ExploreNEOs: The Warm Spitzer Near Earth Object Survey. D. E. Trilling[1], J. L. Hora[2], M. Mueller[3], C. A. Thomas[1], A. W. Harris[4], A. R. Hagen[5], M. Mommert[4], L. Benner[6], B. Bhattacharya[7], W. F. Bottke[8], S. Chesley[6], M. Delbo[8], J. P. Emery[9], G. Fazio[2], J. L. Kistler[1], A. Mainzer[6], A. Morbidelli[8], B. Penprase[10], H. A. Smith[2], T. B. Spahr[2], and J. A. Stansberry[11], [1]Northern Arizona University (david.trilling@nau.edu), [2]Harvard-Smithsonian Center for Astrophysics, [3]SRON/Netherlands, [4]DLR/Germany, [5]Pennsylvania State University, [6]JPL, [7]Claremont Colleges, [8]SWRI, [9]University of Tennessee, [10]Pomona College, [11]University of Arizona.

Introduction: We have observed some 600 near Earth objects (NEOs) at 3.6 and 4.5 microns with the Warm Spitzer Space Telescope in the ExploreNEOs program. The goals of this program are to derive the albedo and diameter for each of these 600 NEOs; to derive some global properties of the NEO population, including distribution of albedos and size distribution; and to carry out detailed studies of a small number of targeted NEOs.

Results: As of this writing we have four papers published; one submitted; and two more about to be submitted, with several more in development. In paper 1 we defined our sample and presented results for the first 100 targets [1]. In paper 2 we compared our thermal model results to "ground-truth" results from spacecraft and other sources of data [2]. In paper 3 we examined the albedo and probable temperatures for low delta V targets in describing candidate spacecraft targets [3]. In paper 4 we presented the density for a binary asteroid and a general method for deriving densities from our Warm Spitzer thermal data [4]. In paper 5 we derived mean albedo as a function of asteroid taxonomic type [5]. In paper 6 we presented a preliminary size distribution for the NEO population [6]. In paper 7 we presented the results of an extensive ground-based campaign to derive accurate optical photometry for 100 of our targets, and the consequent updates to our thermal model results [7].

In forthcoming papers, all in preparation, we will compute the average albedo as a function of probable source region among the NEO population; present results from our ground-based and Spitzer lightcurve components, with implications for shape and surface thermal properties; studies of low Tisserand objects; and results for a subset of objects that were observed multiple times at a wide range of phase angles (to be used, among other purposes, for calibrating our thermal models).

We also have been carrying out an extensive ground-based observating campaign whose primary goal is to obtain spectroscopy and therefore compositional characterization of ExploreNEOs targets (see Thomas et al., this meeting).

In this ACM presentation, we will summarize our work to date on these various topics. One result of our ExploreNEOs program is to produce the largest well-characterized data set of NEOs to date – nearly 10% of all known NEOs at the inception of the program. Future work includes detailed studies of some ExploreNEOs targets, from both the ground and space, and a complementary survey to study the properties of subpopulations that are underrepresented in our original survey.

References: [1] Trilling et al. 2010, AJ, 140, 770. [2] Harris et al. 2011, AJ, 141, 75. [3] Mueller et al. 2011, AJ, 141, 109. [4] Kistler et al. 2012, AJ, submitted. [5] Thomas et al. 2011, AJ, 142, 85. [6] Trilling et al. 2012, in prep. [7] Hagen et al. 2012, in prep.

Acknowledgments: We acknowledge the thorough and prompt hard work of the staff at the Spitzer Science Center, without whom the execution of this program would not be possible. This work is based in part on observations made with the Spitzer Space Telescope, which is operated by JPL/Caltech under a contract with NASA. Support for this work was provided by NASA through an award issued by JPL/Caltech.