Astrometric Observations of Faint Satellites

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June 12, 1995

In 1982 we initiated a systematic program of astrometric observations of satellites of Jovian planets. This program was motivated by the present southern declination of these planets, which allowed observations close to the zenith from our latitude ($\phi \approx -23^0$). The observations were made at the Cassegrain focus of the 1.6 m Ritchey-Chretien reflector of the Laboratório Nacional de Astrofísica, Brazil. This telescope has the focal distance for the Cassegrain combination equal to 15.8 m. Which gives the scale of 13.0"/mm at focal plane. From 1982 to 1988 all observations were made using photographic plates and since then CCD devices have been used.

We observed the five largest satellites of Uranus (Miranda, Ariel, Umbriel, Titania and Oberon), the satellites Triton and Nereid of Neptune and Mimas, Hyperion, Helene, Telesco and Calypso of Saturn. ¿From 1982 to 1994 we obtained many images of the Uranian system and of Triton, and some images of Nereid and of the Saturnian system.

For the reduction of our observations some methods were developed. The center positions for the images were determined using special photometric methods to remove, from the satellite images, the background gradient produced by the overexposed image of the planets. The reference system on the small field of the reflector was obtained through a new method which uses

the apparent motion of the planets in successive plates or frames.

We compared our measurements with the theoretical positions of the satellites calculated using the best ephemeris for each satellite. Our residuals are comparable to the best ones available in the literature.