



GRACE as geodetic precision space laboratory

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The GRACE satellites are equipped with a suite of instruments carrying out geodetic precision measurements: GPS ranging, inter-satellite ranging, star cameras, accelerometry, star sensors. The sensor data are very precise and come with a much higher temporal resolution than for other satellites. We use data of several GRACE sensors looking for new opportunities to investigate satellite dynamics at a new accuracy level, and to monitor the characteristics of the sensor platforms. We analyze systematic attitude variations related to attitude control and external forces, and we discuss related effects on ranging observations. We investigate how the accelerometer measurements can be validated and used to monitor the measurement conditions on board the satellites. Further on, we assess radiation pressure modeling using accelerometer signals during penumbra transitions of the satellites. Results may give new ideas on how to configure and combine sensors for future geodetic satellites.