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Does Vesta Have Moons?: Dawn's Search for Satellites.
L.A. McFadden¹, M. V. Sykes², P. Tricarico², U. Carsenty³, P. Gutierrez-Marques⁴, R.A. Jacobson⁸, S. Joy⁵, H.U. Keller⁴, J.-Y. Li⁶, B. McLean⁷, N. Memarsadeghi¹, S. Mottola³, M. Mutchler⁷, A. Nathues⁴, D. O'Brien², E. Palmer², C. Polansky⁸, H. Sierks⁴, M. D. Rayman⁸, C.A. Raymond⁸, C.T. Russell⁵, S. Schroeder⁴, D. Skillman¹, S. Weinstein-Weiss⁸.
¹NASA, Goddard Space Flight Center. E-mail: lucy.mcfadden@nasa.gov. ²Planetary Science Institute, Tucson, AZ, ³DLR, Berlin, ⁴Max-Planck-Institut für Sonnensystemforschung, Lindau, Germany ⁵IGPP, UCLA, ⁶U. Maryland, ⁷Space Telescope Science Institute, ⁸California Inst. Technology, Jet Propulsion Lab.

Upon approach to asteroid 4 Vesta, the Dawn mission included a dedicated satellite search observation of the operational sphere of the spacecraft around Vesta. Discovery of moons of Vesta would constrain theories of satellite formation. The sequence using the framing camera and clear filter includes three mosaics of six stations acquired on July 9-10, 2011. Each station consists of four sets with three different exposures, 1.5, 20 and 270 s. We also processed and scanned the optical navigation sequences until Vesta filled the field of view. Analysis of images involves looking for moving objects in the mosaics and identifying catalogued stars, subtracting them from the image and examining residual objects for evidence of bodies in orbit around Vesta. Celestial coordinates were determined using Astrometry.net, an astrometry calibration service (<http://astrometry.net/use.html>). We processed the images by subtracting dark and bias fields and dividing by a flatfield. Images were further filtered subtracting a box car filter (9x9 average) to remove effects of scattered light from Vesta itself. Images were scanned by eye for evidence of motion in directions different from the background stars. All objects were compared with Hubble Space Telescope's Guide Star Catalogue and US Naval Observatory's UCAC3 catalog. We report findings from these observations and analysis, including limits of magnitude, size and motion of objects in orbit around Vesta. We gratefully acknowledge modifications made to Astrometrica <http://www.astrometrica.at/> for purposes of this effort.