



CENTRE NATIONAL D'ÉTUDES SPATIALES

28th Scientific Committee Paris, May 29th 2008

COROT : MISSION STATUS

Mission Status

■ Satellite : **Nominal** behavior

■ Instrument

- ◆ flight software updated V5.00 : filtering of bright pixels on Exo background windows
- ◆ **nominal** behavior but
 - DPU1 SEU counter behavior at transition from VLE_PBS to VLE_APS under investigation (no impact on mission)
 - Faulty Ecartometry data using Corot ID 8158 (DPU1) during operations and current RUN LRc02 under vestigation (no impact on mission, DPU1 provides ecartometric data to AOCS system)

■ GPS constellation

- ◆ 1 event 13/05/2008
- ◆ No impact on the mission

■ Ground segment

- ◆ Corot Control Center : **Nominal**
- ◆ Corot Mission Center : **Nominal**
- ◆ Ground stations : **Nominal**

■ Conclusion of 1st REVEX (28th of Feb. , 18th of March) => Corot System performs very well and provides great satisfaction to the scientific team

CMC : On-Going Maintenance Activity

■ Monitoring

- ◆ Development of a new module for the instrument monitoring
- ◆ Development of a monitoring function of the data flow and data processing

■ N1 Alarm

- ◆ Processing chain implemented : computer upgraded to 64bits configuration
- ◆ Production of LRc02 (week 1,2,3,4) data has started
- ◆ Still under evaluation and consolidation

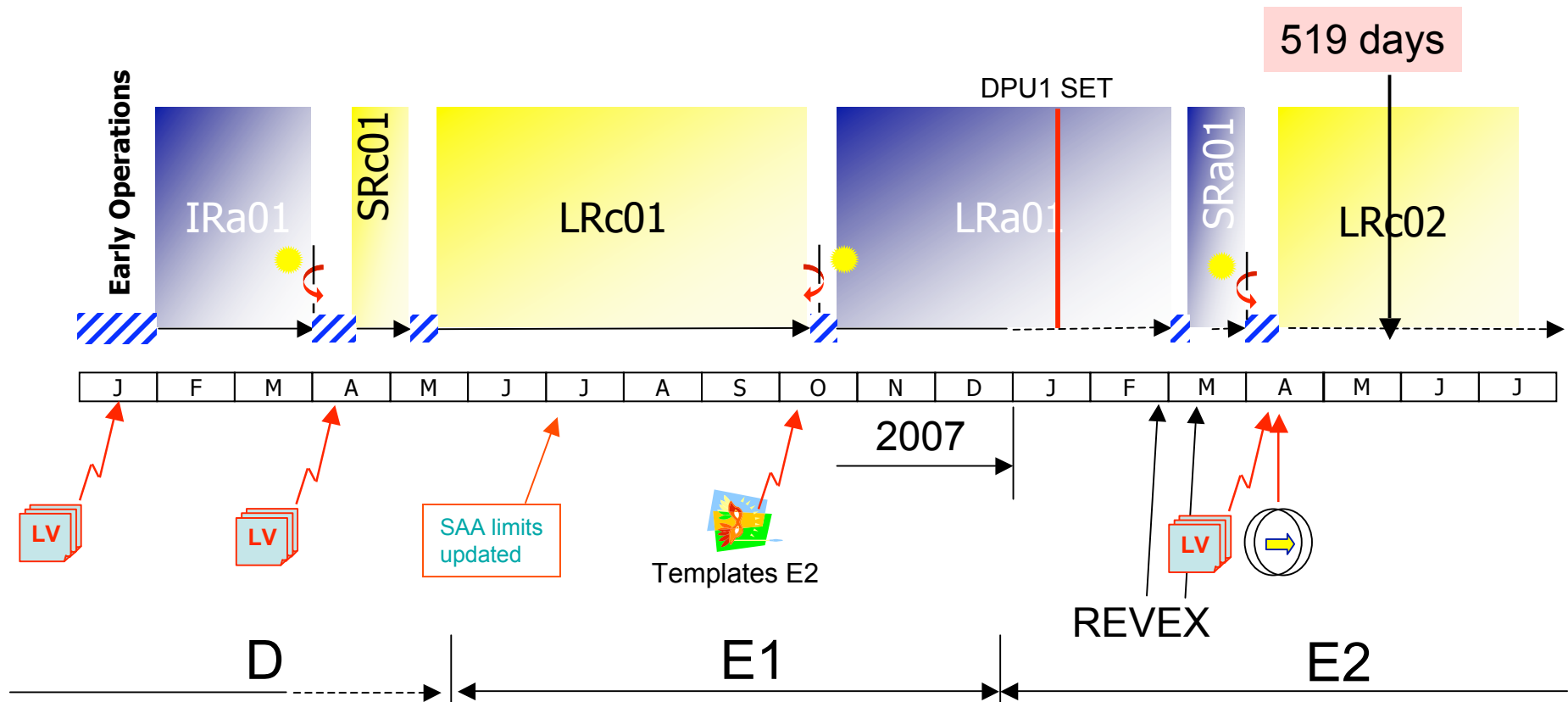
■ Data Base

- ◆ Data to be migrated under one single database

■ Corotsky :

- ◆ OMP data update V2.6 : 2008/03/26 => Exo Stars (AP) added for LRc02
- ◆ Data base migration to Oracle10g to be done soon
- ◆ Application to be updated to new version before summer (V5.4)
- ◆ Orbit ephemeris to be updated

Mission History



Status of previous completed run : SRa01

■ **Pointing** : r.a. 101.04°, dec. 9.02°, roll 2.31°

■ **A1 Ecartometry data used by Attitude Control System**

■ **Scientific Services & Processing**

- ◆ **A1** : Start : 2008/03/05 at 22:39 UT - Stop : 2008/03/31 at 7:44:06 UT - ~25 days OBS
- ◆ **A2** : Start : 2008/03/07 at 12:56 UT - Stop : 2008/03/31 at 7:13:00 UT - ~25 days OBS
- ◆ **E1** : Start : 2008/03/07 at 21:50 UT - Stop : 2008/03/31 at 7:44:06 UT - ~23 days OBS
- ◆ **E2** : Start : 2008/03/07 at 21:50 UT - Stop : 2008/03/31 at 7:13:00 UT - ~23 days OBS
- ◆ **Update of Astero Masks** : 2008/03/12 at 17:00 UT

■ **Exo Oversampling**

- ◆ 2008/03/10 : 1st list of 500 brightest stars for E1 & E2

■ **Specific Operations**

◆ **Star Window (Corot ID 2503) acquisition performed :**

- The 26th of March during a solar array rotation (20 minutes interruption of science data on A2 + E2)
- 31th of March at the end RUN

Status of current Run : LRc02

- **Pointing** : r.a. 279.66 °, dec. 6.40°, roll 16.72°
- **A2 Ecartometry data used by Attitude Control System**
- **Scientific Services & Processing**
 - ◆ **A1 : Start : 2008/04/11 at 21:00 UT**
 - ◆ **A2 : Start : 2008/04/11 at 21:00 UT**
 - ◆ **E1 : Start : 2008/04/15 at 23:10 UT**
 - ◆ **E2 : Start : 2008/04/15 at 23:10 UT**
 - ◆ **Update of Astero Photometric Masks : 2008/04/15 at ~22:50 TU**
- **Exo Oversampling Updates** :
 - ◆ **2008/04/16 : 1st list of 500 stars for E1 & E2**
 - ◆ **2008/04/18 : 9 (resp. 13) stars added/removed for E1 (resp. E2)**
- **Specific operations**
 - ◆ **Acquisition of rough Ecartometric data (Corot ID 8158) :**
 - 2008/05/06 : from 16:08 to 17:52 TU science data interrupted on A1 & E1
 - ◆ **Star Window + Rough Ecartometric data acquisition:**
 - 2008/05/21 : from 15:13 to 17:15 TU science data interrupted on A1 & E1

TM Assessment

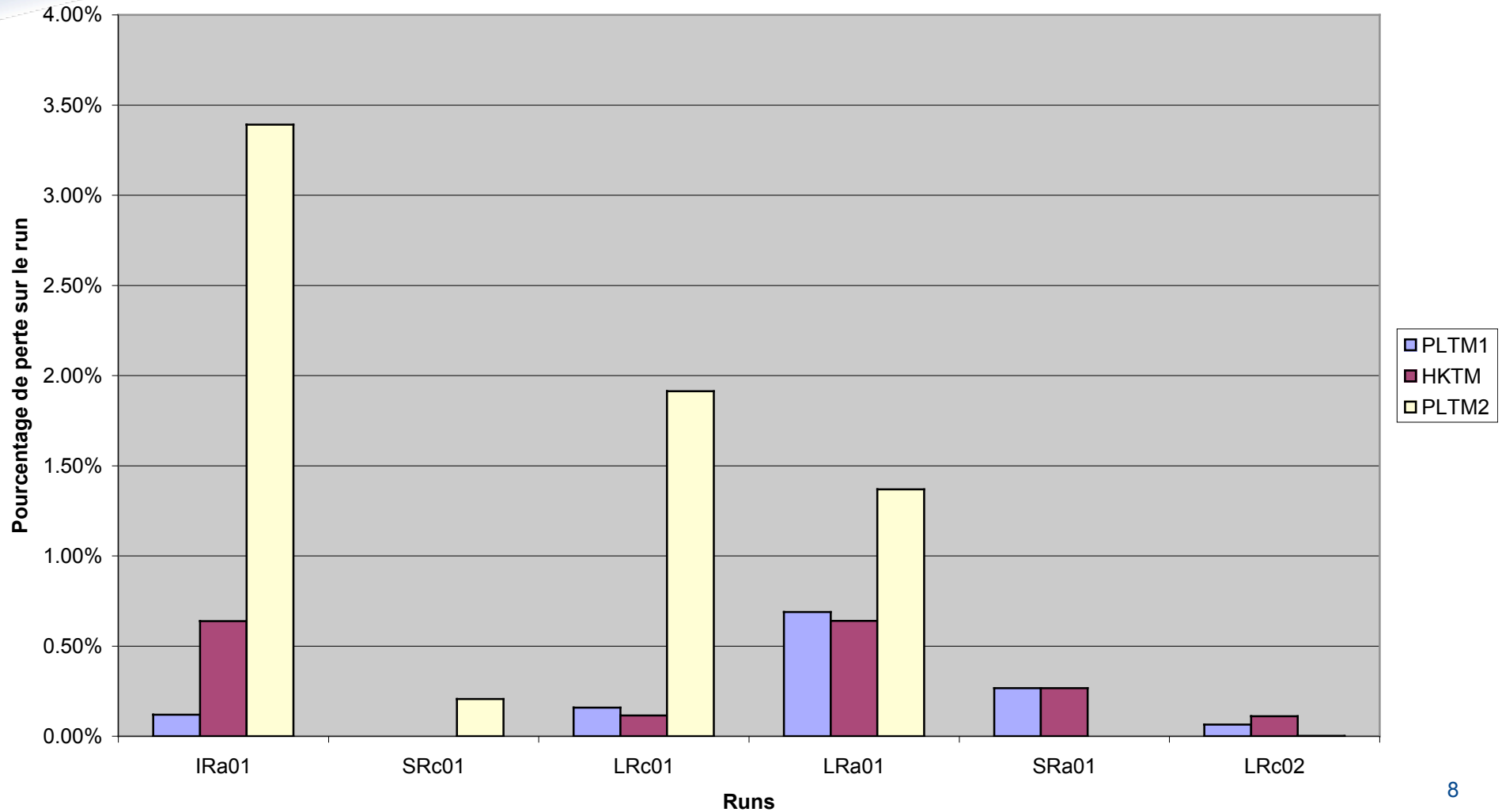
■ SRa01 :

- ◆ **99.73% of PLTM1 acquired and delivered :**
 - 1 KRN pass lost (2008/03/28) : 1.5 h loss of PLTM1 and HKTM
- ◆ **100% of the PLTM2 acquired and delivered**

■ LRC02 :

- ◆ **99.94% of PLTM1 acquired and delivered**
 - 2008/05/05 : 10 minutes loss of PLTM1
 - 2008/05/20 : 26 minutes loss of PLTM1
- ◆ **100% of the PLTM2 acquired and delivered**

TM Loss for each RUN



Maneuvers for the Drift of the Orbit Plan

■ 1 calibration + 4 inclination maneuvers achieved:

- ◆ April 01, 02, 03, 04, 07

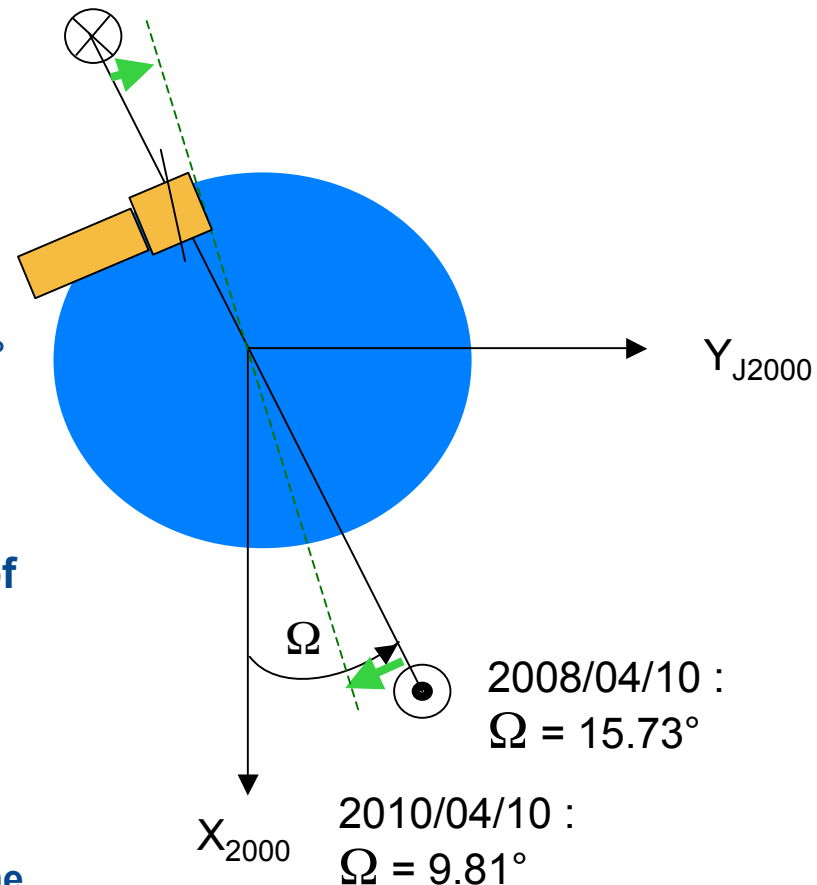
■ Orbit plane :

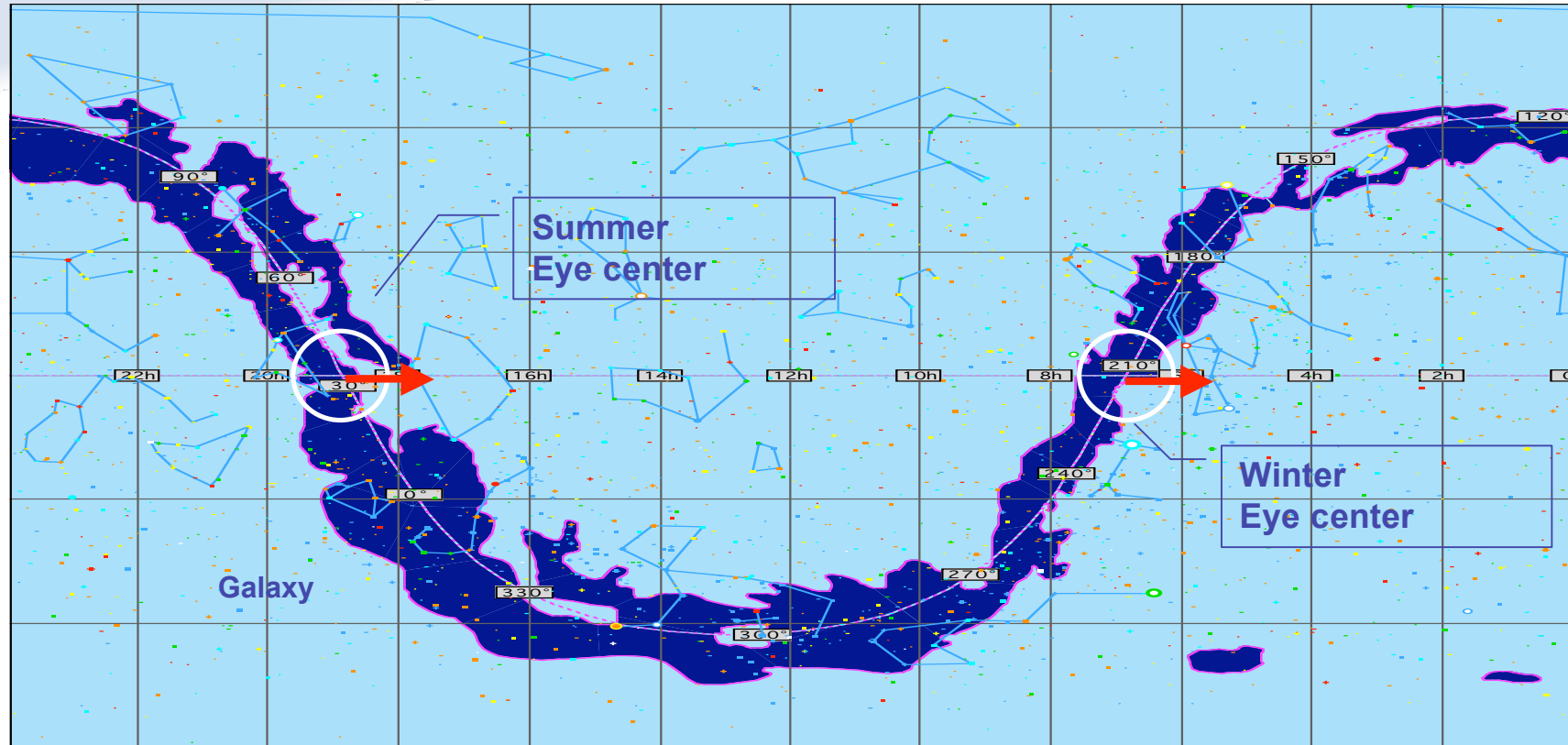
- ◆ Delta i : from 90.03° (03/31) to 89.92° (04/08)
- ◆ Ω drift : $\sim -3^\circ/\text{year}$

■ Excellent efficiency

■ 14.9m/s consumed (total capacity of 95 m/s) => savings for

- ◆ maneuvers to stop the drift of the orbit (2010)
- ◆ Maneuvers to avoid collision with space debris
- ◆ End of Life maneuvers to desorbit the satellite





Space Debris

- CNES performs the station keeping of 16 spacecraft (14 LEO, 2 GEO)
- A fully operational capacity to monitor and manage the collision risks for the LEO satellites (including COROT) has been developed
- It is based on a 5 main steps :
 - ◆ Daily monitoring of close conjunction (7 days in the future, $d < 10$ km, probability $> 10^{-4}$) with all the USSTRATCOM catalogue objects (automated screening)
 - ◆ Manual risk assessment
 - ◆ Dangerous conjunctions fine analysis (new orbit data + 3D visualization)
 - ◆ Conjunction mitigation (Up to avoidance maneuver)
 - ◆ Feedback for knowledge and operational improvements
- COROT
 - ◆ The orbit of COROT is “populated”
 - ◆ Since august 2007, 89 conjunctions have been detected leading to manual assessments (43 objects)
 - ◆ No dangerous conjunction (probability $> 10^{-3}$) has been reported yet
- <http://debris-spatiaux.cnes.fr/>

Next Run Schedule

■ LRC02

- ◆ R.a = 279.7°
- ◆ Start : Astero 2008/04/11, Exo 2008/04/15
- ◆ Stop : 2008/09/08
- ◆ 150 days of Astero, 146 days of Exo data

■ SRC02

- ◆ R.a ~ 284°
- ◆ Start : Astero 2008/09/10, Exo 2008/09/13
- ◆ Stop : 2008/10/06
- ◆ 26 days of Astero, 23 days of Exo data

■ SRa02

- ◆ R.a ~ 98°
- ◆ Start : Astero 2008/10/10, Exo 2008/10/13
- ◆ Stop : 2008/11/03
- ◆ 25 days of Astero, 21 days of Exo data

■ LRa02

- ◆ R.a ~104°
- ◆ Start : Astero 2008/11/05, Exo 2008/11/08
- ◆ Stop : 2009/04/05
- ◆ 151 days of Astero, 148 days of Exo data