THE PASAGE PROJECT:
ASTROMETRIC POSITIONING OF GEOESTATIONARY SATELLITES

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Abstract

To have precise ephemerides of geosynchronous satellites available at any time is of great importance for satellite's station keeping routines, both for planning maneuvers and for checking the results of these maneuvers.
The major goal of this project is to use earth-based astrometric observations both for obtaining precise ephemeris of geosynchronous satellites, and for orbit determination of these satellites. This use will be a new and important application of earth-based astrometry, and will require the development of the necessary techniques and algorithms for processing the observations.
Topocentric equatorial coordinates of the satellite can be obtained with one single telescope, and a sufficient number of observations can be used for orbit determination purposes. The Gautier astrographic telescope of the Real Instituto y Observatorio de la Armada (ROA), if provided with an appropriate CCD camera, will be an adequate device for doing the task. The improvement of the telescope's performances by using CCD techniques will suppose the recovery of this instrument, obsolete at present.
A better ephemeris determination can be achieved by means of astrometric observations taken from several telescopes. Observations with the Schmidt camera of Centro de Investigación de Astronomía (CIDA) in Merida (Venezuela) will be available from the beginning of the project. In the mid term, the ROA's Baker-Nun camera will also be available at Observatory Fabra II, in the Catalan Pirinee. Processing astrometric observations from these three telescopes will provide high accurate satellite positions.
The geographic positions of San Fernando, in Spain, and Mérida, in Venezuela, are ideal locations for performing astrometric observations of many different geosynchronous satellites, among which we can find the Hispasat satellites.
A redundant check on the ephemeris precision can be supported by using "two way" synchronizing techniques. Range measures can be obtained with this procedure, and at present range measurement of INTELSAT 903 are routine operations in ROA. In fact, both techniques could be mutually validated.

Supported by Spanish Goverment, “Dirección General de Investigación” (# AYA2004-03298)