$\mathcal{GG}$ $\mathcal{Error}$ $\mathcal{Budget}$ $\mathcal{for}$ $\mathcal{EP}$ $\mathcal{Testing}$ $\mathcal{to}$ $\mathcal{1}$ $\mathcal{part}$ $\mathcal{in}$ 10^{17}

Launch 2004 (close to solar minimum); maximum drag value along the orbit assumed; improved Q and CMR w.r.t current measurements

Acceleration (transverse plane) DUE TO:	Formula	Frequency (inertial frame) *(Hz)*	Frequency (detected by spinning sensors) *(Hz)*	Phase	Differential acceleration *(m/sec²)*	Differential displacement *(m)*
EP SIGNAL	$\dfrac{GM_\oplus}{a^2}\eta$	$\nu_{orb} \cong 1.75\cdot10^{-4}$	ν_{spin} w.r.t. Earth	Test body to center of Earth	$8.38\cdot10^{-17}$ $\eta=10^{-17}$ $h=520\,Km$	$6.3\cdot10^{-13}$ $\omega_{dm}\cong 1.15\cdot10^{-2}\ 545\ sec$ dif.f period
AIR DRAG	$\dfrac{1}{2}C_D V_{sc}^2 \dfrac{A}{M}\rho_{atm}$	ν_{orb}	ν_{spin}	~along track	$4.47\cdot10^{-18}$ AFTER : $\chi_{FEEP}=\dfrac{1}{50000}$ $\chi_{CMR}=\dfrac{1}{500000}$	$3.36\cdot10^{-14}$
SOLAR RADIATION PRESSURE	$\dfrac{A}{M}\dfrac{\Phi_\Theta}{c}$	$\nu_{orb}-\nu_\Theta \cong \nu_{orb}$	ν_{spin}	test body to center of Earth component	$1.92\cdot10^{-19}$ same χ_{FEEP},χ_{CMR}	$1.44\cdot10^{-15}$
INFRARED RADIATION FROM EARTH	$\alpha_\oplus\dfrac{A}{M}\dfrac{\Phi_\Theta}{c}$	ν_{orb}	ν_{spin}	test body to center of Earth	$2.87\cdot10^{-19}$ same χ_{FEEP},χ_{CMR}	$2.16\cdot10^{-15}$
EARTH COUPLING TO TEST BODIES QUADRUPOLE MOMENTS	$\dfrac{3}{8}\dfrac{GM_\oplus}{a^2}\dfrac{\Delta J}{J_x}\cdot\left(\dfrac{r_1^2+r_2^2+l^2/3}{a^2}\right)$	ν_{orb}	ν_{spin}	test body to center of Earth	$2.4\cdot10^{-19}$	$1.8\cdot10^{-15}$
MECHANICAL THERMAL NOISE	$\sqrt{\dfrac{4K_B T\omega_{dm}}{mQ}}\dfrac{1}{\sqrt{T_{int}}}$	$\nu_{d.m.}$	$\nu_{spin}\pm\nu_{d.m.}$	Random	$1.68\cdot10^{-17}$ $T_{int}\cong 8\ days$ $Q=100000$	$1.26\cdot10^{-13}$
					TOTAL ERROR BUDGET	$1.27\cdot10^{-13}$