



CENTRE NATIONAL D'ÉTUDES SPATIALES

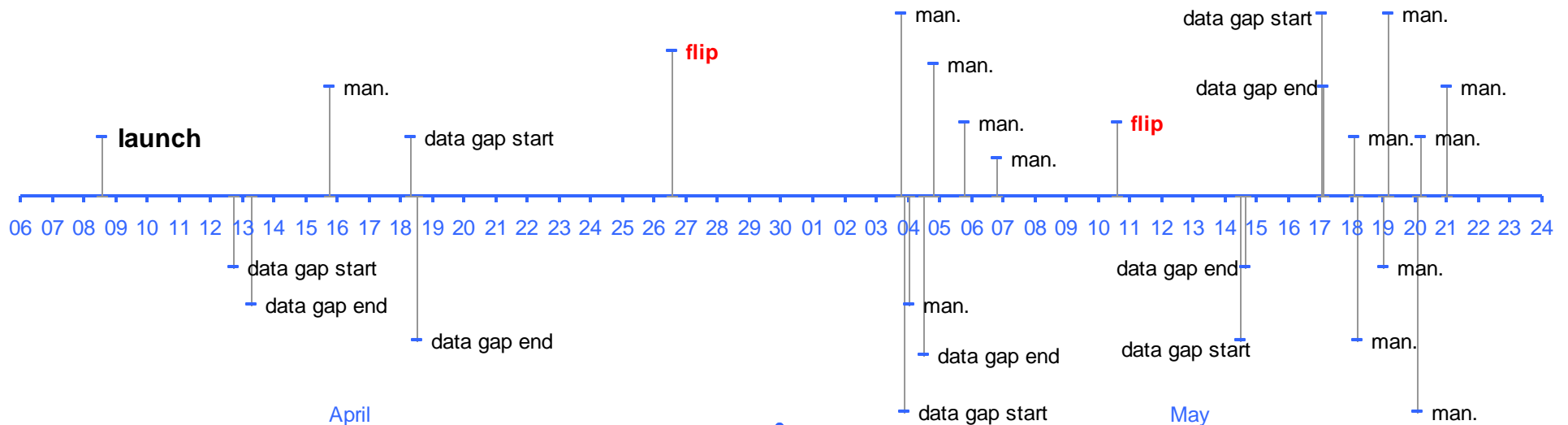
CRYOSAT-2 POD STATUS AND MODELING SUMMARY

CNES POD Team

DORIS AWG MEETING – May 26-27, 2010 ESOC

POD status

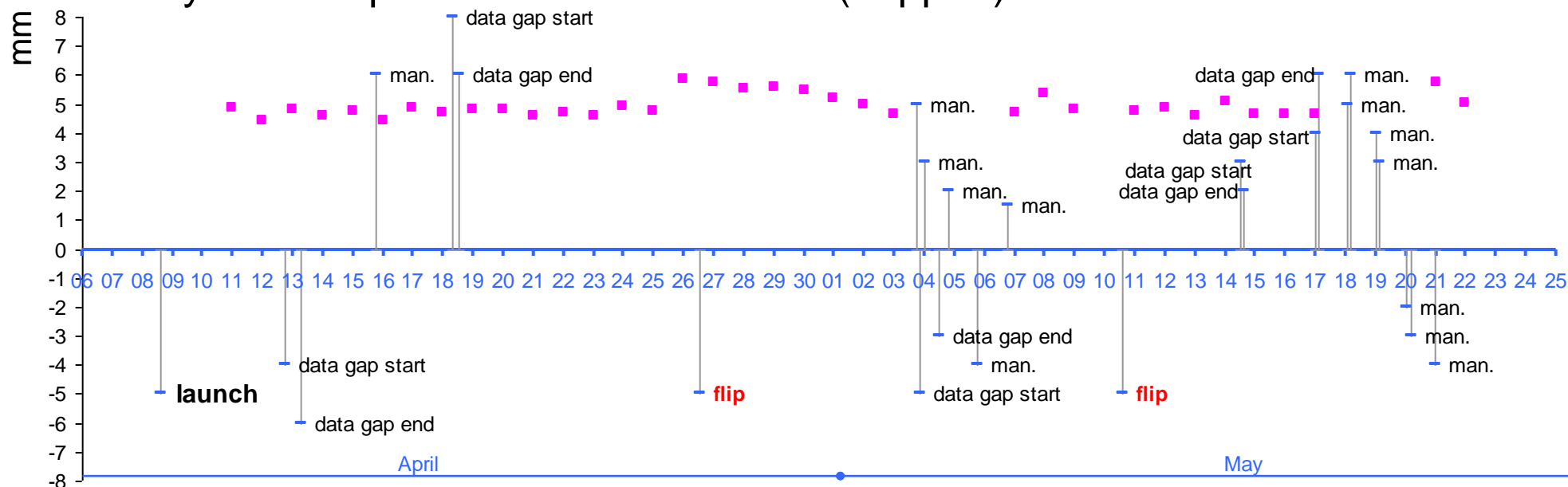
- CRYOSAT-2 launched on 08/04, DORIS receiver switched-on on 10/04
- MOE orbit operationally delivered including data from 11/04 onward
 - ◆ Most data gaps have been recovered, DORIS data can be delivered during the early mission stage
 - ◆ Several maneuvers to reach nominal orbit



Status of DORIS tracking

- 62% of measurements are above 10° elevation (74% for Jason-2)
- about 8700 non-edited meas./day (~9200 meas./day for Envisat)
- RMS of post-fit residuals generally below 5 mm (typical of MOE orbits outside maneuvers periods)

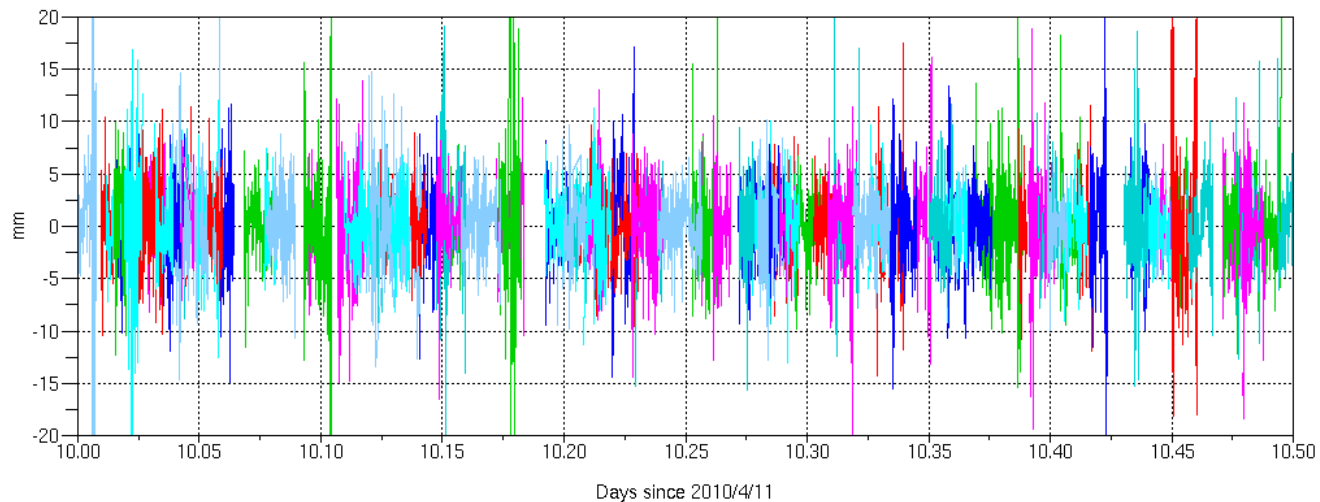
Daily RMS of post-fit DORIS residuals (doppler)



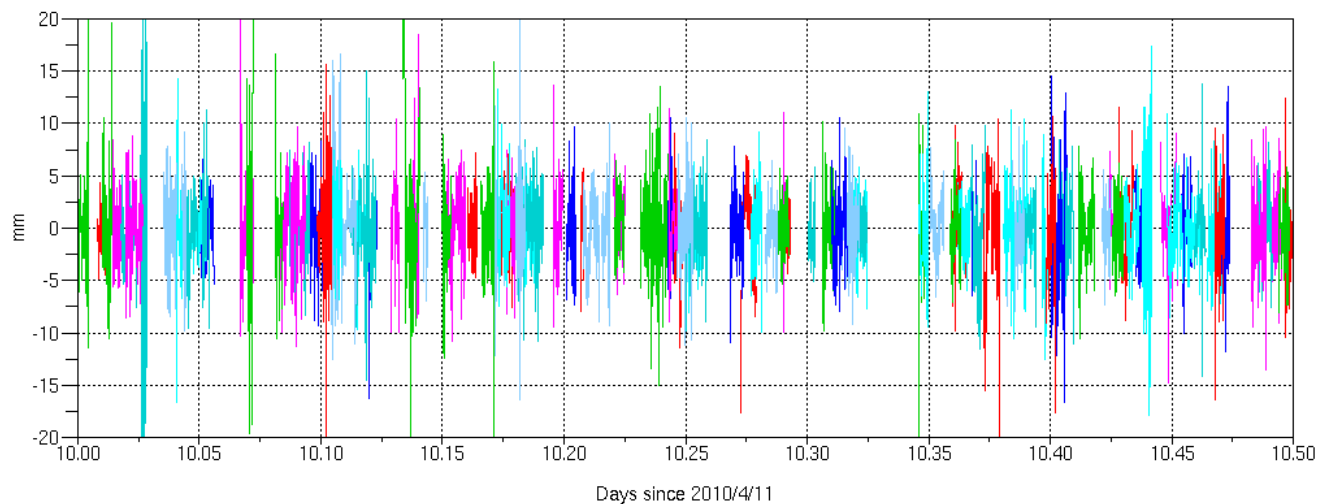
Status of DORIS tracking

- **CRY-2 and JAS-2 Doppler post fit residuals look similar and don't exhibit any particular signature**

JASON-2 PHASE-INCREMENT RESIDUALS

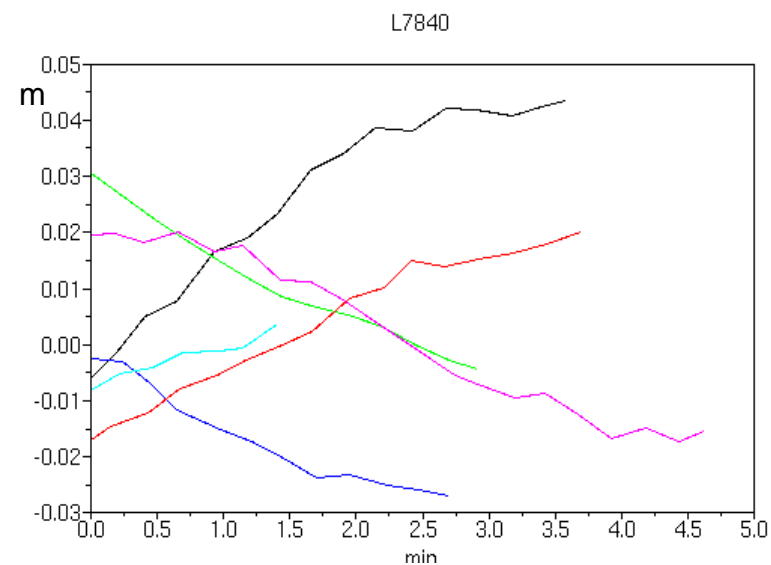
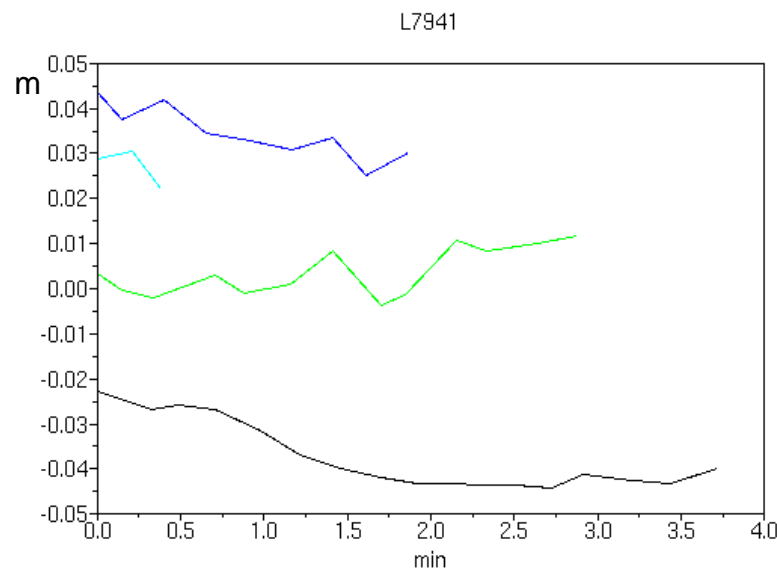
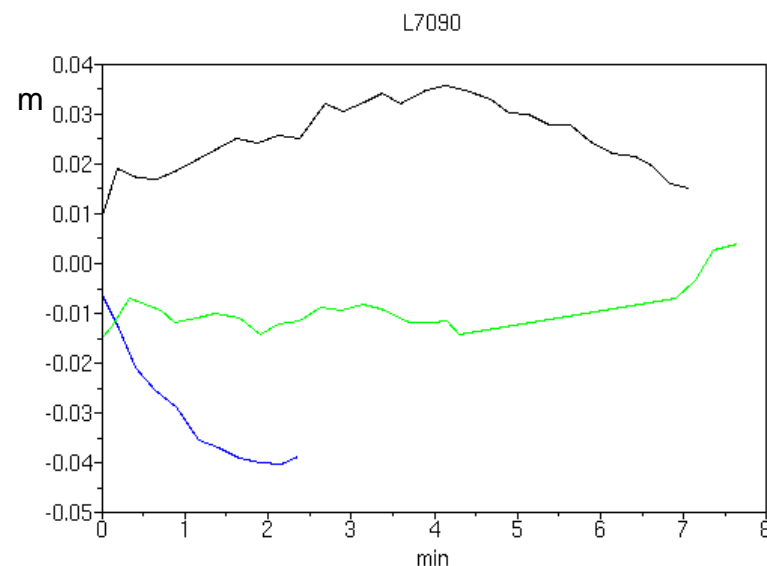


CRYOSAT-2 PHASE-INCREMENT RESIDUALS



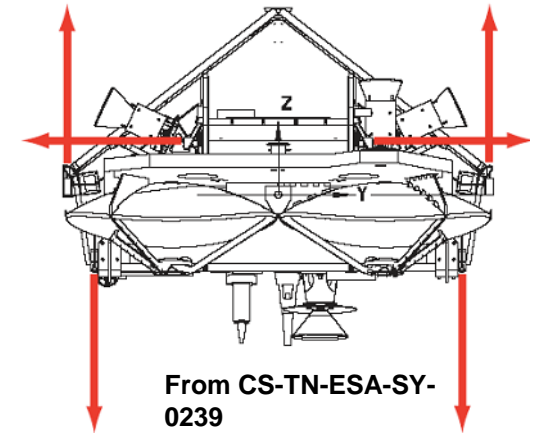
SLR residuals on DORIS-only orbits

- SLR residuals computed on DORIS-only orbits between 19/04 and 25/04 indicate a fit in the order of few cm (few passes, not statistically significant)

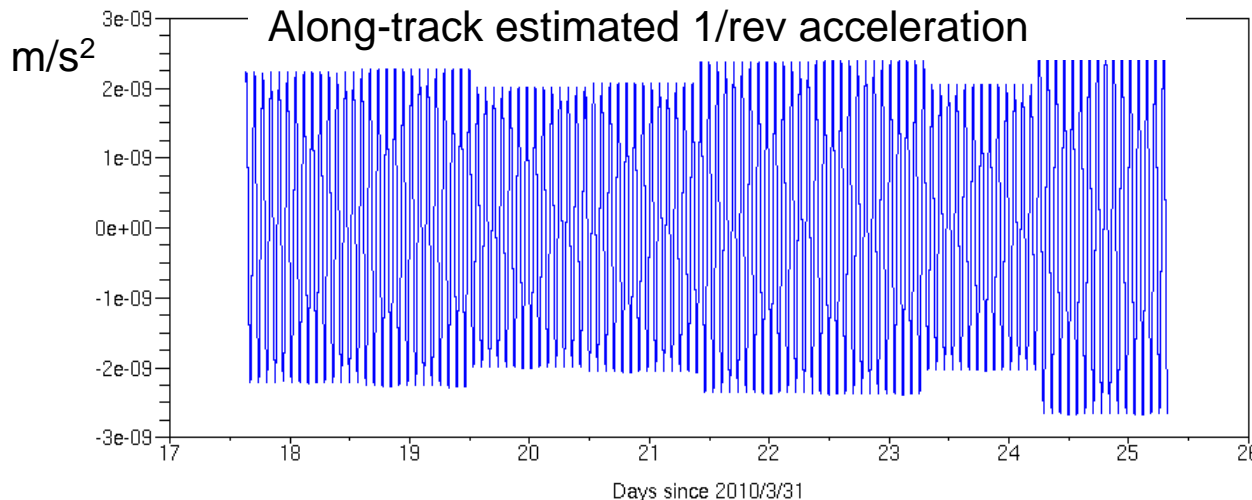


Cryosat-2 Modeling Status

- The same GDR-C models used for Jason-1,2 and Envisat are applied to Cryosat-2
- Macromodel provided by ESA (CS-TN-ESA-SY-0239)



AREA	VISIBLE			INFRARED			
	SPEC	DIFF	ABS	SPEC	DIFF	ABS	
+X	2,515	0,063	0,093	0,844	0,023	0,175	0,802
-X	2,515	0,047	0,096	0,857	0,015	0,182	0,803
+Y	5,114	0,048	0,066	0,887	0,017	0,124	0,859
-Y	5,114	0,04	0,066	0,894	0,014	0,127	0,859
+Z	8,882	0,015	0,056	0,929	0,005	0,11	0,885
-Z	8,882	0,132	0,085	0,784	0,054	0,15	0,796



Cryosat-2 Modeling Status

■ Nominal attitude : normal to ellipsoid, “nose down” (6°), X_{sat} axis oriented towards the earth-fixed velocity vector (4° yaw-steering at equator crossing),

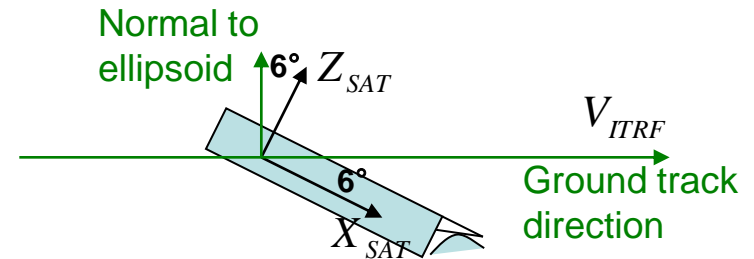
- Nominal attitude is used for MOE orbits
- Measurements from the 3 star trackers can be used for POE

■ Antenna reference points

- ◆ DORIS and SLR antenna axis point perpendicular to the ellipsoid

■ LRA range correction

- ◆ Currently using average value of 19 mm
- ◆ Elevation angle dependent pattern provided by LRA manufacturer



	X (mm)	Y (mm)	Z (mm)
CoM at launch	1631	11	14
DORIS 2GHz	1848	-200	-751
DORIS 400MHz	1832	-200	-598
SLR	1809	-935	-450

2.2.4 The value of systematic correction for the range measurements relative to center of the LRR baseplane C varies between 25.5 mm and 13.9 mm depending on the elevation angle (see Table). The value of systematic correction is added to the range measurement.

Elevation angle Deg.	20	30	40	50	60	70	80	90
Systematic correction mm	25.5	24.8	22.0	17.1	13.9	15.9	19.0	20.1

Source: email from C. Goetz (12/02/2010)