ASTRODYNAMICS SYMPOSIUM (C1)
Orbital Dynamics (2) (4)

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GEO SATELLITES TRACKING USING OPTICAL OBSERVATIONS

Abstract

In order to better measure and model the position of geosynchronous satellites in space, we developed an autonomous robotic system to optically observe the satellite and determine its position on the sky. The satellite is imaged on a CCD camera through a telescope that is positioned is a closed building. The images are reduced automatically and the angular position of the satellite is found. We use a novel method to find the satellite position on the image which involves several exposures on the same image and a new algorithm to determine the satellite angular position relative to the stars in the image. The angular position is then used through a detailed model to better determine the position of the satellite and to propagate its trajectory to future times with a good accuracy. The position is found to an accuracy of about 0.5 arcsec (less than 100 meters). Combining the angular position with radar range measurements of the position of the satellite can improve its known position.