

SPACE EXPLORATION SYMPOSIUM (A3)
Small Bodies Missions and Technologies (Part 2) (4B)

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DETECTION OF TWO NEAR-EARTH ASTEROIDS WITH A SOUTHERN HEMISPHERE
PLANETARY RADAR SYSTEM

Abstract

We describe an initial demonstration of a southern hemisphere planetary radar system to detect two near-Earth asteroids (NEAs). Radar observations of NEAs are motivated by three considerations. First, asteroids represent primitive remnants of the early solar system and characterization of their properties can provide insights into their evolution and parent population(s); second, they represent targets for spacecraft, both robotic and crewed; and, third, precise knowledge of their orbits is essential to assess the extent to which they might represent impact hazards to the Earth. There is a well-developed planetary radar system in the northern hemisphere, but NEAs that approach from the south are limited in the extent to which they can be tracked. In our initial demonstration, we made use of a 2.1 GHz transmitter at the 70 m antenna of the Canberra Deep Space Communications Complex and multiple receivers at the Parkes Radio Telescope and the Australia Telescope Compact Array. This initial system was used to detect the NEAs 2005 UL5 and 1998 WT24. We describe the performance of the system and consider future possibilities using other antennas of the Canberra Deep Space Communications Complex as transmitters.

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