IOM 312.F – 01 – 006

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TO : Solar System Dynamics Group

FROM : E M Standish

SUBJECT : Suggested GM Values for Ceres, Pallas, and Vesta

The Table presents GM values for Ceres, Pallas, and Vesta which represent the most recent planetary ephemeris adjustments. The associated uncertainties are intended to be realistic values as opposed to the formal errors from the solutions.

It seems as though the various ephemeris solutions during the past half year have all given GM values which are within the limits of the uncertainties given here.

GM values of Ceres, Pallas, and Vesta.

	km^3/s^2	$\sigma[\%]$	$au^3/d^2 \times 10^{-13}$	$\mathcal{M}_{ast}/\mathcal{M}_{Sun} \times 10^{-10}$
Ceres	63.2 ± 0.2	0.3	1.409 ... $\pm$ 0.004	4.762 ... $\pm$ 0.015
Pallas	14.3 ± 0.5	3.5	0.319 ... $\pm$ 0.011	1.078 ... $\pm$ 0.038
Vesta	17.8 ± 0.2	1.1	0.397 ... $\pm$ 0.004	1.341 ... $\pm$ 0.015

These values are virtually identical to those of 63.2, 14.3, and 17.9, presented last November (Standish, 2000), but they do differ a bit from those of DE405 (62.4, 13.3, and 17.3). The improvement since DE405 has come from the addition of a substantial amount of Mars ranging and doppler data (Pathfinder and MGS).

In the ephemeris solutions, determinations are also made for the mean values of the densities of the three major taxonomic classes, C, S, and M (carbonaceous, stony, and metal). The values for these, however, don't seem to be as stable as those of the GMs.

Reference

Standish, E.M.: 2000, "Recommendation of DE405 for 2001 Mars Surveyor and for Cassini", JPL IOM 312.F-00-107.