

The Mission Accessible Near-Earth Objects Survey (MANOS)

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Near-Earth objects (NEOs) are essential to understanding the origin of the Solar System. Their relatively small sizes and complex dynamical histories make them excellent laboratories for studying ongoing Solar System processes. The proximity of NEOs to Earth makes them favorable targets for space missions. In addition, knowledge of their physical properties is crucial for impact hazard assessment. However, in spite of their importance to science, exploration, and planetary defense, a representative sample of physical characteristics for sub-km NEOs does not exist.

Here we present the Mission Accessible Near-Earth Objects Survey (MANOS), a multi-year survey of sub-km NEOs that will provide a large, uniform catalog of physical properties (light curves + colors + spectra + astrometry), representing a 100-fold increase over the current level of NEO knowledge within this size range. This survey will ultimately characterize more than 300 mission-accessible NEOs across the visible and near-infrared ranges using telescopes in both the northern and southern hemispheres. MANOS has been awarded 24 nights per semester for the next three years on NOAO facilities including Gemini North and South, the Kitt Peak Mayall 4m, and the SOAR 4m. Additional telescopic assets available to our team include facilities at Lowell Observatory, the University of Hawaii 2.2m, NASA's IRTF, and the Magellan 6.5m telescopes.

Our focus on sub-km sizes and mission accessibility ($dv < 7$ km/s) is a novel approach to physical characterization studies and is possible through a regular cadence of observations designed to access newly discovered NEOs within days or weeks of first detection before they fade beyond observational limits. The resulting comprehensive catalog will inform global properties of the NEO population, advance scientific understanding of NEOs, produce essential data for robotic and spacecraft exploration, and develop a critical knowledge base to address the risk of NEO impacts. We intend to conduct this survey with complete transparency, publicly sharing our target lists and survey progress. We invite collaborative uses for these data as a way to broaden the scientific impact of this survey.