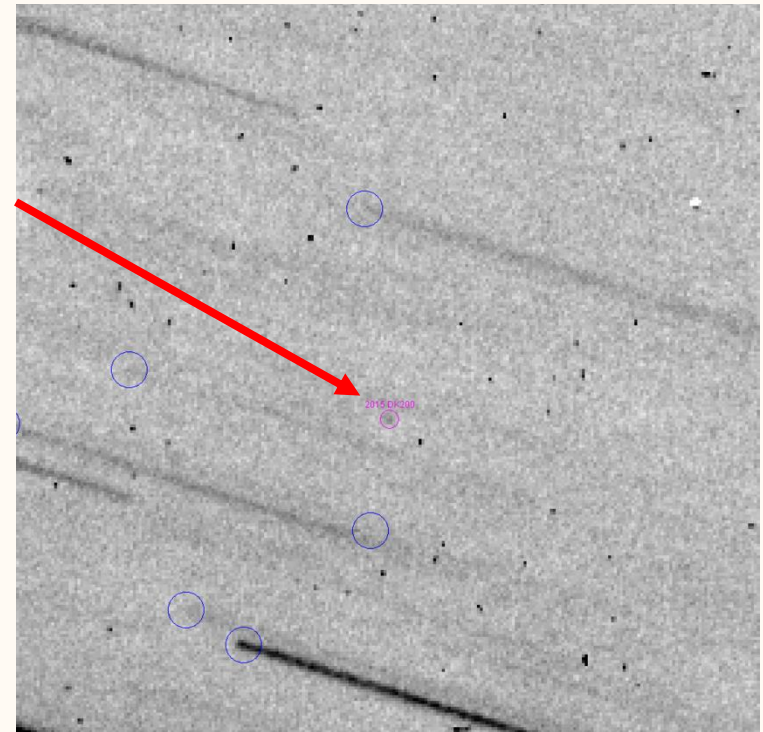


Astrometry of Fainter Targets

We have been aiming to obtain astrometry of fainter ($m_v > 24$) targets to both test the capabilities of the LDT and to facilitate arc extensions of Yarkovsky candidates to grow that population.

A recent example is this image stack of 2015 DK200, astrometry of which was accepted at $m_v = 25.1$.

We can achieve this depth in good conditions in about half an hour, providing a bridge between smaller and larger facilities.



Some Summertime Astrometric Stats.

Over the months of July and August, 17 total new Yarkovsky detections¹ were made – some strong ($>3\sigma$), some less ($\leq 3\sigma$).

- 11 of these 17 included LDT observations.
- 8 of those were *exclusively* LDT observations.

→ We only went after 15 objects astrometrically in that time!

About half of the new Yarkovsky detections were solely due to the LDT, and about three-quarters of the objects we targeted from the Yarkovsky candidate list¹ resulted in a detection.

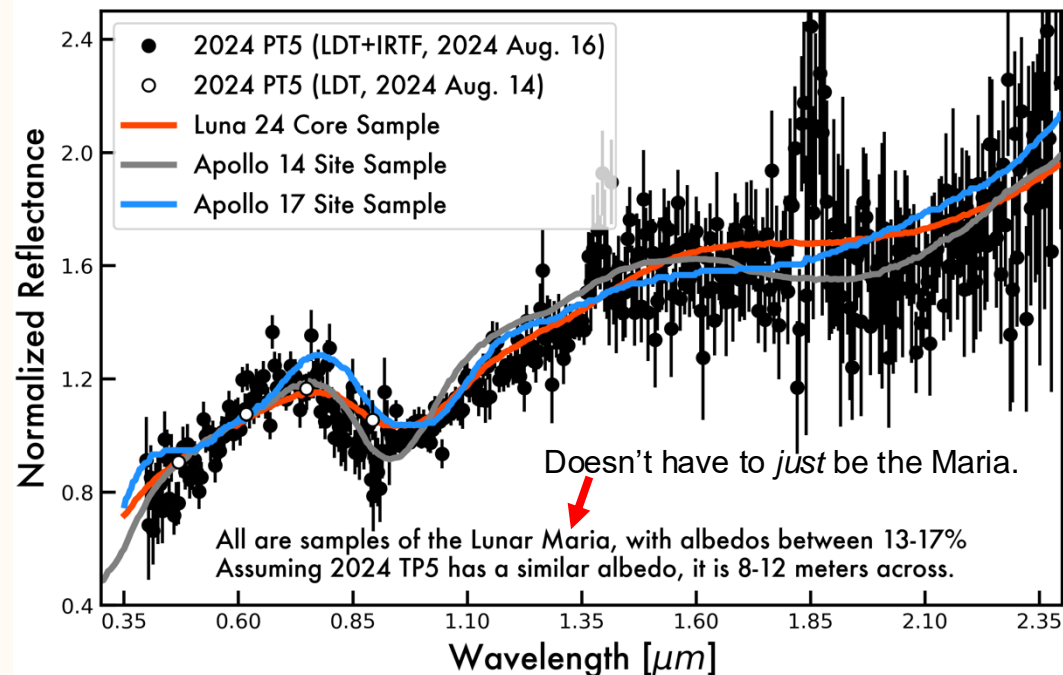
→ We are filling an existing gap and getting better at it.

¹Both Yarkovsky candidates and validation come via Davide Farnocchia.

LDT/IRTF Observations of 2024 PT5

Discovered in mid-August with a very low v_{inf} (artificial or lunar in origin), combined LDT+IRTF ToOs activated to measure composition and discriminate origin scenarios.

- Reflectance spectrum inconsistent with artificial objects and asteroids.
- Surface is quite red, well matched by samples of the Moon. Maria vs. Highlands is hard to say.



Near-Earth Lunar Ejecta?

PT5 is the second NEO that is likely to be Lunar Ejecta based on composition after Kamo'oailewa (Sharkey et al., 2021.)

- One object is an outlier, two is a population – maybe? Hopefully?
- We are working on modeling to figure out how to hunt for more and how many are out there.

Thanks! Email me at [tkareta @ lowell.edu](mailto:tkareta@lowell.edu)

