Proposal Identification No.: R2080

Date Received: 2005-Feb-01 23:58:45

Technical Page

Proposal Type: Regular
General Category: Planetary Radar
Observation Category: Solar System
Total Time Requested: 11 Hours

Proposal Title: Quantifying non-Keplerian effects in Icarus-like orbits: Perihelion shift due to relativity and solar quadrupole moment.

ABSTRACT:

We request 11 hours of time spread over 3 sessions to obtain precise radar astrometry of 1999 MN, following up on the successful range measurements of 2004. This near-Earth object (NEO) is one of the best objects for measuring the perihelion shift due to general relativity (GR) and the oblate Sun [Margot, 2003]. This proposal represents the first part of a larger program in which the orbits of a dozen NEOs are monitored over several years to reduce errors on GR parameters measured from the perihelion shift and to provide a dynamical measurement or upper bound on the gravitational quadrupole moment of the Sun (J2). Considerable improvements over previous studies involving Mercury and Icarus are expected because 1) several newly-discovered asteroids have orbits offering a better sensitivity to the solar J2, 2) our sample incorporates a range of heliocentric distances and inclinations that can unambiguously separate GR and J2 effects, 3) the center of mass locations of small bodies is more accurately determined than that of Mercury. We will also characterize 1999 MN with radar in order to quantify the Yarkovsky orbital drift, which may yield important byproducts such as constraints on asteroid mass and thermal properties.

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<th>Name</th>
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Service Observing Request

- X None
- ☐ All of the observing run.
- ☐ Part of the observing run.
- ☐ Queue Observing

Remote Observing Request

- X No
- ☐ Maybe
- ☐ Yes

Instrument Setup

- S-Band radar
- S-band receiver

Atmospheric Observation Instruments:

Special Equipment or setup: none
RFI Considerations

Frequency Ranges Planned