ARECIBO RADAR IMAGING OF 2001 SN_{263}: A NEAR-EARTH TRIPLE ASTEROID SYSTEM. Michael C. Nolan[1], Ellen S. Howell[1], Lance A. M. Benner[2], Steven J. Ostro[2], Jon D. Giorgini[2], Michael W. Busch[3], Lynn M. Carter[4], Ross F. Anderson[4], Christopher Magri[5], Donald B. Campbell[6], Jean-Luc Margot[6], Ronald J.Vervack[7], and Michael K. Shepard[8], [1]Arecibo Observatory/Cornell University, HC 3 Box 53995, Arecibo PR 00612 USA, nolan@naic.edu; [2]JPL/Caltech; [3]Caltech; [4]Smithsonian Institution; [5]University of Maine at Farmington; [6]Cornell University; [7]Applied Physics Laboratory/JHU; [8]Bloomsburg University.

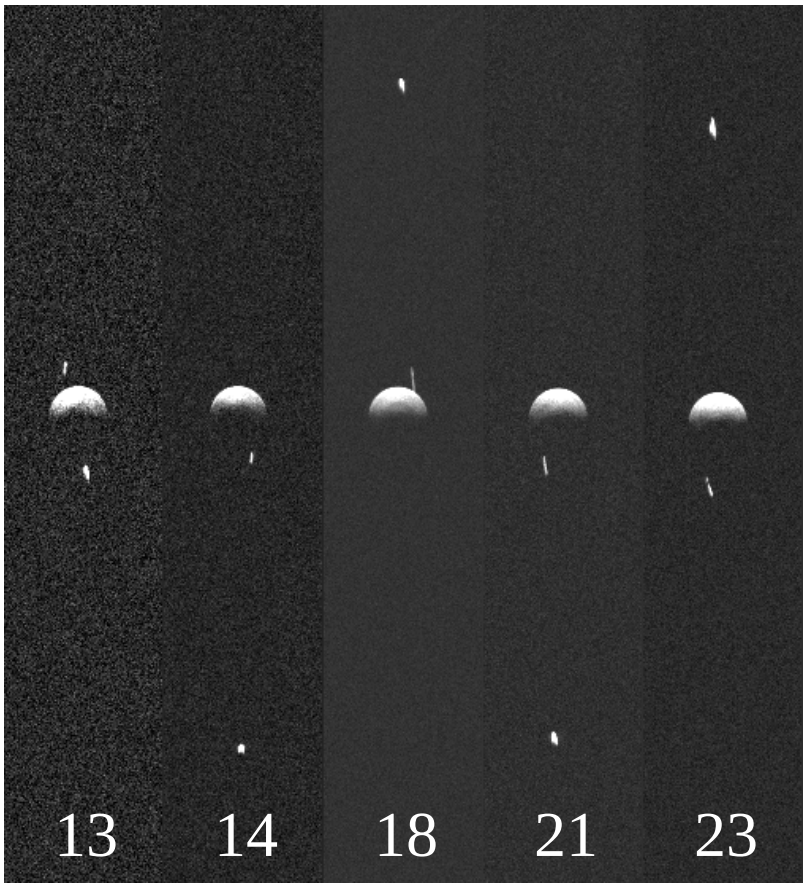

Figure. Each frame in this sequence of radar images is a sum of approximately 30 minutes of data from that date in February 2008. The vertical axis is distance from the observer (at the top) at 75m/pixel resolution. The horizontal axis is Doppler shift, scaled so that the primary appears spherical, with velocity towards the observer increasing to the right. The narrowness of the satellites is due to their slower rotation than the primary. The slanted shape of the inner satellite is due to smearing by its motion during the exposure.

Introduction: Asteroid 2001 SN_{263} presented a good Arecibo radar observation opportunity in February 2008. Because of its fairly large size (absolute magnitude H=16.5, suggesting a diameter of 1–3 km) and relatively long time in the Arecibo sky while close to the Earth (16 days), we chose it for an extensive set of Arecibo radar observations to measure its shape and radar scattering properties.

Observations: The initial observations revealed the object to be a triple asteroid system. As shown in the figure, the components are approximately 2 km, 1 km, and 400 m in size. The orbit of the larger satellite has a semimajor axis of at least 15 km and a period of about 7 days. The orbit of the smaller satellite has a semimajor axis of about 4 km and a period of slightly less than 2 days. The larger satellite is not in tidally locked synchronous rotation.

The near-infrared spectrum is slightly red, suggesting a primitive object. Analysis is continuing to determine the surface properties in more detail. As the orbits are refined, we hope to determine the density of the primary and uncover its internal structure. The stability of the system and constraints on its formation will be discussed.