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TABLE OF CONTENTS

1.		4
1.1	Purpose and Scope	4
1.2	Glossary	4
n		F
Ζ.	SEPTEWIDER 2011 OVERVIEW	
3.	SEPTEMBER 2011 DATA QUALITY ANALYSIS	5
3. 3.1	SEPTEMBER 2011 DATA QUALITY ANALYSIS	5 5
3. 3.1 3.2	SEPTEMBER 2011 DATA QUALITY ANALYSIS	5 5
3. 3.1 3.2 3.3	SEPTEMBER 2011 DATA QUALITY ANALYSIS GGT and CTR outlier on 02 nd of September. Uzz oscillation on 13 th September. S/C anomaly 23-26 September: GAIEU watchdog triggering.	5 5 7



1. INTRODUCTION

1.1 **Purpose and Scope**

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

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

<u>http://earth.esa.int/GOCE/</u> \rightarrow "Level 1b QC" \rightarrow "Monthly"

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

<u>http://earth.esa.int/GOCE/</u> → "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. SEPTEMBER 2011 OVERVIEW

02-Sep-11	Gradients and CTR anomaly with impacts on trace at 12:16:41
10-Sep-11	BeamOut at Utc time 03:12:20
12-Sep-11	BeamOut at Utc time 04:00:09
13-Sep-11	Uzz oscillations with impacts on trace at 19:04:02 and 19:10:52. The corresponding epochs in L0 CTR DS are set to 0 V
15-Sep-11	Beam Out events at UTCs 01:24:50, 02:11:59 and 02:40:29
20-Sep-11	Beam Out event at UTC 17:19:14
22-Sep-11	Beam Out events at UTC 15:27:26 and 19:49:22
23-Sep-11	GAIEU watchdog triggering at 23:52
24-Sep to 26-Sep-	
2011	EGG configuration after watchdog trigger and restoring of the GAIEU non- permanent settings (recombination matrices, DFACS scale factors, acquisition and science control law parameters, detector offsets). Thrust Peak of 11 mN at 17:34:05
27-Sep-11	Beam Out events at UTCs 00:05:30 and 11:40:51

3. SEPTEMBER 2011 DATA QUALITY ANALYSIS

3.1 GGT and CTR outlier on 02nd of September

The Gravity gradients trace spectral density is not nominal during this reference period due to an anomalous oscillation found in gradients datasets at UTC 02/09 12:16:41.





Below the anomaly in the gradients datasets is reported:



Figure 2 Gradients anomaly on 02/09

The same anomaly is present also in the CTR voltages time series in the following components:

- A3 all the 8 CTR components.
- A4 all the 8 CTR components.
- A5 all the X and Z component while no anomalies are found in the Y components.
- A6 all the 8 CTR components.

Below the oscillation in the CTR datasets is reported for the components A4_Z1 and A6_Z1:



Figure 3 The oscillation on 02/09 in the CTR components A4_Z1 (left) and A4_Z2 (right)



The trace PSD return to nominal after the oscillation, as reported below:



Figure 4 Trace PSD after the anomaly

The CM PSDs are not nominal in the upper part of the MBW due to the anomaly occurred on 02/09.



3.2 Uzz oscillation on 13th September

The Gravity gradients trace spectral density is not nominal during 13th September reference period due to two anomalous events occurred on 13/09 in the Uzz gradient respectively at 19:04:02 and 19:10:52.





The trace PDS before the events presents a nominal behaviour, as reported below:



Figure 7 Trace PSD before the events on 13/09

Below the two anomalies in the Uzz time series are reported. The anomalies occurred after the TMM FDIR triggering occurred at 16:43:11. CTR are set to 0 V in the L0 for these events.





Figure 8 Uzz anomalies on 13/09

3.3 S/C anomaly 23-26 September: GAIEU watchdog triggering

Routine science operations were interrupted on 23rd Sept by a sudden reboot of the gradiometer software. Drag-free mode could be maintained.

The GAIEU watchdog triggered at 267.23.52, resulting in an autonomous cold reboot of the GAIEU, followed by the triggering of DFACS surveillance L7-1 and the commanding of the EGG to Acquisition/Science by DFACS after the successful reboot.

No FEEU desynchronisation and no ASH reconfiguration took place following the anomaly, simplifying somewhat the recovery by ground. As part of the recovery activities, the GAIEU watchdog was reenabled and the EGG mil bus was recovered in the pass at 267.08.43.

Recovery of the gradiometer from the sudden watchdog trigger was completed on DoY 269, restoring the GAIEU non-permanent settings (recombination matrices, DFACS scale factors, acquisition and science control law parameters, detector offsets).

3.4 Beam Out event

Eleven Beam Out events occurred at the following UTC time during September 2011 reference frame:

EVENT NUMBER	UTC TIME
1	10/09/2011 03:12:20
2	12/09/2011 04:00:09
3	15/09/2011 01:24:50
4	15/09/2011 02:11:59
5	15/09/2011 02:40:29
6	20/09/2011 17:19:14



7	20/09/2011 17:19:14
8	22/09/2011 15:27:26
9	22/09/2011 19:49:29
10	27/09/2011 00:05:30
11	27/09/2011 11:40:51

Table 1 Beam out event

Below, the effects of the Beam Out in the common mode acceleration, component 14_x, for the 15th September events, are displayed (the effect is the same for all the events).



Figure 9 Beam Out event on 26th of August

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