The Taxonomic Distribution of Mission-Accessible Small Near-Earth Asteroids. M. L. Hinkle[1], N. A. Moskovitz[2], D. E. Trilling[1], R. P. Binzel[3], C. A. Thomas[4], D. Polishook[3], F. E. DeMeo[5], M. Willman[6], E. Christensen[7], M. Person[3], [1]Northern Arizona University, Dept. of Physics & Astronomy, NAU Box 6010, Flagstaff, AZ, 86011 (mhinkle@nau.edu), [2]Lowell Observatory, 1400 West Mars Hill Road, Flagstaff, AZ, 86001, [3]Massachusetts Institute of Technology,Cambridge, MA, 02139, [4]NASA Goddard Space Flight Center,Greenbelt, MD, 20771, [5]Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, 02138, [6]U. Hawaii/Institute for Astrophysics,Honolulu, HI, 96822, [7]Catalina Sky Survey,University of Arizona, Tucson, AZ, 85721.

Introduction: Scientific interest in the near-Earth asteroid (NEA) population has grown in recent years, particularly with regards to characterizing the population of mission-accessible NEAs. Mission accessibility is defined by delta-v, the change in velocity required for a spacecraft to rendezvous with a celestial body. With current propulsion technology, spacecraft can reach NEAs whose orbits have delta-V < 7 km/s.

Across the entire NEA population, the smallest (d < 1 km) objects have not been well-studied, owing to the difficulty of observing them. These very small objects are often targets of opportunity, observable for only a short period of time after their discovery. Even at their brightest (V ~ 18), these asteroids are faint enough that they must be observed with large ground-based telescopes.

The Mission Accessible Near-Earth Object Survey (MANOS) began in August 2013 as a multi-year physical characterization survey that was awarded survey status by NOAO. MANOS will target several hundred mission-accessible NEOs across visible and near-infrared wavelengths, ultimately providing a comprehensive catalog of physical properties (astrometry, light curves, spectra).

Methods: Sixty small, mission-accessible NEAs were observed in 2013 and 2014 using the Gemini Multi-Object Spectrograph at Gemini North & South observatories. Taxonomic classifications were obtained by fitting our spectra to the visible wavelength portions of the mean reflectance spectra of the Bus-DeMeo taxonomy [1].

Results & Discussion: The smallest near-Earth asteroids are the likely progenitors of meteorites; we expect the observed fraction of ordinary chondrite meteorites to match that of their parent bodies, S-type asteroids. We present classifications for these objects as well as preliminary results for the distribution of taxa (as a proxy for composition) as a function of object size and compare to the observed fraction of ordinary chondrite meteorites.

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References:

[1] DeMeo F. E., Binzel R. P., et al. (2009) *Icarus, 202,* 160–180.