

RADAR IMAGES OF ASTEROID 38071 (1999 GU3). L. A. M. Benner¹, M. C. Nolan², G. J. Black³, J. D. Giorgini¹, J. L. Margot⁴, P. Pravec⁵, S. J. Ostro¹, R. F. Jurgens¹, ¹Jet Propulsion Laboratory, Pasadena, CA 91109, lance@reason.jpl.nasa.gov; ²NAIC, Arecibo Observatory, Arecibo, PR, ³NRAO, Greenbank, WV; ⁴Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, CA; ⁵Astronomical Institute, Academy of Sciences of the Czech Republic, Ondrejov, Czech Republic.

We report initial results of radar observations of 1999 GU3 obtained in April, 2002. The observations, which at this writing are in progress, are a multi-observatory campaign to characterize this near-Earth asteroid using monostatic observations at Arecibo and Goldstone, and bistatic observations in which we transmit at Arecibo or Goldstone and receive echoes at Greenbank.

Bistatic observations allow higher Doppler resolution than monostatic observations and are important due to the slow rotation of this asteroid. Arecibo delay-Doppler observations between April 8-15 reveal an irregularly-shaped object with at least one prominent concavity, a very narrow bandwidth of ~ 0.06 Hz, and an apparent rotation period of at least several days that is consistent with bandwidth observed at Goldstone in 1999 and with the 9day rotation period inferred from lightcurves by [1]. The visible range extent averages about 0.2 km; if we assume that it equals half the physical range extent, then the asteroid's effective diameter is about 0.4 km.

Variations in the echo bandwidths and visible range extents confirm the suggestion by [1] from their lightcurve amplitude that 1999 GU3 is elongated. Arecibo echoes have a circular polarization ratio, SC/OC ~ 0.4 , that is comparable to the ratio obtained at Goldstone in 1999 and indicates a rough surface at decimeter spatial scales. The combination of a small diameter and slow rotation establish that 1999 GU3 is an outlier in the near-Earth asteroid population and raise the question of whether this object is a non-principal axis rotator. At the time of this writing, Arecibo and Arecibo-Greenbank observations have been completed. Goldstone and Goldstone-Greenbank observations are planned for April 21-28 with the hope of constraining further the shape and spin state.

References: [1] Pravec, P. et al. (2000) *Icarus*, 148, 589-593.