Geophysical Research Abstracts,
Vol. 11, EGU2009-13366, 2009
EGU General Assembly 2009
© Author(s) 2009

Searching for small bodies on inner orbits

H. Svedhem
ESA/ESTEC, Research and Space Science Dep., Noordwijk, Netherlands (h.svedhem@esa.int, +31 71 56-54697)

Small bodies on orbits fully inside the earth orbit are notoriously difficult to detect from ground based telescopes. Firstly, these bodies are, in the best case, only visible shortly after sunset or shortly before sunrise. The orbital arch visible in a dark sky at sufficient elevation is only a small fraction of the full orbit, and the probability that the body will be in that segment is small. In addition the time available for the observation is short and therefore for the likelihood of capturing them is small.
Secondly, the bodies are only illuminated at a small fraction and in any case less than 50% and therefore appear fainter than if observed at opposition.

A spacecraft in Earth orbit would somewhat improve the situation but a spacecraft located at a position inside the Earth's orbit would make an ideal platform for a telescope for observing small bodies on inner orbits. However, these interplanetary spacecraft always have stringent mass limitations and no spacecraft has so far carried a dedicated telescope for this purpose. On the other hand, all spacecraft carry Star Trackers for navigation purposes. These telescopes/cameras are usually operating continuously, often with a redundant unit being switched off, and by default they point away from the Sun keeping some parts of their Field of View in the ecliptic plane. The pointing is thus ideal for detecting small bodies at a comparatively small distance at or near opposition. Small modifications to the hardware and/or software of these units could make them into potentially effective instruments for search for NEO's on interior orbits at a very low cost.

This talk will discuss the potential of such a scheme and possible detection probabilities together with examples from the Star Trackers on Venus Express.