

The Major Planets Satellite Observations with CCD techniques

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Since May 1998 Valencia University Observatory (OAUV) has a new 30–20 cm double refractor at "Centro Astronomico del Alto Turia" (CAAT), 110 km from Valencia city, and has in its disposal 30 cm telescope of Astronomy Department at Burjassot University Campus.

OAUV has a new CCD AP10 sensor of great format (2048 by 2048 pixels, 28 by 28 mm wide) that allows to obtain regular observations of asteroids and major planets satellites.

In this presentation, actual satellites observation programs are described, including algorithms for ephemerides, zone maps, files related to CCD images, measurement and reduction of observations. Accurate ephemerides for every hour obtained with IAA ERA system [1,2] provide identification of satellites on CCD images. The preliminary investigations of astrometrical properties and images of both satellites and stars in frame of a CCD camera have been performed.

Reduction of CCD zones includes several Tycho–2 catalogue stars. Observations of satellites obtained at CAAT and Burjassot Campus are described. Preliminary results are very promising and allow us to take part in several international programs:

1. the IAA program suggested in 1998 [3,4] and providing the orientation of Hipparcos catalogue with respect to dynamical coordinate system on the base of CCD observations of relative positions of major planets satellites and the Hipparcos stars made at the time of the close conjunctions;

2. the BDL program of absolute observations of Galilean satellites of Jupiter for improving the elements of Jupiter orbit in DE403–5 and for further development of the theories of motion of the satellites themselves [5], including mutual events for the satellites.

The first results of processing of actual observations of relative positions of Galilean satellites, satellites of Uranus and Saturn (2001), according to IAA program are described.

References

1. Krasinsky G. A., Vasilyev M. V. ERA: knowledge base for ephemeris and dynamical astronomy. In: Proceedings of IAU Colloquium 165, Poznan, Poland, July 1–5, Wytrzyszczak et al. (ed.), 1997, 239–244.
2. Krasinsky G. A., Vasilyev M. V. ERA–7 Manual, Anonymous FTP *quasar.ipa.nw.ru/incoming/era*, file ERA7.ps.
3. Casas R., Krasinsky G. A., Yagudina E. I. CCD observations of relative positions of Galilean satellites of Jupiter and star 104297 HIPPARCOS (1997 November 12 – 124). Communications of IAA, 1998, No. 117, 1–18.
4. Casas R., Krasinsky G. A., Oscos A., Sveshnikov M. L. Analysis of conjunction of Galilean satellites of Jupiter and stars of HIPPARCOS Catalogue in 1997–1999. IAA Trans., 2000, **5**, 70–92 (in Russian).
5. Vasilyev M. V., Krasinsky G. A., Sveshnikov M. L., Gorel G. K., Gudkova L. A. The improvements of Jupiter ephemeris by observations of Galilean satellites of Jupiter in Nikolaev 1963–1997. Book of abstracts of the conference: Astrometry, geodynamics and celestial mechanics at XXI threshold, St. Petersburg, 2000 (in Russian).