VISIBLE-WAVELENGTH SURVEY OF JUPITER-FAMILY COMETARY NUCLEI AS PART OF SEPPCON. Y. R. Fernandez[1], S. C. Lowry[2], K. J. Meech[3], R. Laird[2], A. Fitzsimmons[4], C. Snodgrass[5], P. R. Weissman[6], J. Pittichova[3], J. M. Bauer[6,7], H. A. Weaver[8], C. M. Lisse[8], M. F. A'Hearn[9], H. Campins[1], O. Groussin[10], M. S. Kelley[9], P. L. Lamy[10], J. Licandro[11], I. Toth[10,12], and W. T. Reach[13], [1] Univ. of Central Florida (yan@ucf.edu), [2] Univ. of Kent, [3] Univ. of Hawai`i Inst. for Astronomy, [4] Queen's Univ. Belfast, [5] Max Planck Inst. für Sonnensystemforschung, [6] Jet Propulsion Lab./Caltech, [7] Infrared Processing and Analysis Ctr./Caltech, [8] JHU/Applied Physics Lab., [9] Univ. of Maryland, [10] Lab. d'Astrophysique de Marseille, [11] Inst. de Astrofísica de Canarias, [12] Konkoly Obs., [13] SOFIA/NASA/Ames Research Ctr.

Introduction: SEPPCoN, the Survey of the Ensemble Physical Properties of Cometary Nuclei, was initiated in 2006 to characterize the sizes, albedos, beaming parameters, colors, and shapes of a statistically significant sample of cometary nuclei. The observational goal is to measure the distributions of these properties and understand what the "typical" properties of a nucleus are. The scientific goals are to: (a) use the ensemble properties to learn about the evolutionary processes that have made the comet population we see today, and (b) make statistical comparisons between cometary nuclei properties and those of related small-body populations such as the Jovian Trojans, Centaurs, and trans-Neptunian objects.

Observations of thermal emission from 88 Jupiter-family comets (JFCs) by the Spitzer Space Telescope resulted in significant progress in our understanding of the size distribution, the thermal properties, and near-aphelion activity of the ensemble of JFCs [1,2]. This sample represents 20% of the current, known JFC population (and was almost 30% of the known population at the start of the survey.) We are currently in a large, multinational, and multi-observatory campaign to observe all 88 nuclei (and as many additional ones as possible) at visible-wavelengths so that we can complement and augment the survey results already in hand. We report here recent progress on this project (cf. [3]).

Observations: Data have been collected using telescopes around the world: at Mauna Kea Observatories (with the University of Hawaii 2.2-m telescope and the Keck I 10-m telescope), European Southern Observatory (with the 3.6-m New Technology Telescope and the 8.2-m "Antu" Very Large Telescope), Apache Point Observatory (with the 3.5-m Astrophysical Research Consortium telescope), Observatorio del Roque de los Muchachos (with the 4.2-m William Herschel Telescope, 2.6-m Nordic Optical Telescope, and 2.0-m Liverpool Telescope), Palomar Observatory (with the 5-m Hale and 1.5-m "60-Inch" telescopes), and Cerro Pachón (with the 4.1-m Southern Astrophysical Research telescope). We are also making use of imaging of JFC nuclei that appear in the NEAT archive.

To date we have attempted to observe about 90% of the sample, and detected about three-fourths of the comets at at least one epoch. Of those detected, about three-fourths of the comets appeared on at least one occasion as point-sources that were presumably identical with their nuclei. Virtually all observations have occurred with each comet farther than 3 AU from the Sun, and usually farther than 4 AU, so as to minimize the influence of coma on the photometry of the nucleus. The typical R-band magnitude of the nuclei is 22.0-23.0.

An example of some of our observations is shown in Figure 1, with R-band images from APO. The faintest nuclei here are about 23rd magnitude. We will present further example images, as well as preliminary analyses of the photometry and of the distributions of albedos and shapes among the sample comets.

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References: [1] Fernandez Y. R. et al. (2012) *Icarus*, submitted. [2] Kelley M. S. et al. (2012) *Icarus*, submitted. [3] Lowry S. C. et al. (2010) *EPSC 2010*, Abstract #510.

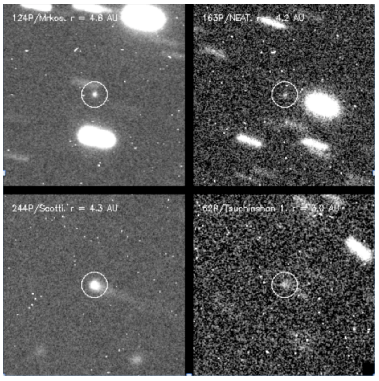

Figure 1. R-band images of various JFCs as observed at Apache Point Observatory in the course of our campaign. Clockwise from top left, the comets and heliocentric distances are: 124P, 4.6 AU; 163P, 4.2 AU; 62P, 3.0 AU; 244P, 4.3 AU.