CHECK ON JPL DExxx USING HIPPARCOS AND TYCHO OBSERVATIONS

L.V. MORRISON[1], D. HESTROFFER[2], D.B. TAYLOR[1], F. VAN LEEUWEN[1]
[1] *Royal Greenwich Obsertvatory, Cambridge, UK*
[2] *ESTEC, ESA, NL*

Obervations of the positions of Europa (J2) and Titan (S6) by Hipparcos, and Ganymede (J3) and Callisto (J4) by Tycho are analysed to give checks on the latest JPL ephemerides of the planets Jupiter and Saturn.

The observed positions of the satellites are compared with DExxx, using the G5 theory of the Galilean satellites and D.B. Taylor's theory of Titan to calculate their offsets from the barycentres of the two systems.

Each Tycho observation can be resolved into RA and Dec because the slits are inclined to the scan direction. Hipparcos, on the other hand, which has a uni-directional scan, requires a minimum of two (preferably orthogonal) scans to resolve the offsets into RA and Dec. We have subdivided the Hipparcos observations in time and solved for corrections to DExxx at several epochs over the period of the mission.

The Hipparcos observations of J2, and Tycho of J3 and J4, put tight constraints on the orbit of Jupiter, and agree closely with the series of ground-based observations made by the Carlsberg Meridian Telescope. In particular, they help to resolve a problem in the declination of Jupiter associated with larger than expected errors in the tracking of Voyager II and radio positions from the VLA.

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