Geophysical Research Abstracts
Vol. 12, EGU2010-12285, 2010
EGU General Assembly 2010

The BepiColombo Mission to Mercury: reaction wheels desaturation manoeuvres and the ISA accelerometer $\Delta\vec{V}$ measurements

Valerio Iafolla (1), Sergio Nozzoli (1), David Lucchesi (1,2), Francesco Santoli (1), Roberto Peron (1), Emiliano Fiorenza (1), Carlo Lefevre (1), and Andrea Reale (1)

(1) IFSI, INAF, Roma, Italy (david.lucchesi@ifsi-roma.inaf.it), (2) ISTI, CNR, Pisa, Italy

The MPO will be a three–axis stabilized spacecraft and nadir pointing to Mercury center–of–mass. Such a pointing, needed for the very ambitious goals of the ESA space mission to Mercury denominated BepiColombo, is reached thanks to the onboard reaction wheels, and it is also required during the unobserved (from Earth) arcs. The unavoidable manoeuvres of desaturation of the reaction wheels, which are necessary to remove the accumulated angular momentum, represent a clear reduction of the accuracy of the objectives of the ESA space mission. Indeed, during these manoeuvres the spacecraft thrusters are fired —- to guarantee the planet center–of–mass pointing —- and directly impact the accuracy of the propagated state–vector of the satellite at the beginning of the subsequent observed arc. Their impact is quantified by their number, position along the orbit and, especially, in the uncertainty in the linear momentum transferred to the spacecraft. This presentation is devoted to prove the feasibility of the measurements of the transferred momentum by the thruster thanks to the onboard accelerometer ISA. Therefore, such measurements will be an essential ingredient in order to preserve the accuracy of the BepiColombo Radio Science Experiments and of the pointing accuracy of other onboard instruments, as is the case of BELA. This additional capability of ISA strengthen once more the key rôle of the accelerometer in the BepiColombo mission to Mercury.