New GDR-E orbit standards

The differences between the new GDR-E orbit standards and the previous GDR-D orbit standards are summarized in the table below:

	GDR-D	GDR-E
Gravity model	EIGEN-GRGS_RL02bis_MEAN-FIELD	EIGEN-GRGS.RL03-v2.MEAN-FIELD
	Non-tidal TVG: annual, semi-annual, and drift up to deg/ord 50	Non-tidal TVG: one annual, one semi-annual, one bias and one drift terms for each year up to deg/ord 80; C21/S21 modeled according to IERS2010 conventions; C31/S31 estimation by arc if necessary
	Solid Earth tides: from IERS2003 conventions	Unchanged
	Ocean tides: FES2004	Ocean tides: FES2012 (as soon as the associated load tide model will be provided)
	Atmospheric gravity: 6hr NCEP pressure fields (20x20) + tides from Biancale-Bode model	Atmospheric gravity: 6hr NCEP pressure fields (72x72) + tides from Biancale-Bode model
	Pole tide: solid Earth and ocean from IERS2010 conventions	Unchanged
	Third bodies: Sun, Moon, Venus, Mars and Jupiter	Unchanged
Surface forces	Radiation pressure model: thermo-optical coefficient from pre-launch box and wing model, with smoothed Earth shadow model	Radiation pressure model: calibrated semi-empirical solar radiation pressure model
	Earth radiation: Knocke-Ries albedo and IR satellite model	Unchanged
	Atmospheric density model: DTM-94 for Jason satellites, and MSIS-86 for other satellites	Atmospheric density model: DTM-13 for Jason satellites, HY-2A, and MSIS-86 for other satellites
Estimated dynamical parameters	Drag coefficient every 2 or 3 revolutions Along-track and cross-track 1/rev per day or every 12 hours	Improved stochastic solutions
Satellite reference	Mass and center of gravity: post-launch values + variations generated by Control Center	Unchanged

	Attitude model: For Jason satellites: quaternions and solar panel orientation from control center, completed by nominal yaw steering law when necessary Other satellites: nominal attitude law	
Displacement of reference points	Earth tides: IERS2003 conventions Ocean loading: FES2004 Pole tide: solid earth pole tides Reference GPS constellation: JPL solution at IGS (orbits and clocks) – fully consistent with IGS08	Unchanged Ocean loading: FES2012 (as soon as the model will be provided) Pole tide: solid earth pole tides and ocean pole tides (Desai, 2002) S1-S2 atmospheric pressure loading, implementation of Ray & Ponte (2003) by van Dam Reference GPS constellation: JPL solution in "native" format (orbits and clocks), referenced to the CoM of the solid Earth/Ocean system – fully consistent with IGS08
Geocenter variations	None	Tidal: ocean loading and S1-S2 atmospheric pressure loading Non-tidal: seasonal model from J. Ries
Terrestrial reference frame	Extended ITRF2008 (SLRF/ITRF2008, DPOD2008, IGS08)	Unchanged
Earth orientation	Consistent with IERS2010 conventions and ITRF2008	Unchanged
Propagation delays	SLR troposphere correction: Mendes-Pavlis SLR range correction: constant 5.0 cm range correction for Envisat, elevation dependent range correction for Jason DORIS troposphere correction: GPT/GMF model GPS PCO/PCV (emitter and receiver) consistent with constellation orbits and clocks (IGS08 ANTEX) GPS: phase wind-up correction	Unchanged Unchanged Unchanged DORIS beacons phase center correction Unchanged Unchanged
Estimated measurement parameters	DORIS: one frequency bias per pass, one troposphere zenith bias per pass SLR: bias per arc solved for a few stations, bias per pass for a few stations	Unchanged Reference used to evaluate orbit precision and stability

	GPS: floating ambiguity per pass, receiver clock adjusted per epoch	Unchanged
Tracking data corrections	Jason-1 Doris data: South Atlantic Anomaly model (J.-M. Lemoine et al.) applied before and after DORIS instrument change DORIS time-tagging bias for Envisat and Jason aligned with SLR before and after instrument change	Jason-1 Doris data: updated South Atlantic Anomaly model (J.-M. Lemoine et al.) applied before and after DORIS instrument change Unchanged
DORIS weight	1.5 mm/s (1.5 cm over 10 sec) For Jason-1, DORIS weight is reduced by a factor 10 before DORIS instrument change	Unchanged For Jason-1, SAA DORIS beacons weight is divided by 10 before DORIS instrument change
SLR weight	15 cm	Reference used to evaluate orbit precision and stability
GPS weight	2 cm (phase) / 2 m (code)	Unchanged