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June 2011**

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1. INTRODUCTION

1.1 Purpose and Scope

This document contains the Quality report for GOCE L1b data for June 2011.

The latest version of this document is available on the GOCE Data Quality portal at:

<http://earth.esa.int/GOCE/> → “Level 1b QC” → “Monthly”

The GOCE Data Quality portal is the principal source for any quality-related information on GOCE products.

<http://earth.esa.int/GOCE/> → “Level 1b QC”.

1.2 Glossary

The following acronyms and abbreviations have been used in this report.

ABBREVIATION	MEANING
EGG	Electrostatic Gravity Gradiometer
DFACS	Drag Free and Attitude control system
SST-I	Satellite-to-satellite tracking instrument
CTR	Control Voltages
STR	Star Tracker
Trace SD	Trace Spectral Density
ICM	Inverse Calibration Matrix
GAR	Gradiometer Angular Rates
FPM	Fine Pointing Mode

2. JUNE 2011 OVERVIEW

- Beam Out event at UTC 02/06/2011 00:01:19.
- Beam Out at UTC 05/06/2011 02:28:38 and 21:23:13 and oscillation in gradients components Uxx and Uzz in correspondence of a thrust peak at 01:47:33 with impacts on trace.
- Instrument Calibration operations were performed on June 07th. EGG data are not produced during Calibration Operations. Jun 07th and 08th data are affected by these operations.
- Anomalous oscillation found in CM 14_X at UTC 09/06/2011 22:22:05.
- Beam Out event at UTC 15/06/2011 21:54:03.
- Beam Out event at UTC 21/06/2011 21:56:40.
- Anomalous oscillation found in gradients datasets and in IAQ component Q2 with impacts on trace at UTC 27/06/2011 16:41.

3. JUNE 2011 DATA QUALITY ANALYSIS

3.1 Anomalous oscillation in Uzz and Uxx component on 05th of June

The Gravity gradients trace spectral density is not nominal, during the 05th of June reference period. Trace SD is reported in Figure 1, below.

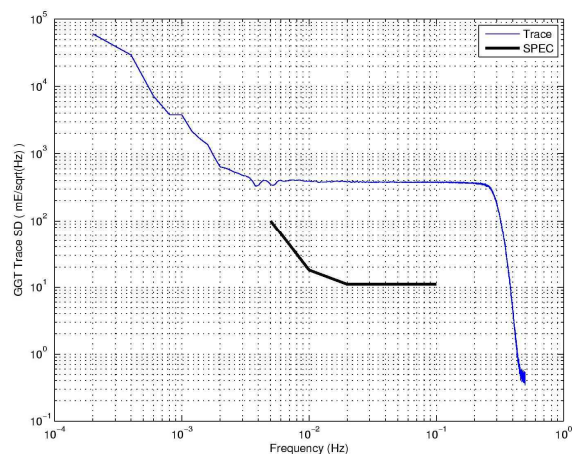


Figure 1 Current trace PSD.

The anomalous behavior of the trace PSD is due to an oscillation found in Uxx and Uzz components caused by the peak in the thrust during the reference period. The effects of the peak are clearly visible in the following datasets as well:

- CTR components: A1_Z1/2, A2_Y1/2, A3_Y1/2, A4_Z1/2, A5_Y1/2, A6_Y1/2.
- CCM : 14_X, 25_X, 36_X, 14_Z, 25_Z, 36_Z
- CDM : 14_X, 25_X, 36_X, 14_Y, 36_Y, 14_Z, 25_Z, 36_Z.

The CM PSDs show that during the reference period the 14_X is not nominal due to the oscillation found in CM data caused by the thrust peak on 05/06 01:47:33. The component 36_Z has an anomalous behaviour in the upper part of the MBW as well as the component 25_Y.

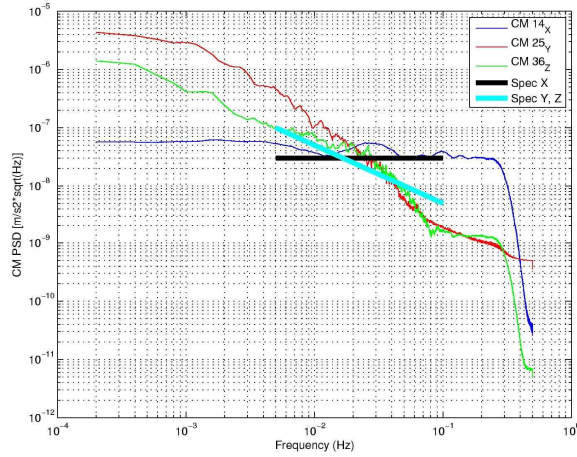


Figure 2 CM Signals PSD

The behaviour of the thrust over the reference period is reported below in which is clearly visible the peak of 12.617 mN:

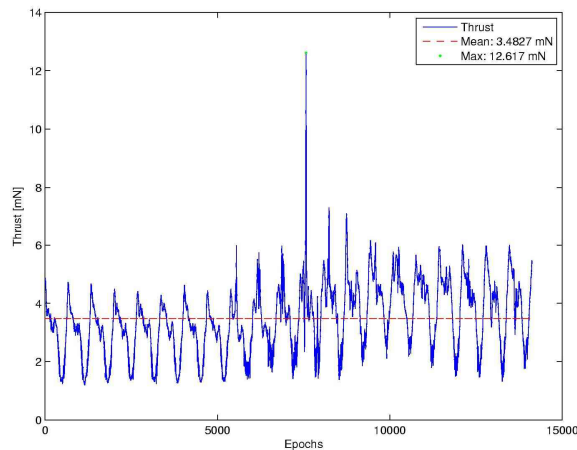


Figure 3 Time series, mean value and max value of the thrust over 05th of June reference period

The trace PSD not considering the anomalous oscillation is reported below and shows a nominal behaviour:

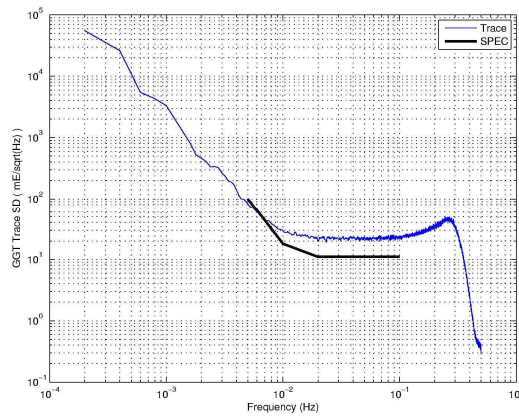


Figure 4 Trace PSD not considering the anomalous oscillation of 08/05

3.2 Common mode oscillation on 9th June

The CM PSDs show that during the 9th June reference period the 14_X is not nominal due to an anomalous oscillation in data on 09/06 22:22:05, as reported in figure 6. The component 36_Z is nominal as well as the 25_Y component.

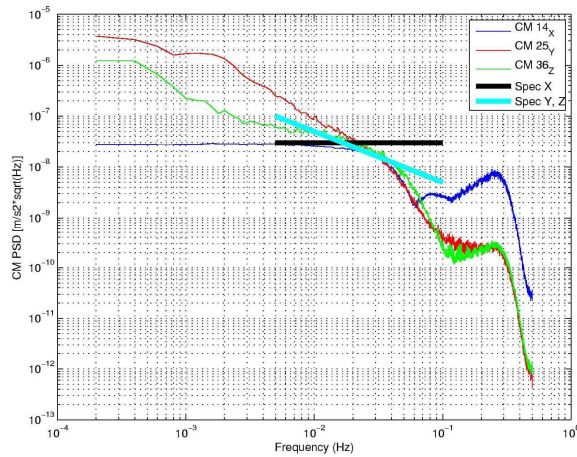


Figure 5 CM PSDs (right) and during the 9th June reference period

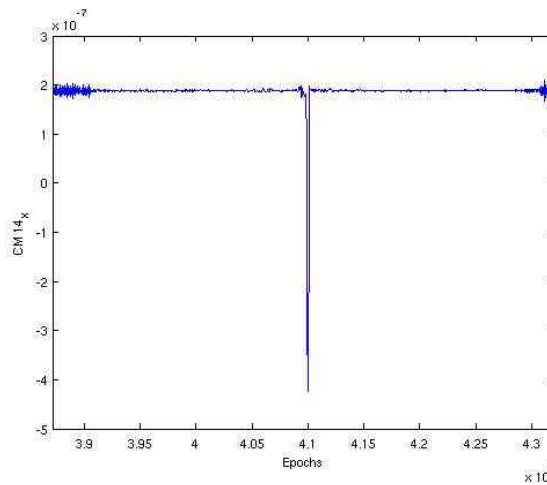


Figure 6 CM 14_X anomaly during the 9th June reference period

3.3 Instrument Calibration

Special Spacecraft Operations for Instrument Calibration were performed on 07th June 2011, from

- 20110607T 071408
- to
- 20110608T 070947

EGG_NOM_1b data are unavailable during this period, i.e. between products:

- GO_CONS_EGG_NOM_1b_20110607T054424_20110607T071408
- and
- GO_CONS_EGG_NOM_1b_20110608T070947_20110608T083931

3.4 Data anomaly on 27th June

The Gravity gradients trace spectral density is not nominal, during the 27th June reference period. Trace SD is reported in 7, below.

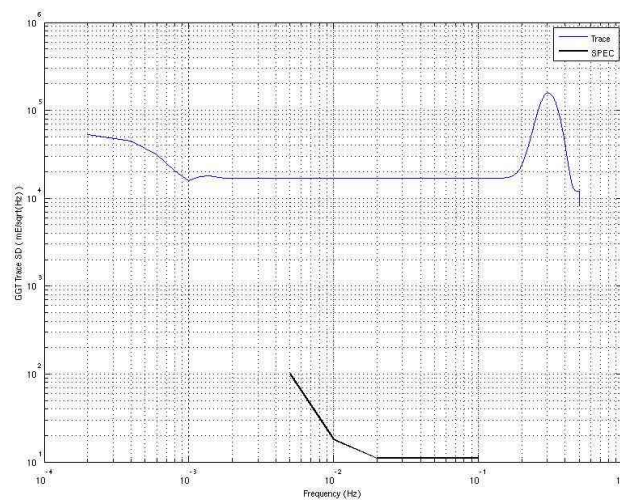


Figure 7 Current trace PSD (right), compared with previous days (left).

The not nominal behaviour of the trace PSD is due to an anomalous oscillation which affects the gradients time series occurred on 27th of June at 16:41:33:

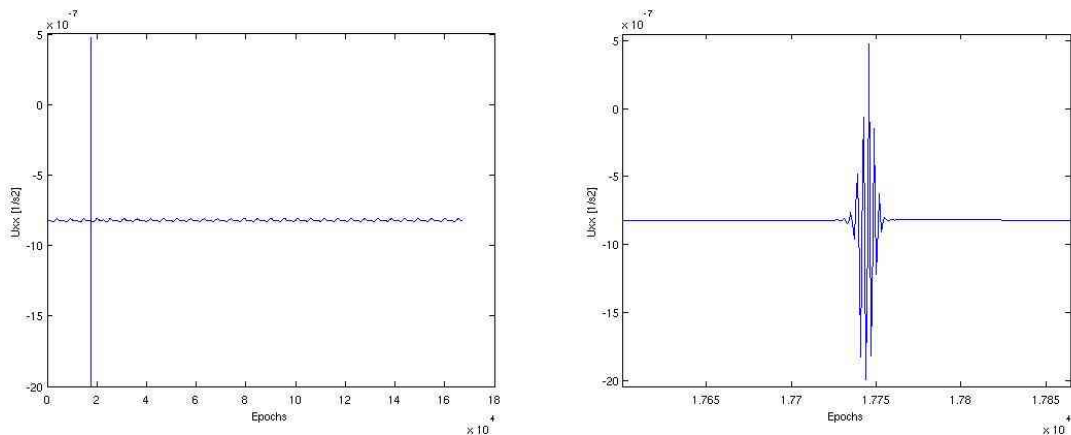


Figure 8 Uxx anomaly (left) and its zoom (right) the same anomaly affects Uyy and Uzz

The oscillation has peak to peak amplitude of $\sim 25e-7$ 1/s². The trace not considering the anomalous event is nominal as reported below:

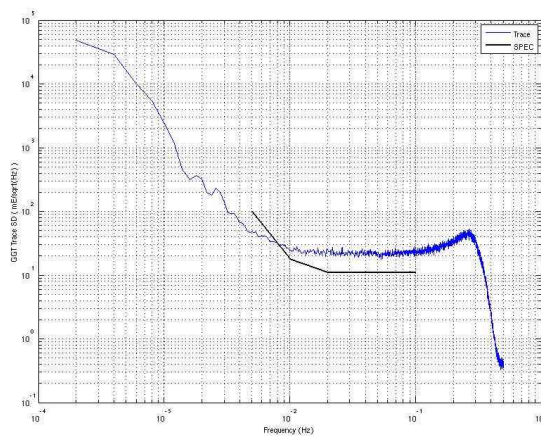


Figure 9 Trace PSD not considering the anomaly

The anomaly affects also the following CTR components (figure 4 reports the components A3 Z1 for example):

- A3 Z1-2
- A4 X1-4 Z1-2
- A5 X1-4
- A6 Z1-2

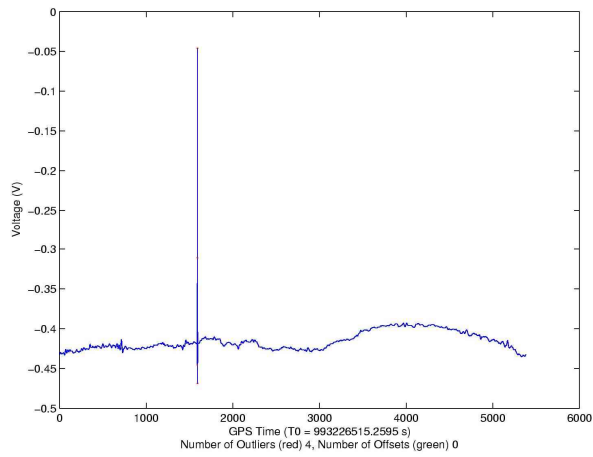


Figure 10 The anomaly in CTR component A3_Z1

Below the effect of the anomaly in DM accelerations components 14_X 25_Y and 36_Z which enters in the computation of the diagonal components of the gravity gradients tensor:

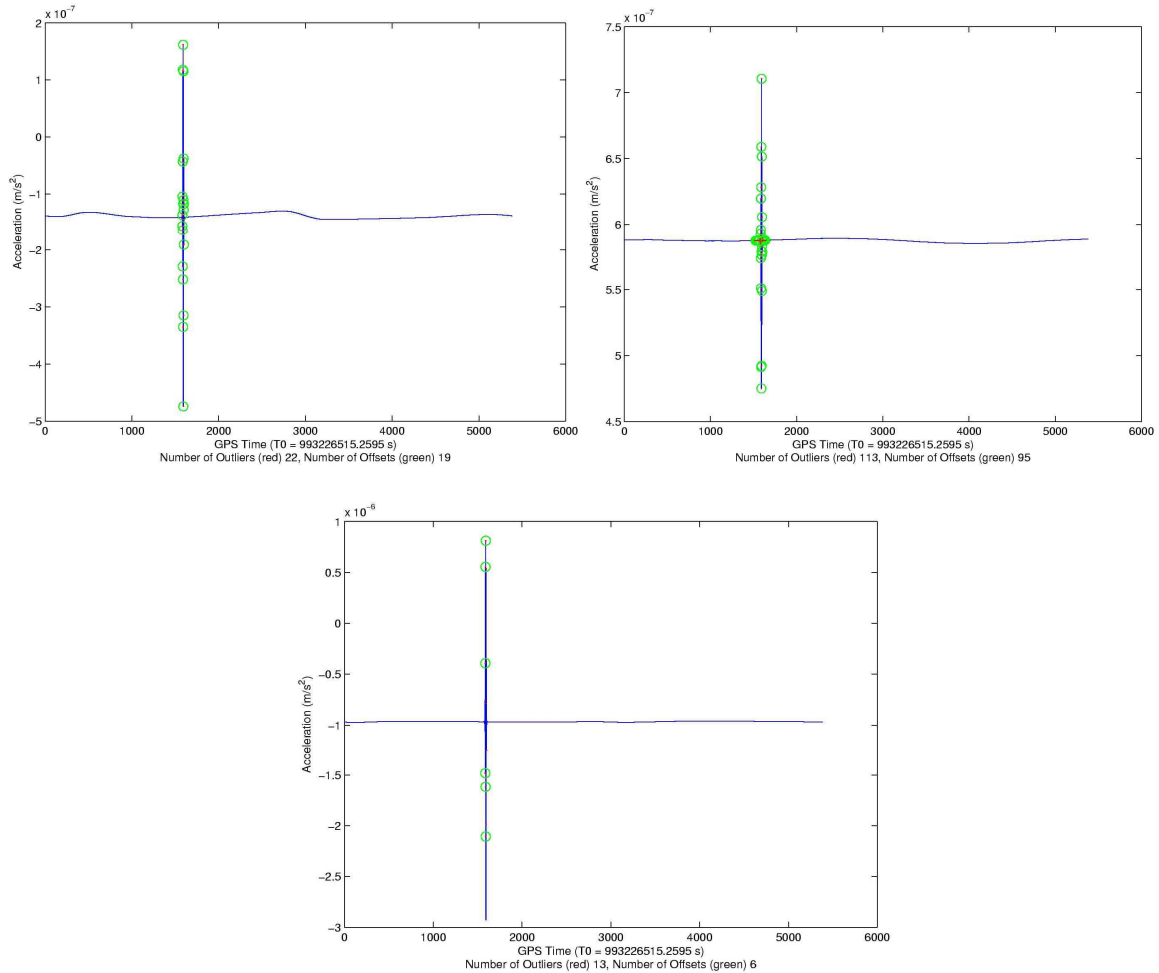


Figure 11 DM components 14_x (upper left) 25_Y (upper right) and 36_Z (center)

3.5 Beam Out events

Five Beam Out events occurred at the following UTC time during June 2011 reference frame:

EVENT NUMBER	UTC TIME
1	02/06/2011 00:01:19
2	05/06/2011 02:28:38
3	05/06/2011 21:23:13
4	15/06/2011 21:54:03
5	21/06/2011 21:56:40

Table 1 Beam out event

Below, the effects of the Beam Out in the common mode acceleration, component 14_x, are displayed, for the five events.

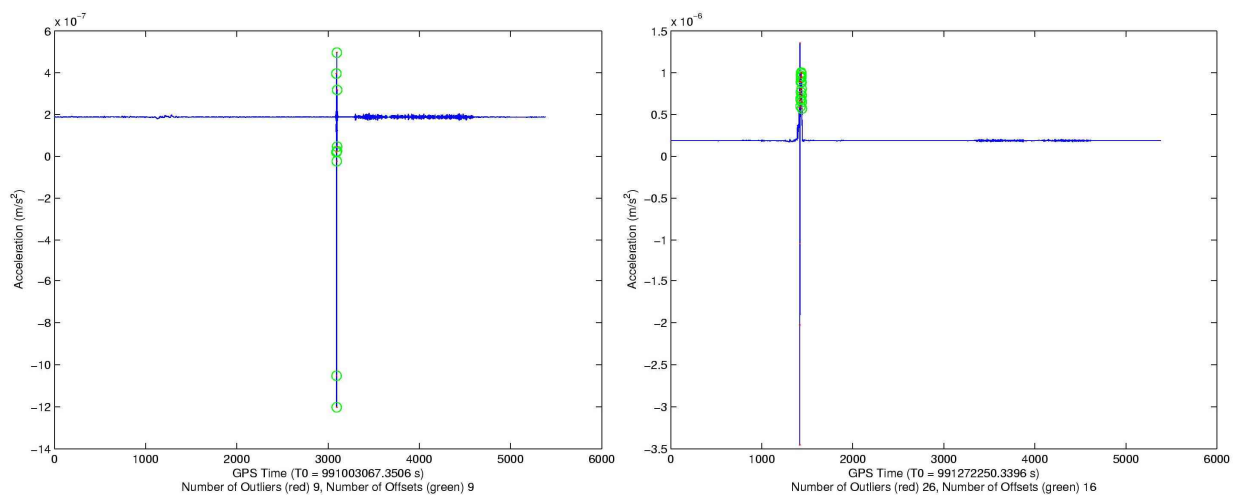


Figure 12 Beam Out events on 2nd of June (left) and on 5th of June (right)

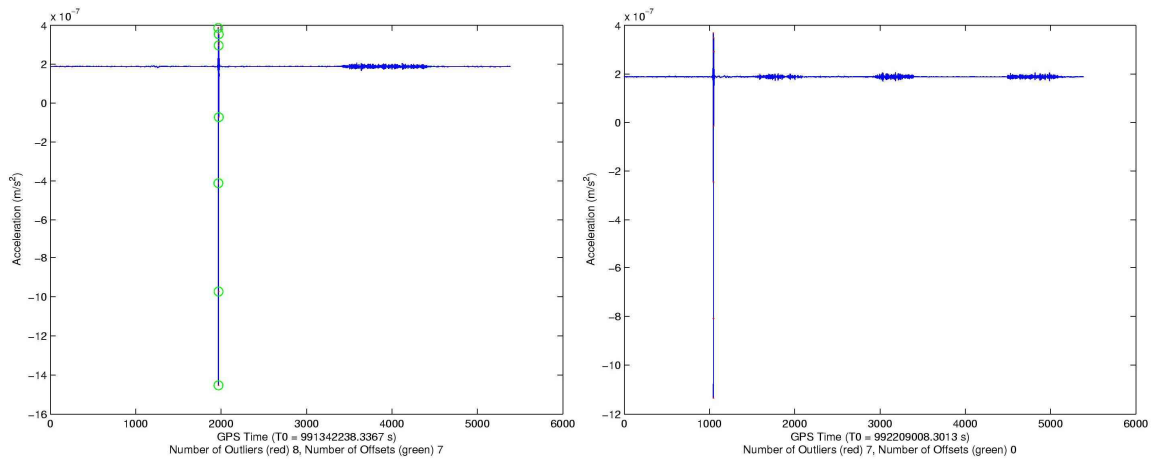


Figure 13 Beam Out events on 05th of June (left) and 15th of June (right)

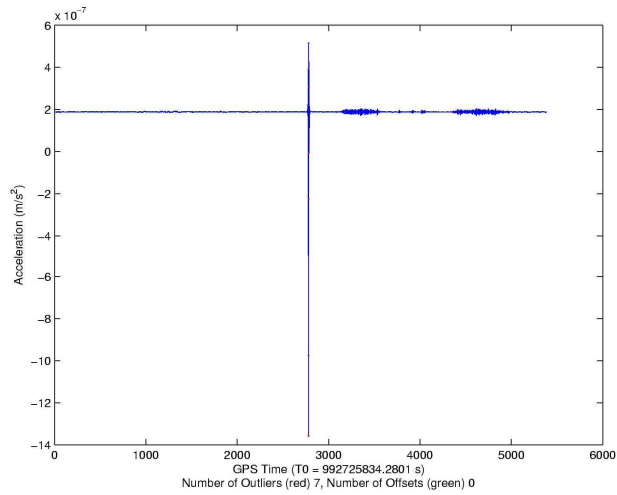


Figure 14 Beam Out events on 21st of June

Each Beam Out event enters in the gradients time series notably in the Uxx component without any relevant impacts on performance.