SPECTRAL PROPERTIES OF NEAR-EARTH OBJECT MISSION TARGETS. R. P. Binzel[1], C. A. Thomas[1], A. Tokunaga[2], S. J. Bus[3], F. E. DeMeo[4], A. S. Rivkin[5], T. H. Burbine[6], P. Vernazza[7], M. Birlan[8], S. P. Storm[1], A. Springmann[1], and M. Masterman[1]. [1]Department of Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA 02139, rpb @ mit.edu, [2]Institute for Astronomy, University of Hawaii, 2680 Woodlawn Drive, Honolulu, HI 96822, tokunaga @ jeans.ifa.hawaii.edu, [3]Institute for Astronomy, 640 N. A'ohoku Place, Hilo, HI 96720, sjb @ IfA.Hawaii.Edu, [4]Observatoire de Paris, 5 Place Jules Janssen, F-92195 Meudon Cedex, France, francesca.demeo @ obspm.fr, [5]Johns Hopkins University Applied Physics Laboratory, 11100 Johns Hopkins Road, Laurel, MD 20723, andy.rivkin @ jhuapl.edu, [6]Department of Astronomy, Mount Holyoke College, South Hadley, MA 01075, tburbine @ mtholyoke.edu, [7]Research and Scientific Support Department, European Space Agency, Keplerlaan 1, 2201 AZ Noordwijk, The Netherlands, pierre.vernazza @ esa.int, [8]Institut de Mecanique Celeste et de Calcul des Ephemerides, Observatoire de Paris, 77 Avenue Denfert-Rochereau, Paris 75014, France, Mirel.Birlan @ imcce.fr.

Introduction: Advances in the sophistication of spacecraft technology and our understanding of asteroid-meteorite connections are increasing the scientific motivation and imperative for the design and implementation of near-Earth object (NEO) sample return missions. We will summarize currently measured spectral properties for more than 150 NEOs residing in orbits having sample return ΔV requirements of ≤ 7.0 km/s. Nearly one-third of these are new and previously unpublished results. For this presentation, we focus on bodies whose spectral characteristics may be interpreted as having "primitive" compositions.

Observational Program: A majority of our observations come from a program designed specifically for the routine measurement of near-Earth object (NEO) spectra, with potential spacecraft mission targets receiving high priority. This program is conducted jointly by MIT, the University of Hawaii, and the NASA Infrared Telescope Facility (IRTF) on Mauna Kea, Hawaii. All spectroscopic observations obtained in this campaign are being made publicly available in near-real time via the website: http://smass.mit.edu/ and linked through the IRTF website. On the 3-meter NASA IRTF, we utilize SpeX, a low-to-medium resolution near-infrared spectrograph and imager [1], to obtain 0.8- to 2.5-micron spectra of near-Earth objects. Under good seeing conditions the limiting magnitude for our program is near V magnitude 17.5. Most observations are conducted by remote observing from the MIT campus. We have as an operational goal to process and make available the spectral results within a few days of the observations. We post these data for release to the public domain via our website http://smass.mit.edu. While we welcome collaboration opportunities, there is no pre-condition for collaboration for any researcher wishing to use these data. Our website gives a suggested acknowledgement for the use of these data.

Sample Results: As an example, we present the visible plus near-infrared spectrum of (65679) 1989 UQ, which based on visible wavelength measurements alone was classified as a B-type [2], suggesting a carbonaceous chondrite-like composition. Measurements extended into the near-infrared confirm its flat-to-neutral spectrum, but most importantly, a thermal excess blackbody curve beyond 2.1 microns demonstrates a low albedo typically associated with primitive meteorites. Removal of a thermal flux [3] corresponding to an albedo of ~0.05 yields a final (visible+NIR) taxonomic assignment as a C-type [4], with a likely carbonaceous chondrite composition consistent with all available measurements.

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