GERB Operations: Status Report

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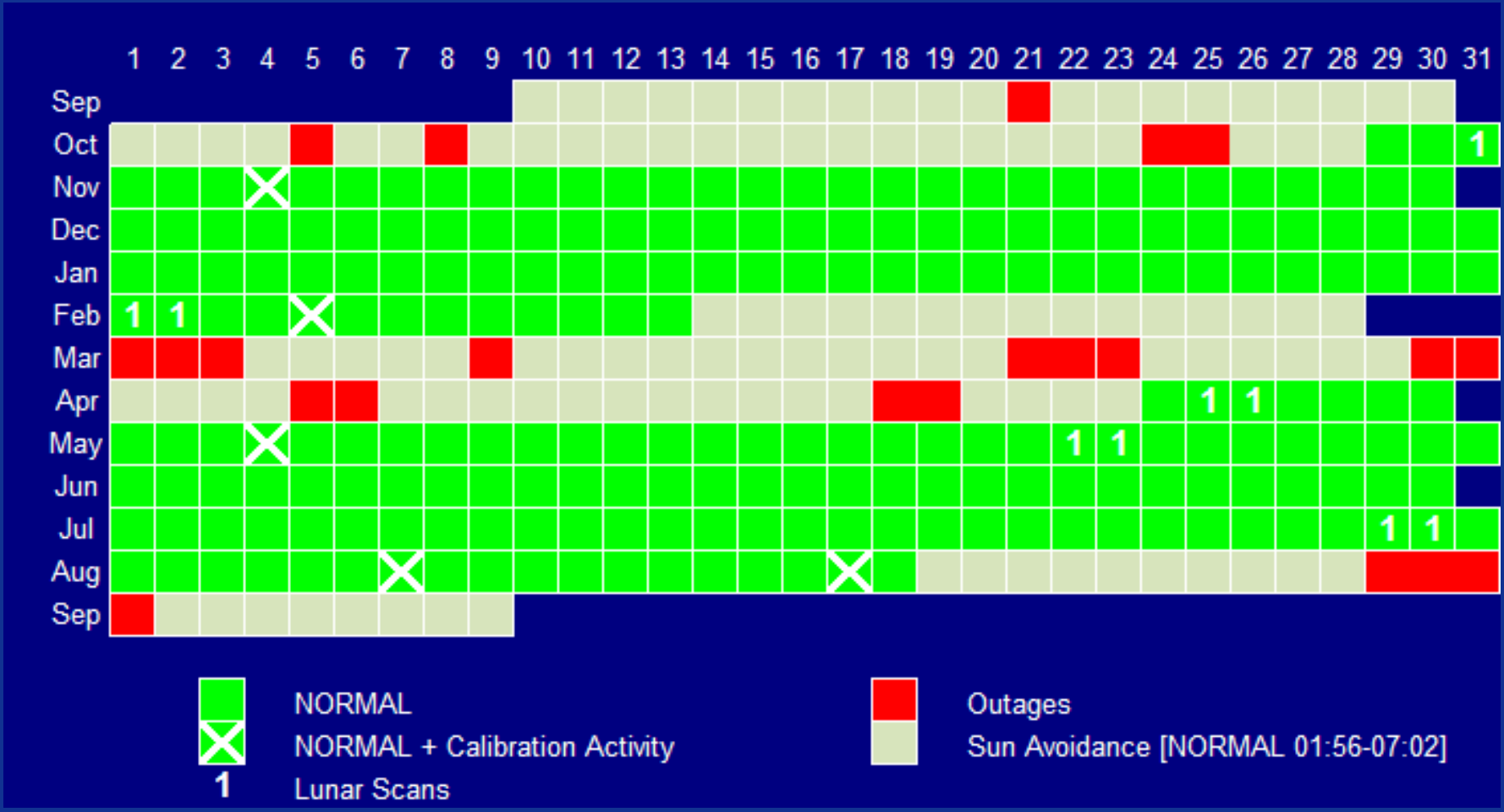
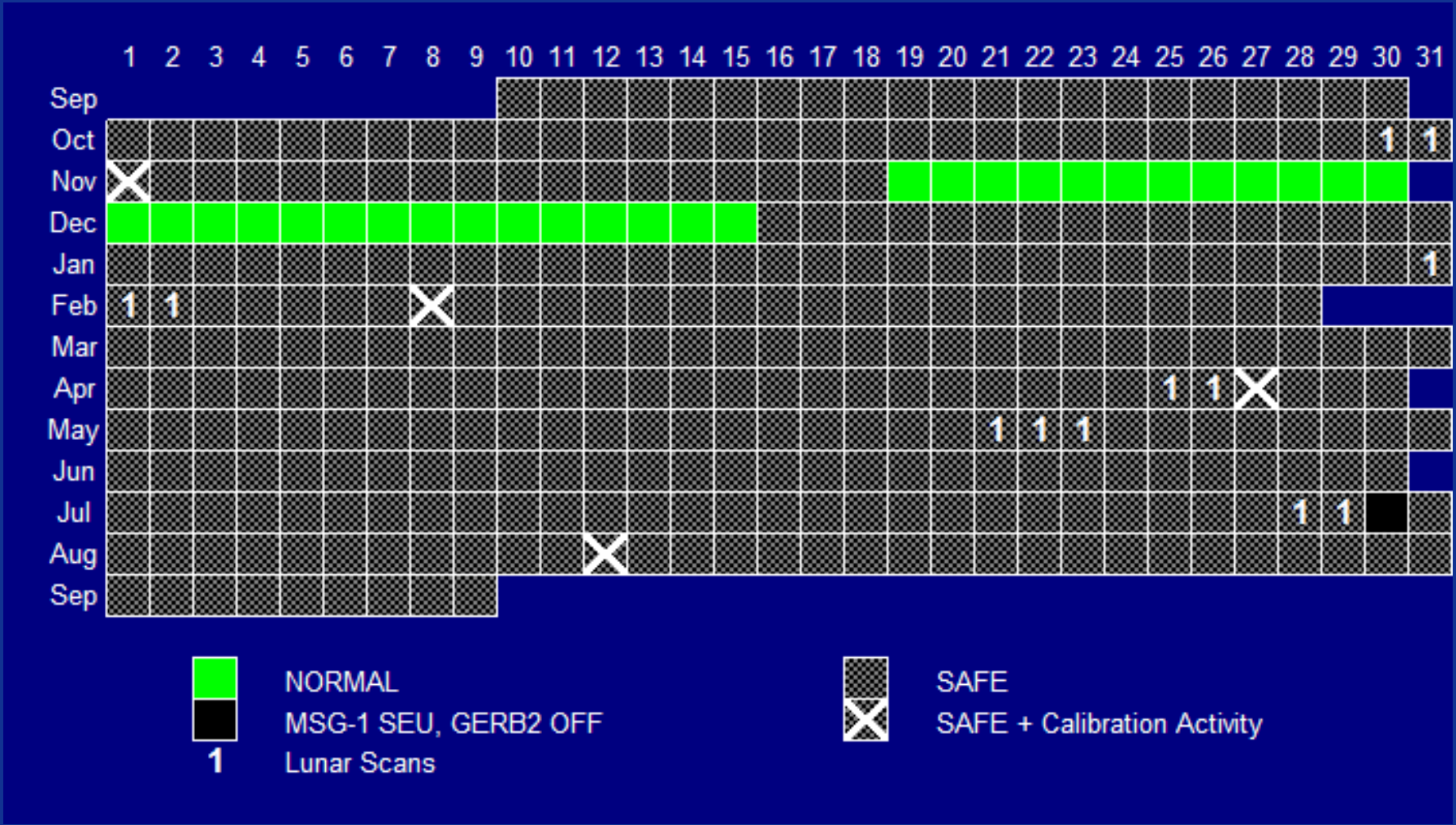
GIST 30, ERB Workshop
Ecole Normale Supérieure, Paris
13th – 16th September 2010

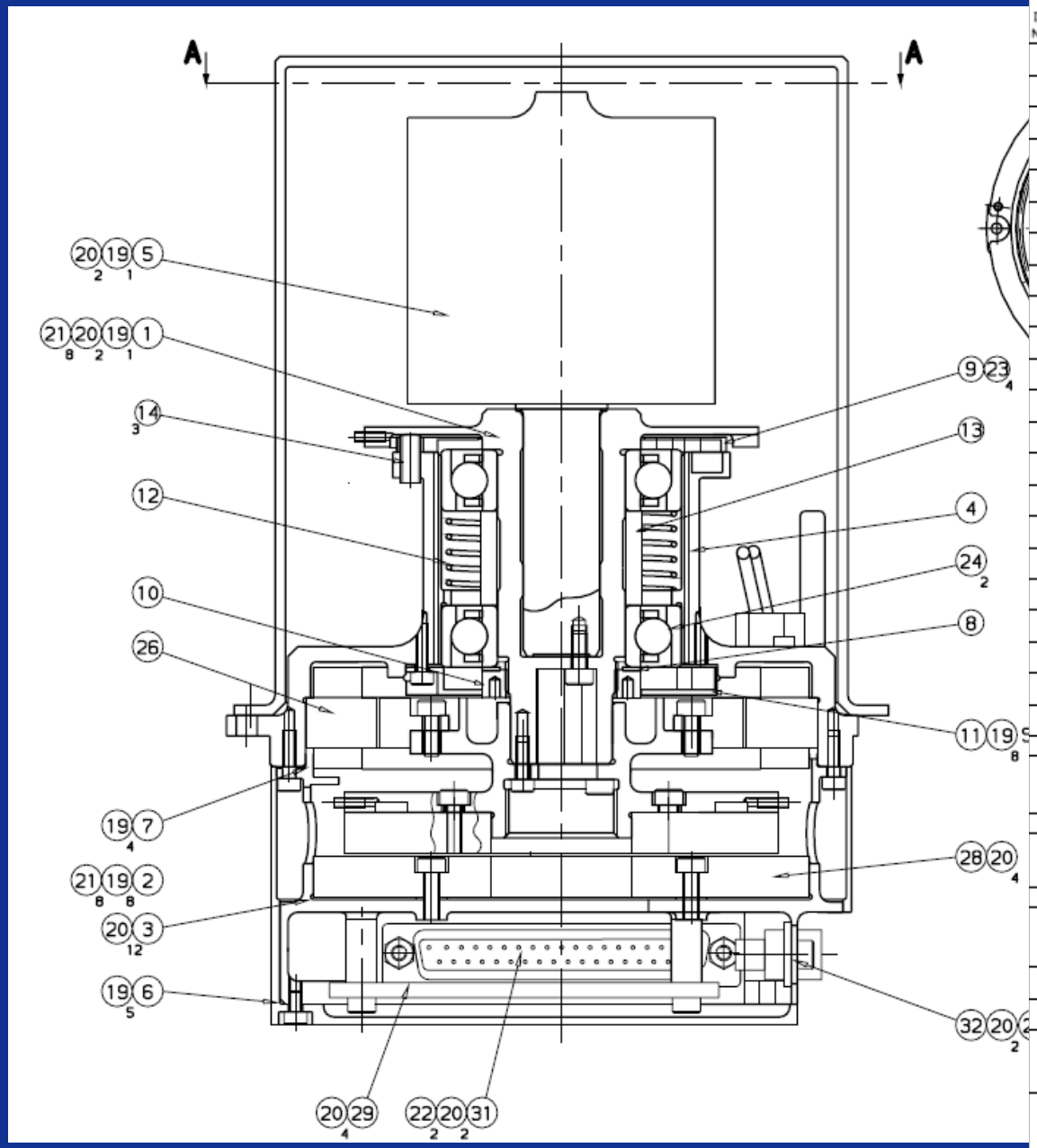
GERB1 Operations Summary



GERB2 Operations Summary

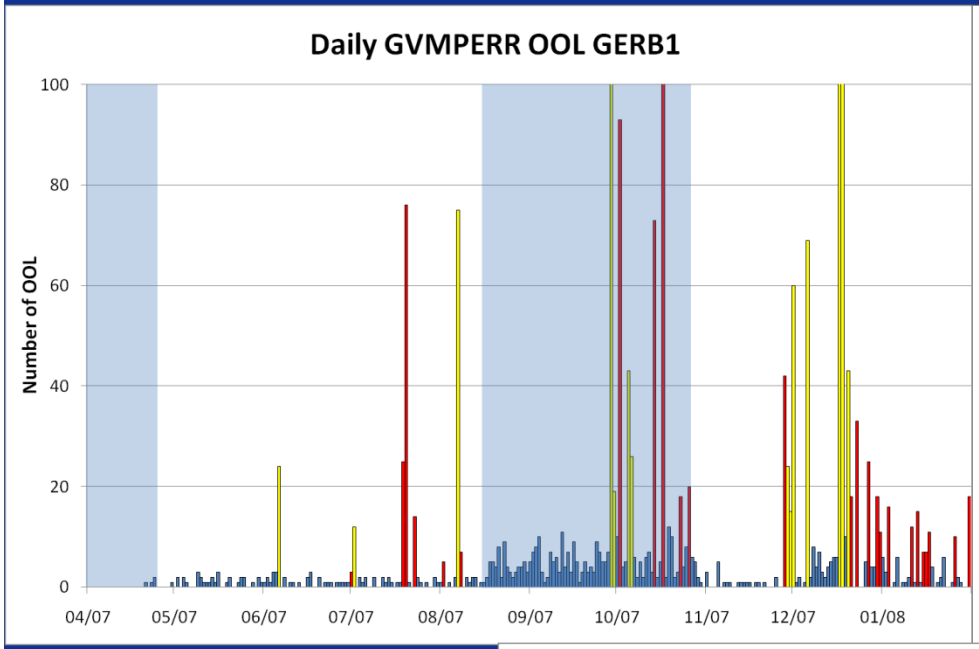


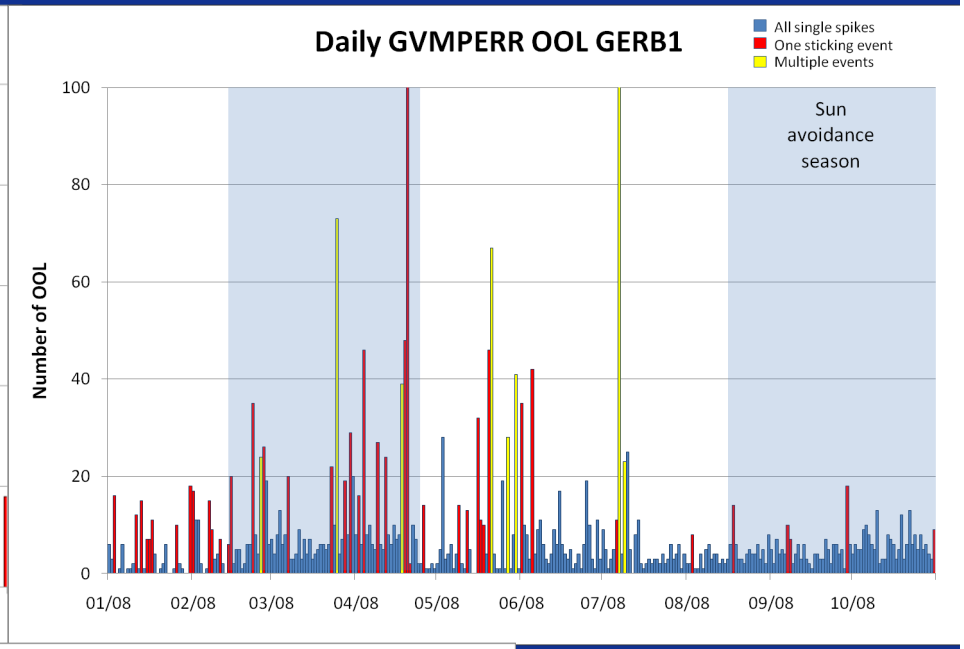
GERB Operation Status Report

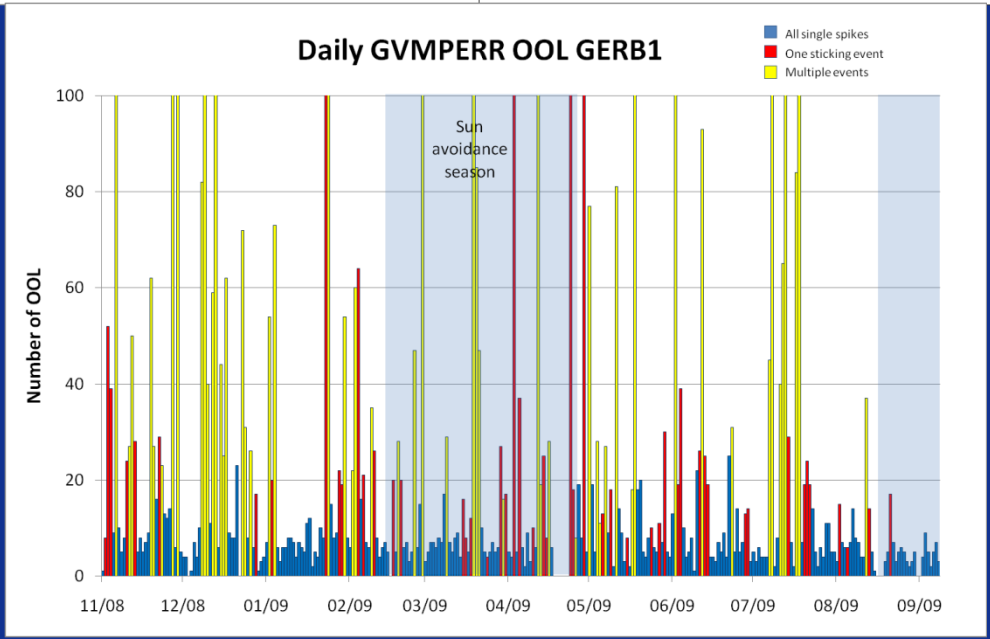


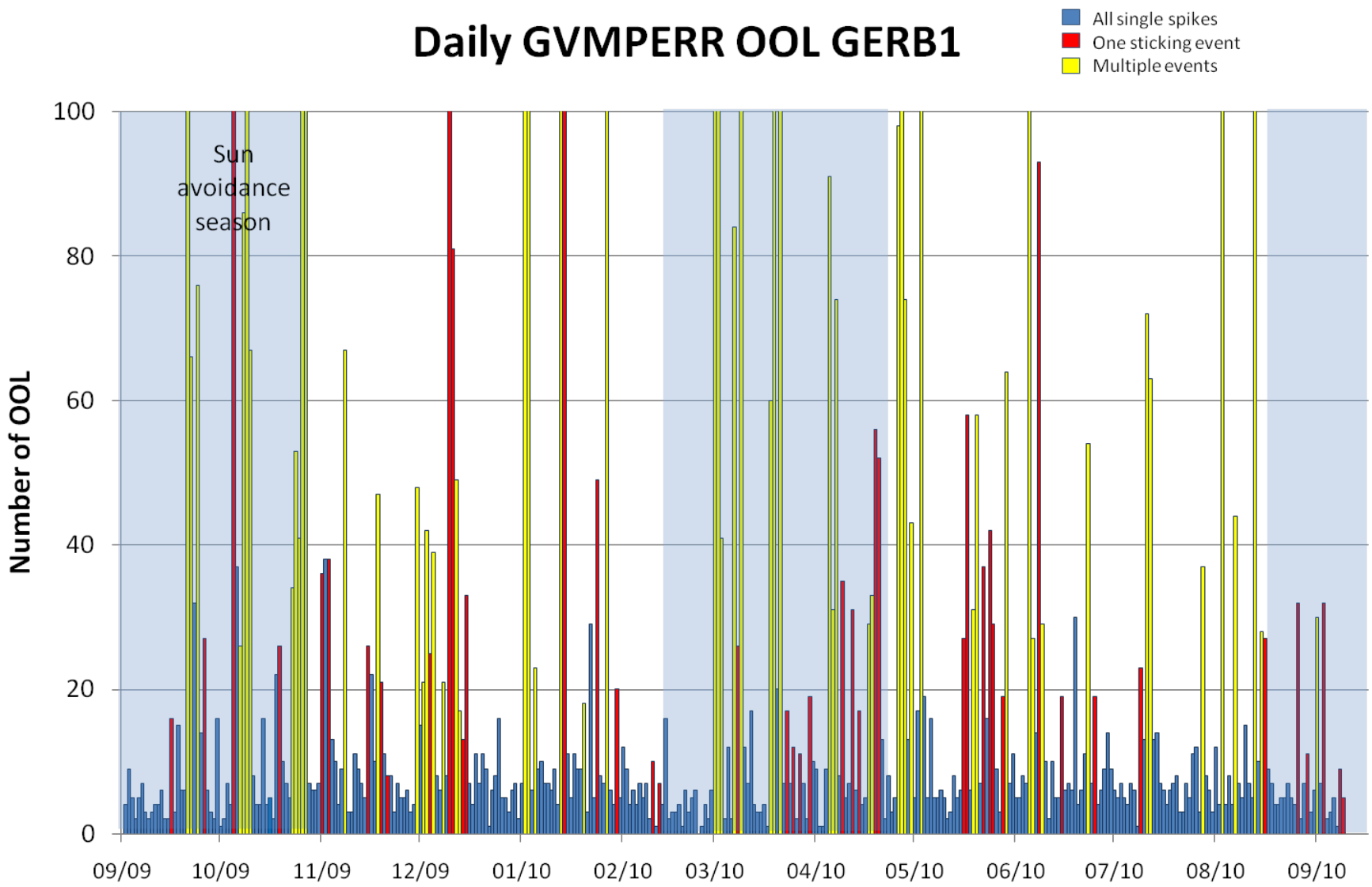
ITEM No.	DRAWING No. CATALOGUE No.	DESCRIPTION	No. OFF	REMARKS
1	1-KE-0119-412	ROTOR	1	19000C174640
2	1-KE-0119-411	ROTOR FLANGE	1	19000C174650
3	1-KE-0119-414	SUPPORT	1	01900C174660
4	1-KE-0119-405	HOUSING ASSEMBLY	1	01900C174670
5	2-KE-0119-408	MIRROR	1	44300C174680
6	2-KE-0119-403	COVER	1	02700C174690
7	2-KE-0119-407	MOTOR STATOR CLAMP	1	17500C174700
8	3-KE-0119-417	WASHER	1	17100C174760
9	1-KE-0119-422	LABYRINTH	1	.
10	3-KE-0119-401	BEARING CLAMP	1	17200C174710
11	2-KE-0119-423	CLAMP	1	
12	3-KE-0119-409	PRE-LOAD SPRING	1	16600C174730
13	3-KE-0119-413	SPACER	1	17400C4740
14	3-KE-0119-415	ROTOR STOP	3	17000C174750
15	3-KE-0119-421	GUIDE	1	.
16	3-KE-0119-420	GLAND MOUNTING BLOCK CLAMP	1	.
17	3-KE-0119-419	GLAND MOUNTING BLOCK	1	.
18	2-KE-0119-416	PROTECTIVE COVER	1	.
19	. FASTENER	SCREW HEX SKT CAP HD M2.5 x 6	50	SEE NOTE 1
20	. FASTENER	SCREW HEX SKT CAP HD M3 x 6	20	SEE NOTE 1
21	. FASTENER	SCREW HEX SKT SET M2.0 x 6	16	SEE NOTE 1
22	. FASTENER	NUT HEX ORD M3	4	SEE NOTE 1
23	FASTENER	SCREW COUNTERSUNK M2.5 x 6	4	SEE NOTE 1
24	.	EX 25 ANGULAR CONTACT BEARING BEARING ASSEMBLED AT ESTL WITH HYBRID CAGE AND LEAD LUBRICATED RACES	2	SNFA/ESTL
25				
26	.	BRUSHLESS DC MOTOR ASSY ETEL PART No. RAL TM01-D101A	1	ETEL SA 2112 MOTIERS SWITZERLAND
27				
28	.	INDUCTOSYN 3" 100 POLE M/REDUNDANT HALL DEVICE AND TRANSFORMER FARRAND DRG No. 219982 - I	1	FARRAND CONTROLS 99 WALL STREET VALHALLA N.Y. USA
29	.	INDUCTOSYN HYBRID PRE AMP BOARD	1	RAL DRG NO. 4-KE-0135-790-01
30	.	M2.5 EARTHING TAB	2	
31	.	SUBMINIATURE REAR MTG D TYPE 37 WAY CONNECTOR GOLD PLATED CONNECTOR SHELLS ESA/SCC LEVEL C	1	SOURIAU
32	.	SUBMINIATURE REAR MTG D TYPE 15 WAY CONNECTOR GOLD PLATED CONNECTOR SHELLS ESA/SCC LEVEL C	1	SOURIAU

GERB Operation Status Report

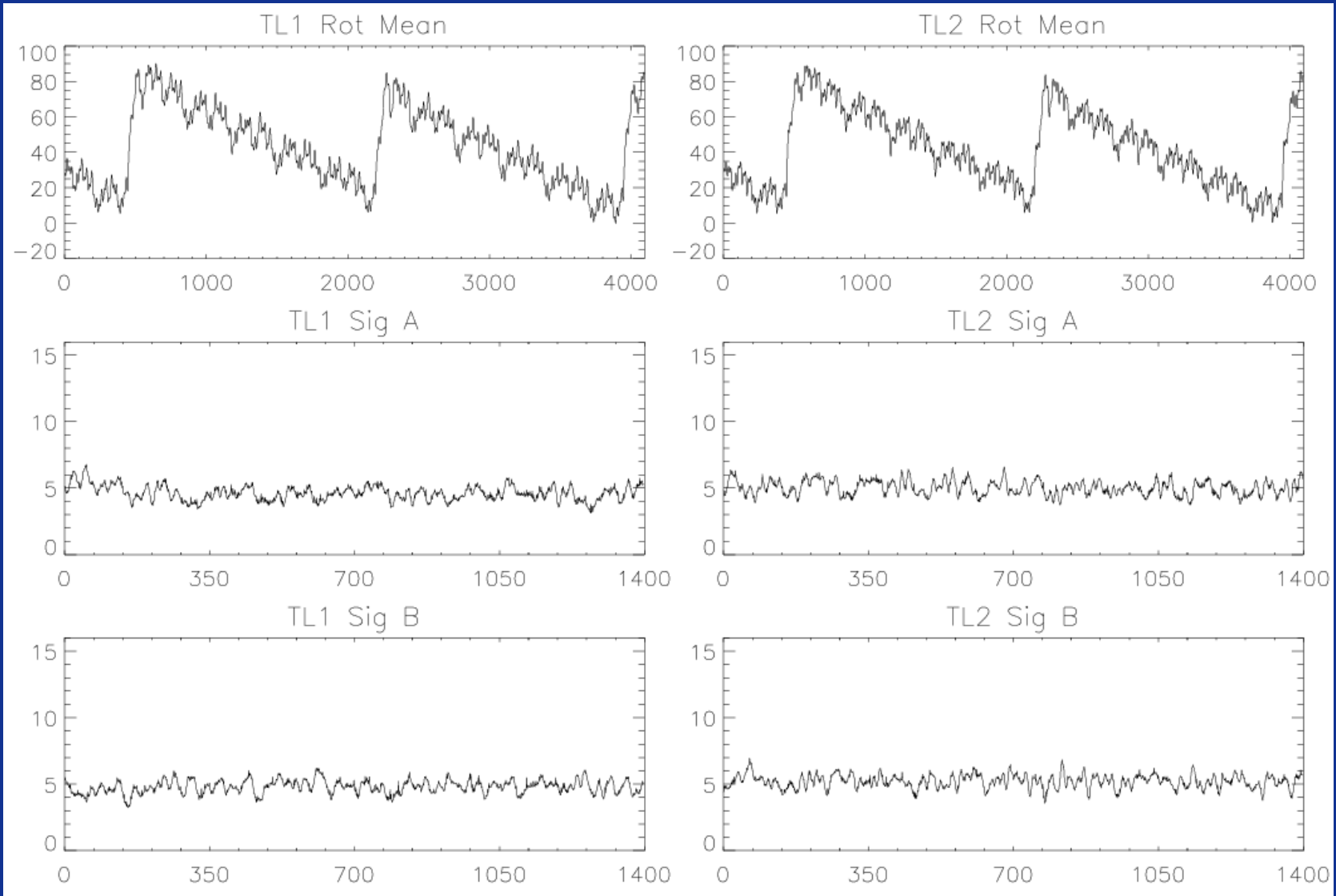




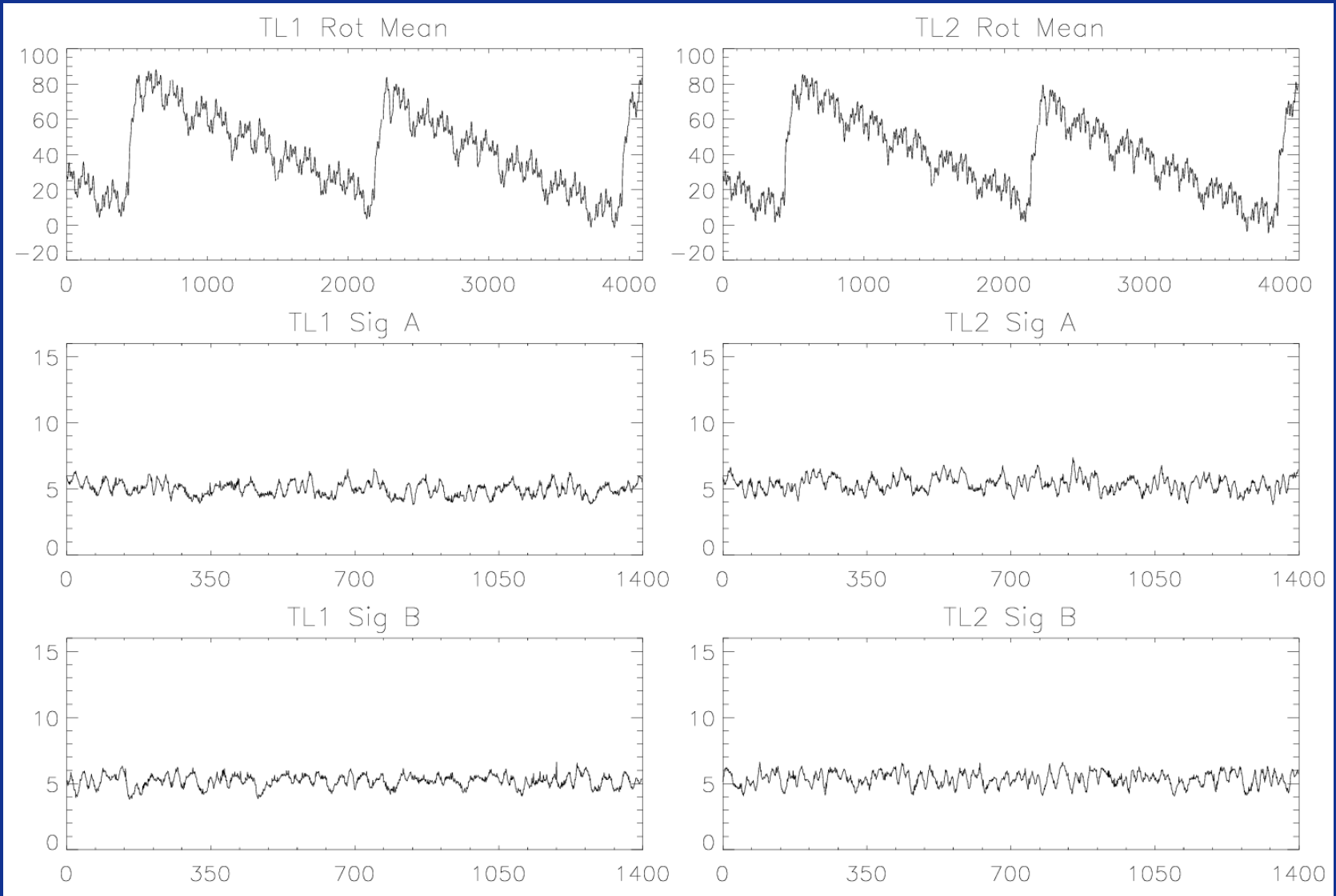



Daily GVMPERR OOL GERB1
All single spikes
One sticking event
Multiple events
Sun avoidance season
Number of OOL
100
80
60
40
20
0
09/09
10/09
11/09
12/09
01/10
02/10
03/10
04/10
05/10
06/10
07/10
08/10
09/10

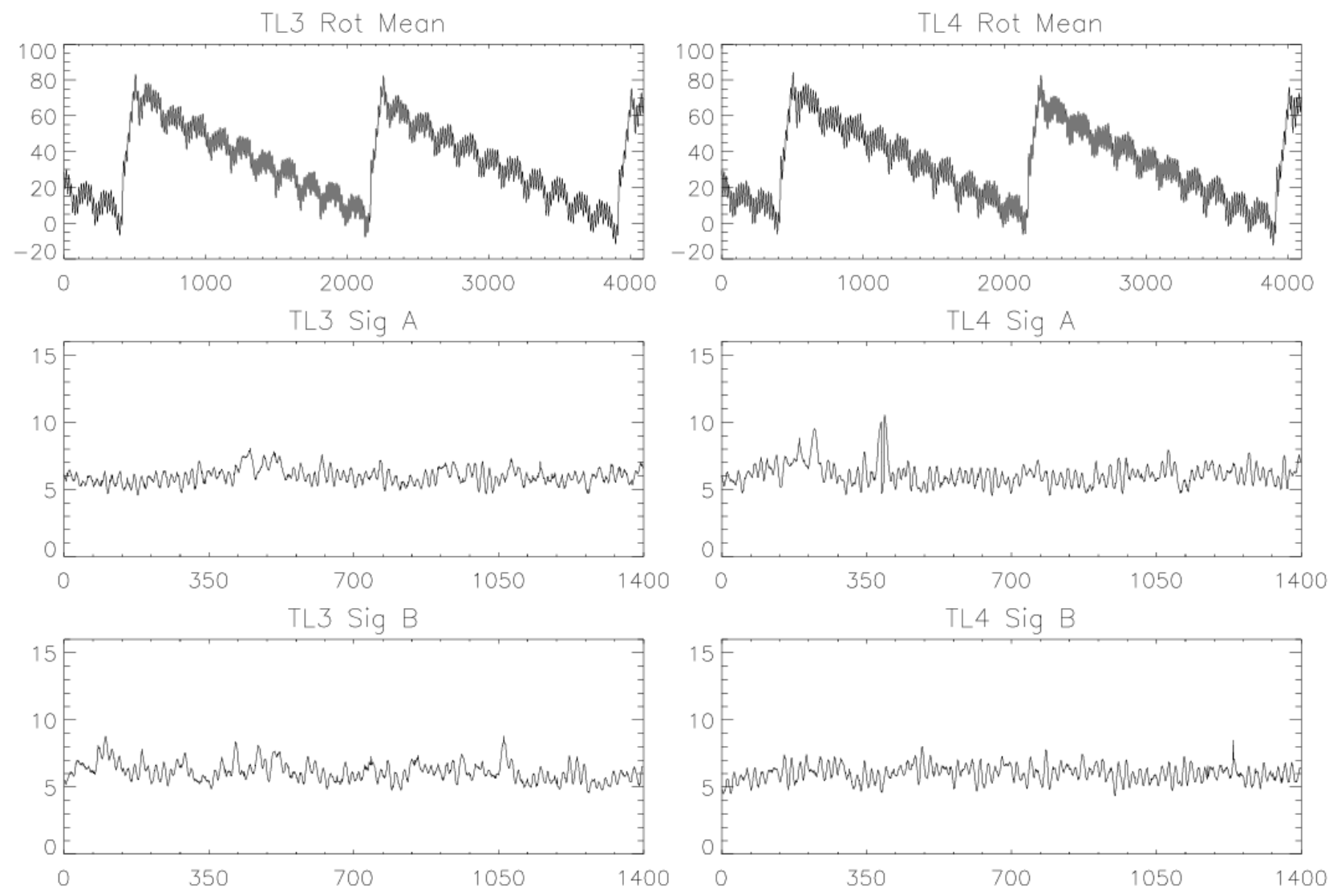
GERB1 TL Test – May 2009



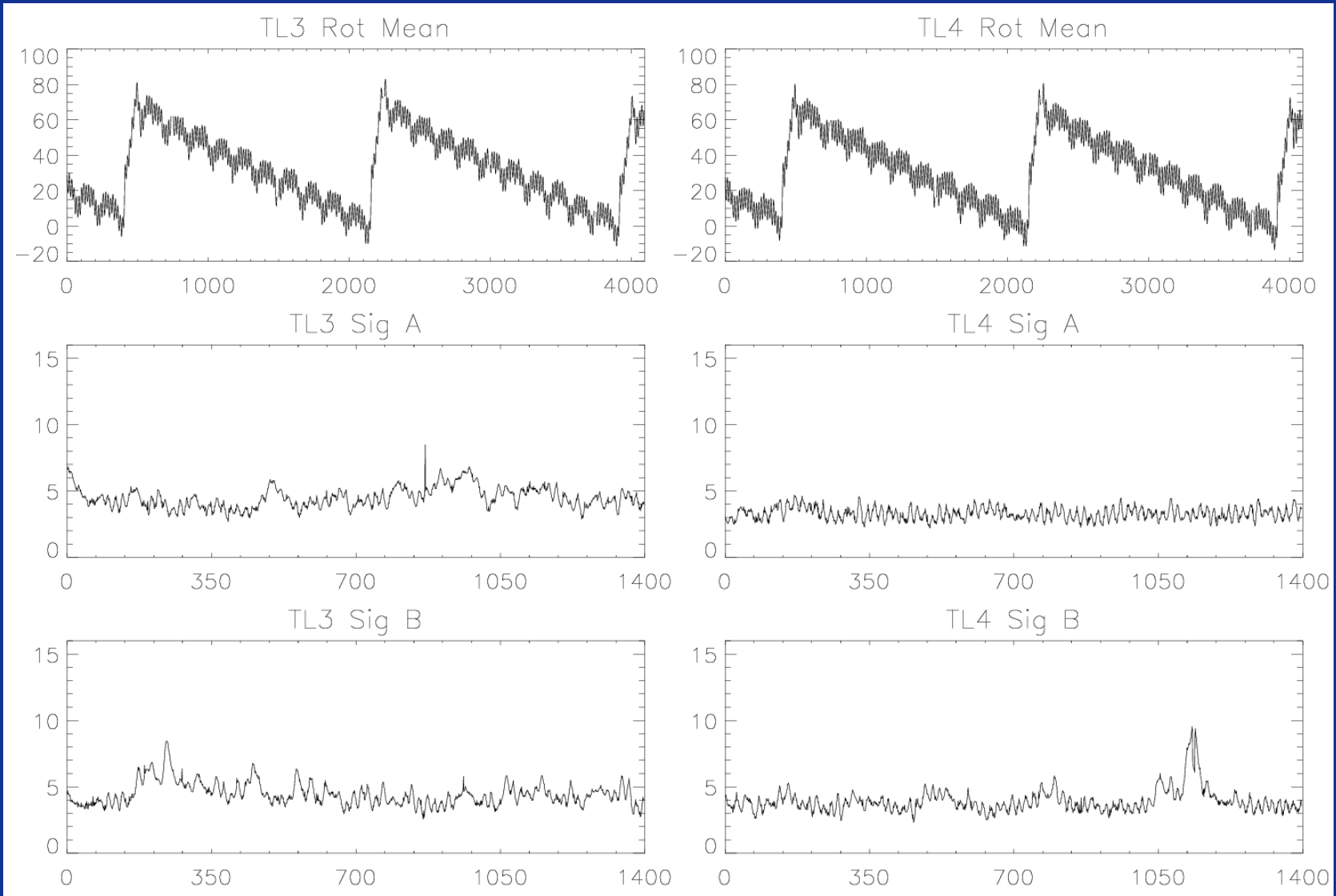
GERB1 TL Test – August 2010



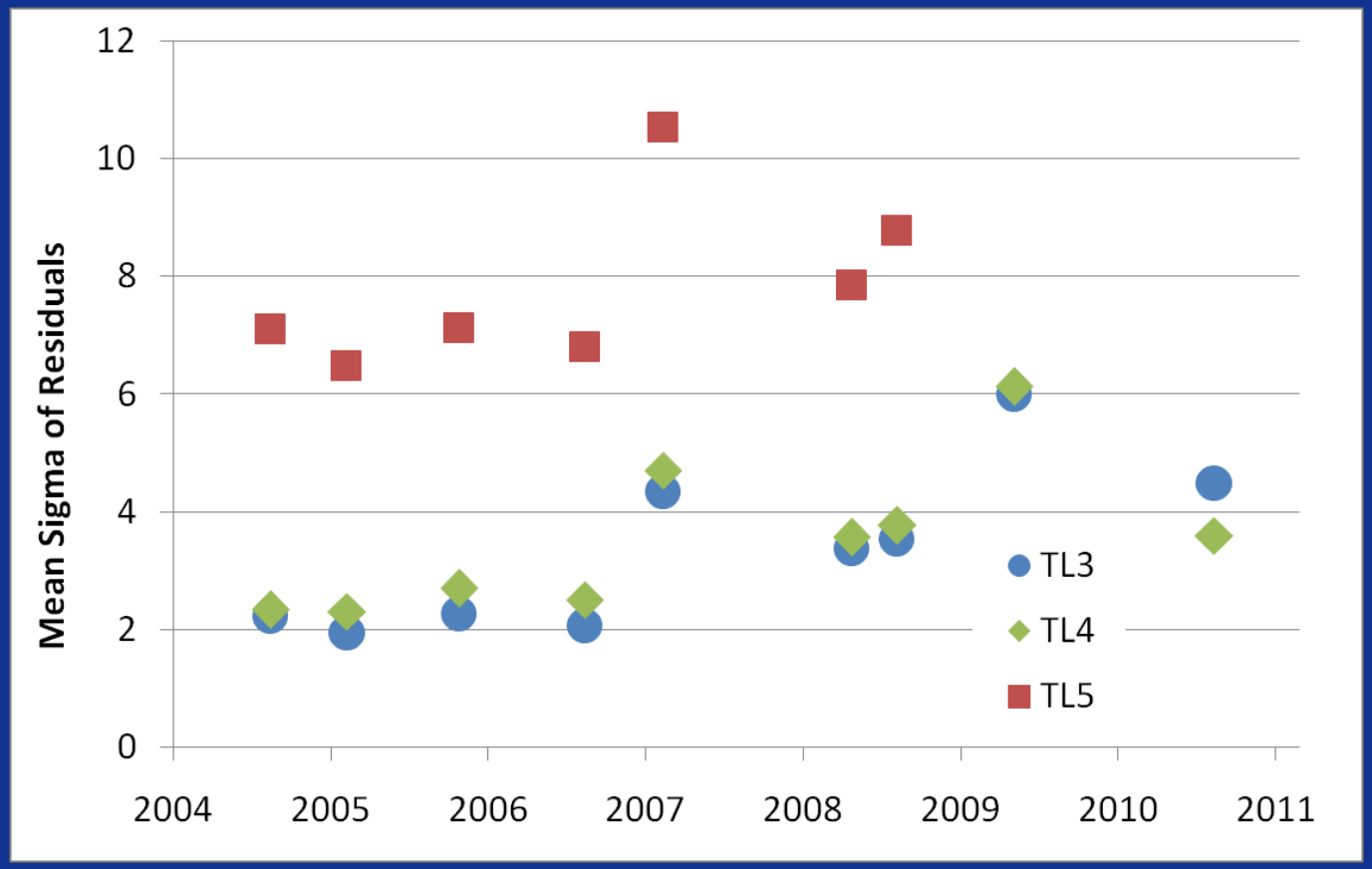
GERB2 TL Test – May 2009



GERB2 TL Test – August 2010



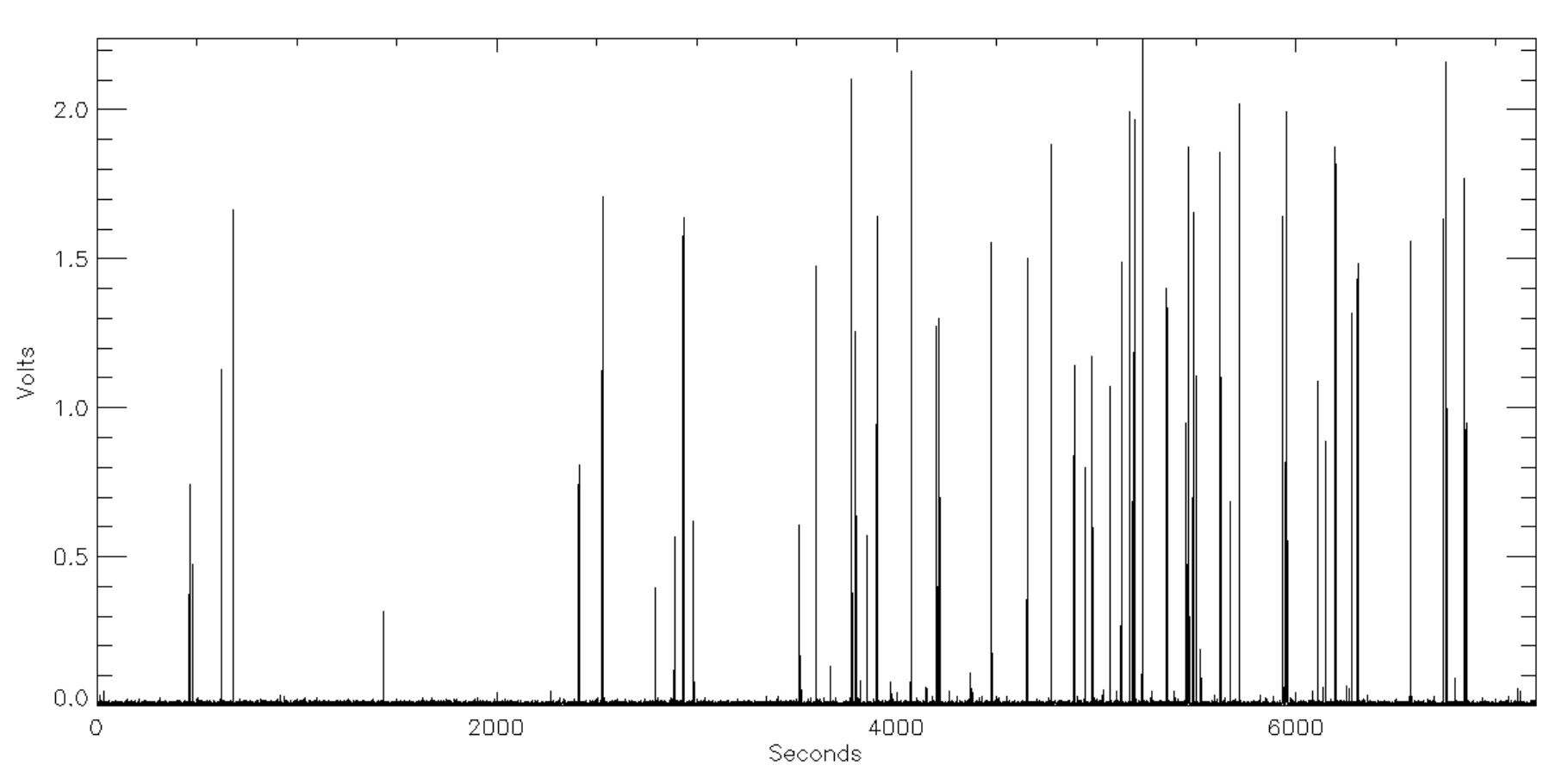
Review of GERB2 TL Tests – '04 to '10



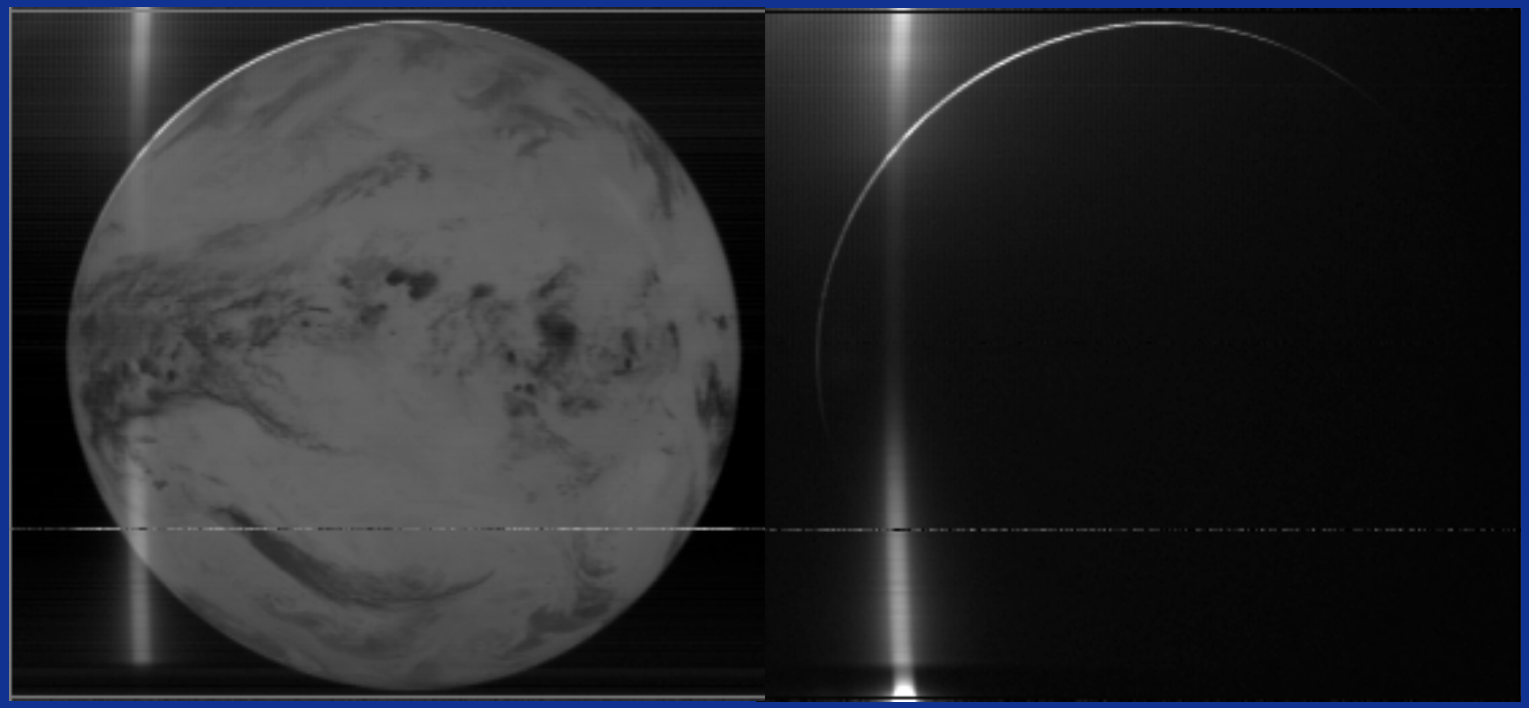
- Changes between 06-07 and 08-09 are in periods of constant mirror rotation. Between 09-10 the mirror was predominantly static.
- Stop testing TL5 due to bearing housing rattle.

TL GERB2 Noise Inversion

Over the course of the two hour torque level test the number of mirror OOL increased significantly. The first hour (TL4) experienced significantly fewer mirror anomalies resulting in lower noise than the second hour (TL3).



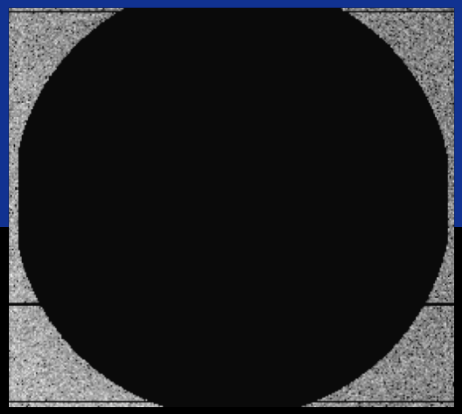
GERB Stray Light



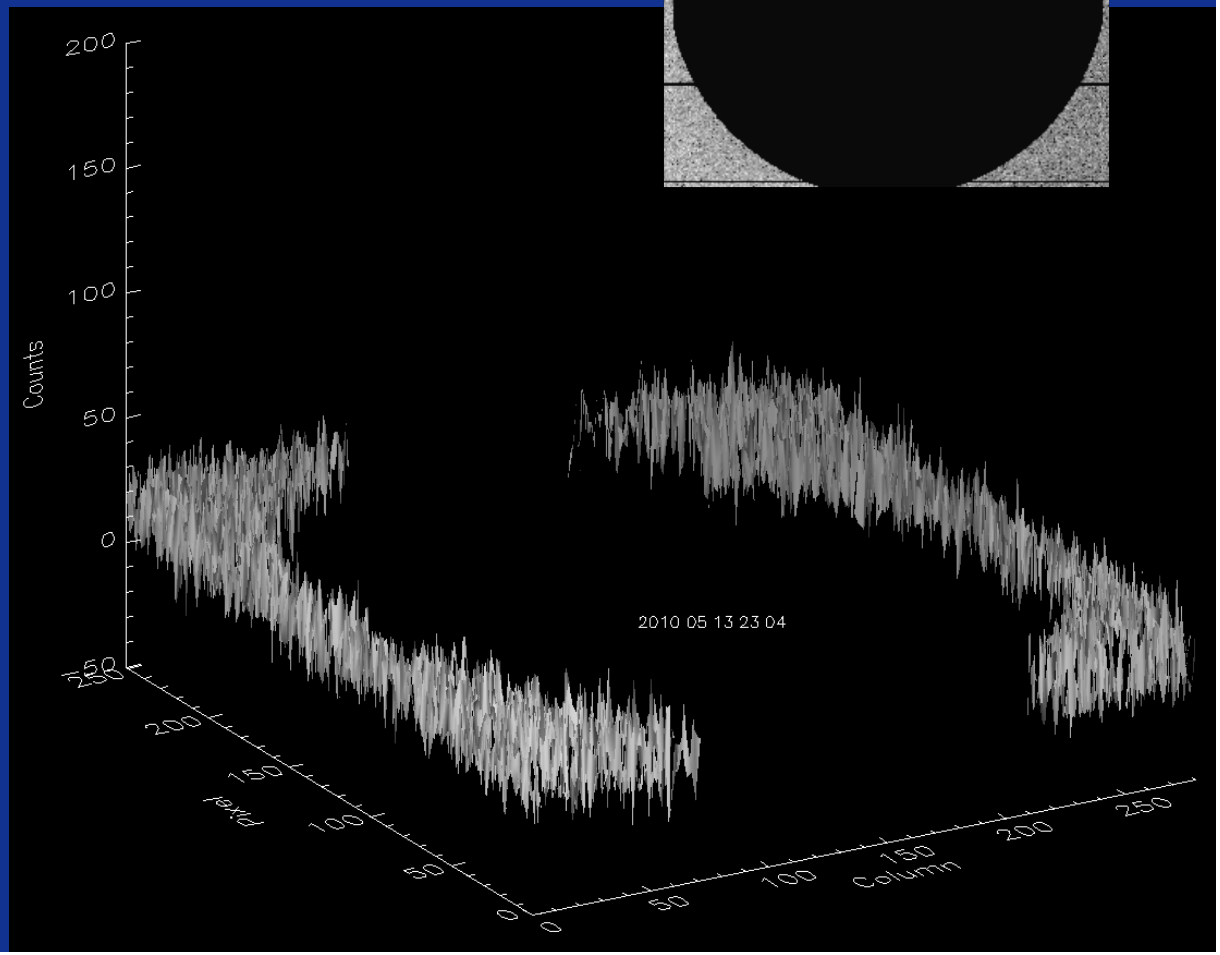
Both GERBs show evidence of stray light. The images shown are from GERB2 just before local midnight . The stray light in this case consists of a bar N-S across the image but more diffuse regions of stray light are present before and after and at approximately midday in the days leading up to and immediately after the Sun avoidance seasons.

Characterising GERB Stray Light

To recover the stray light accurately only the SW, deep space pixels were considered. A circular mask excluded Earth data and noisy pixels were also removed.



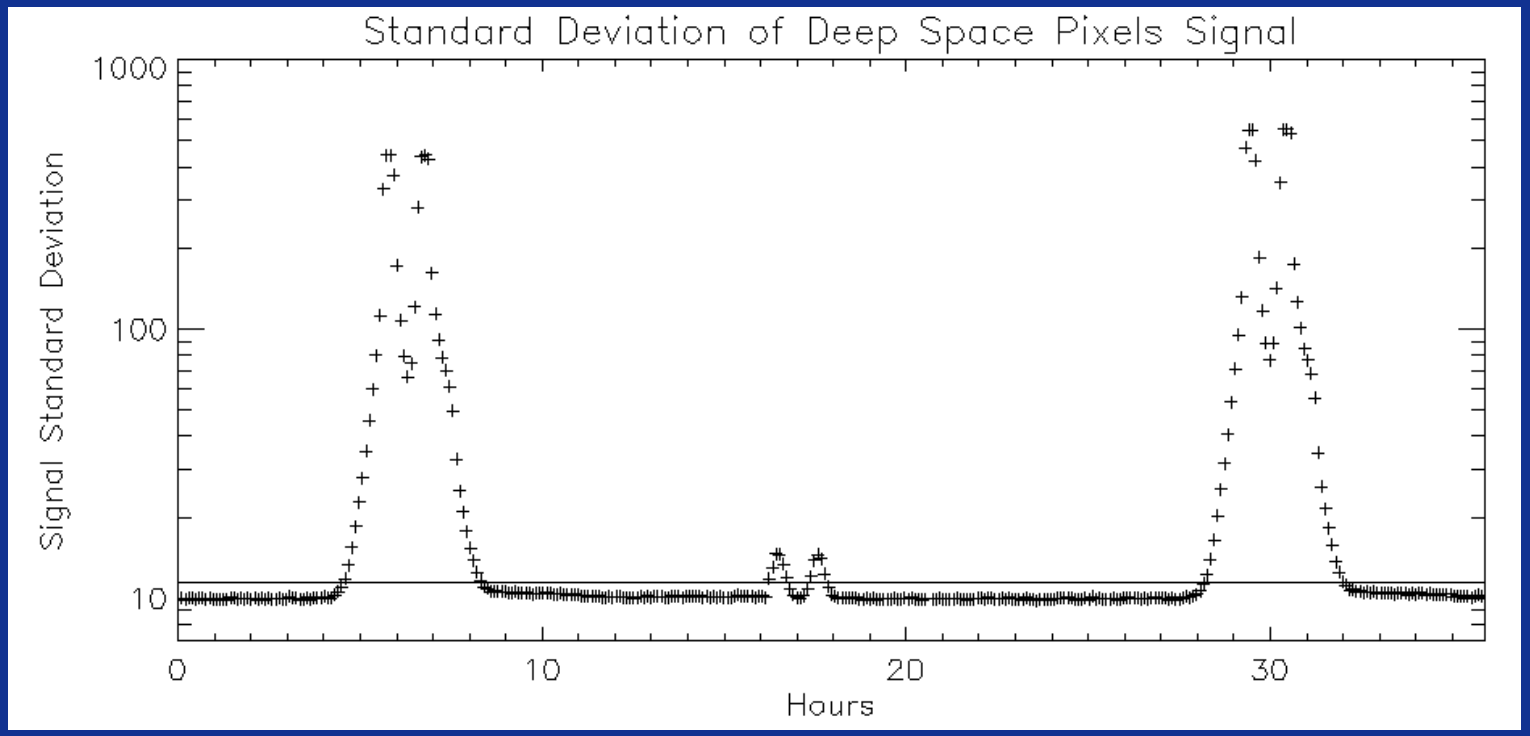
The deep space data plotted shows a typical scene, free of stray light and showing only detector noise.

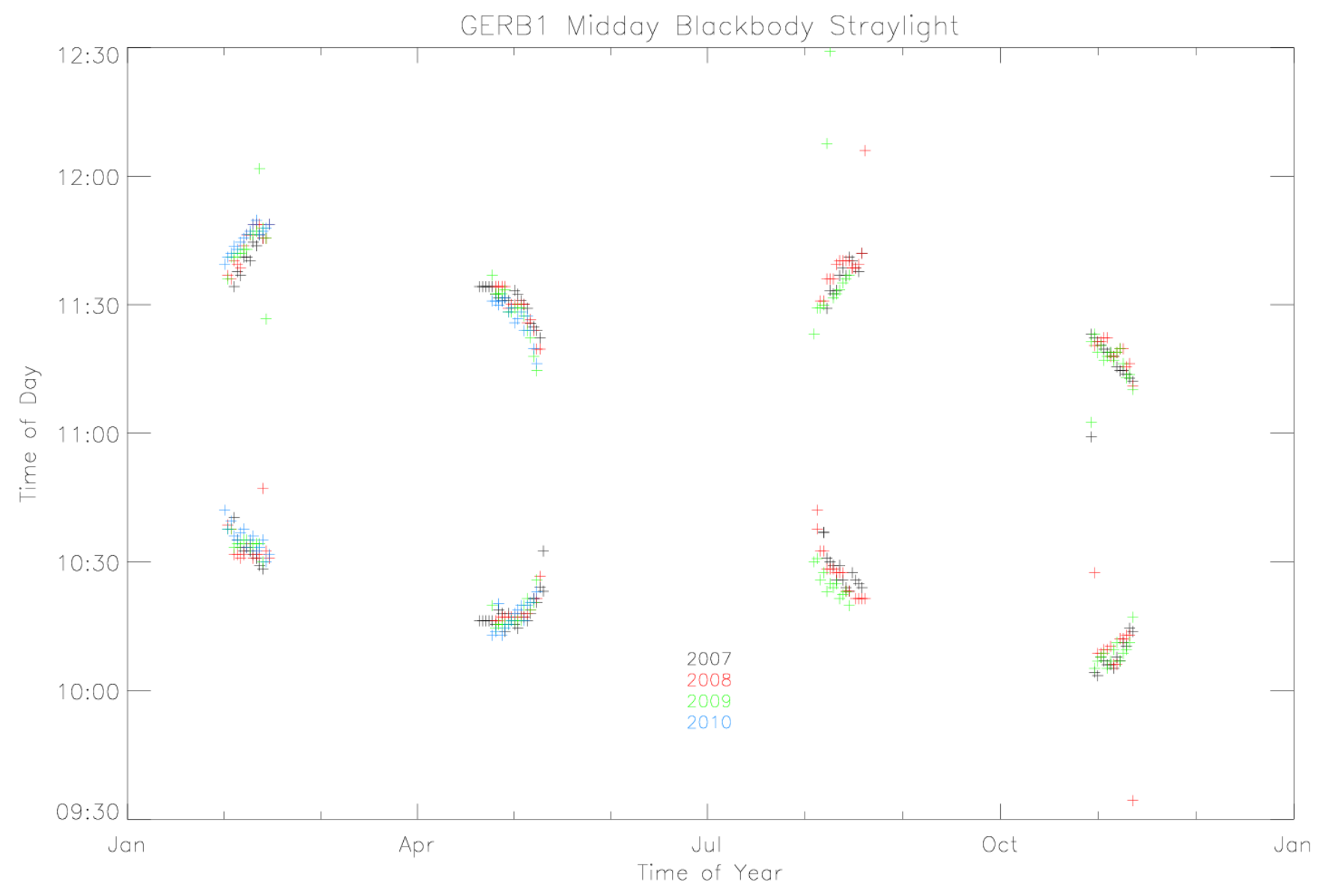


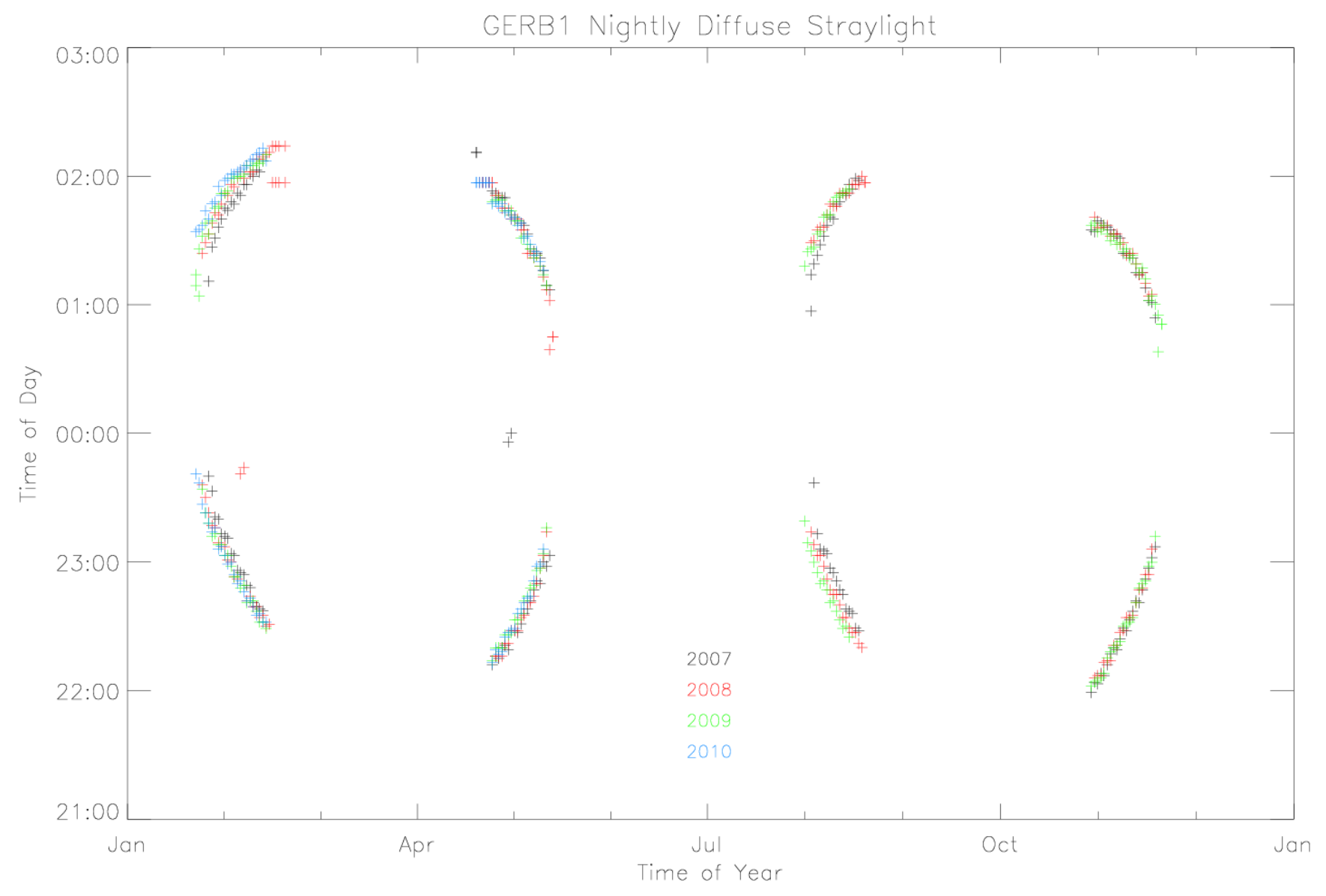
Diffuse Stray Light Threshold

Standard deviations for the deep space pixels of each SW GL0 file over one and a half days centred around midday, 12th February 2010 show clearly the strong signal around midnight and the smaller problem at midday.

A threshold of 115% of the background level was found to give a indicator for the presence of all forms of stray light.



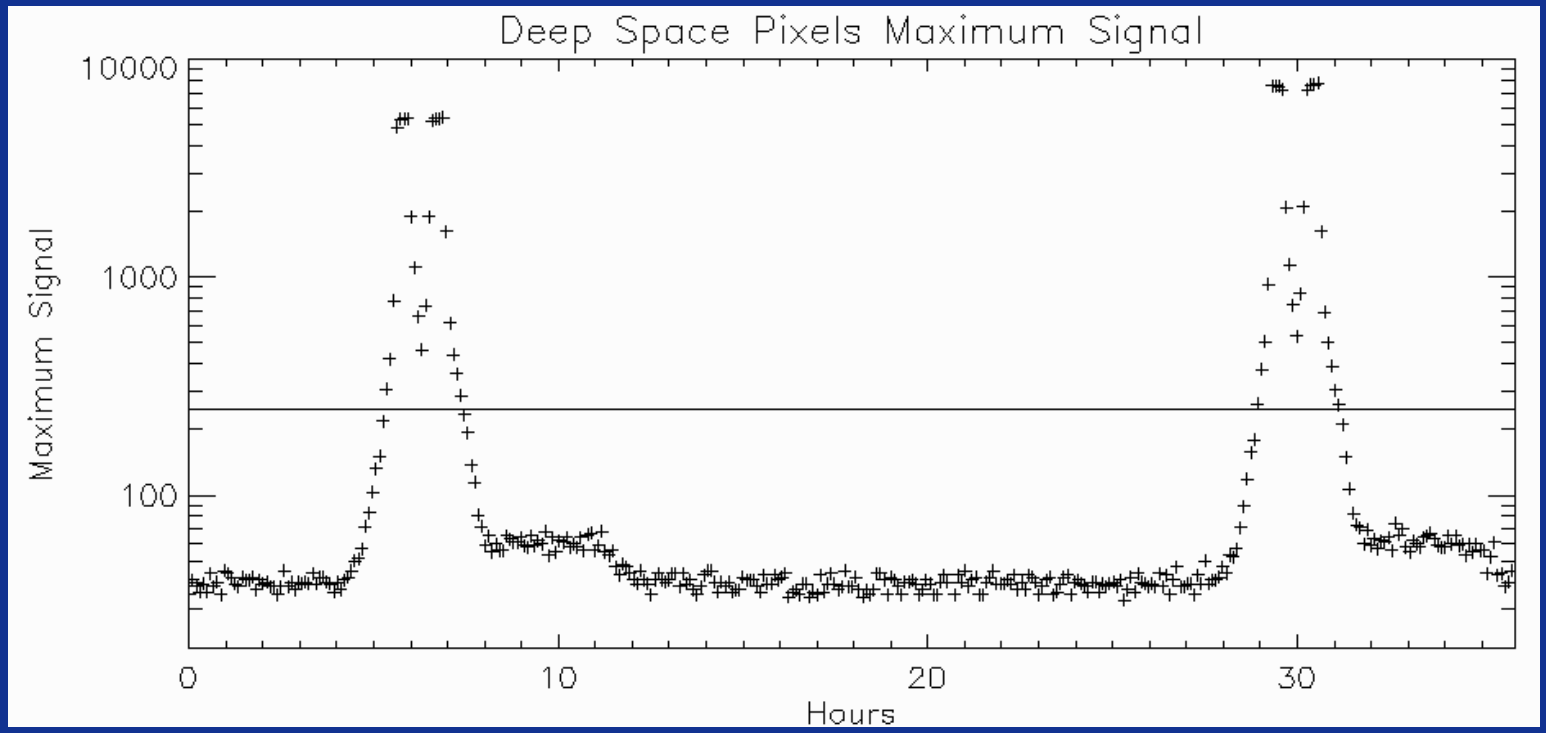

GERB1 Midday Blackbody Straylight
12:30
12:00
11:30
11:00
10:30
10:00
09:30
Time of Day
Jan
Apr
Jul
Oct
Jan
Time of Year
2007
2008
2009
2010

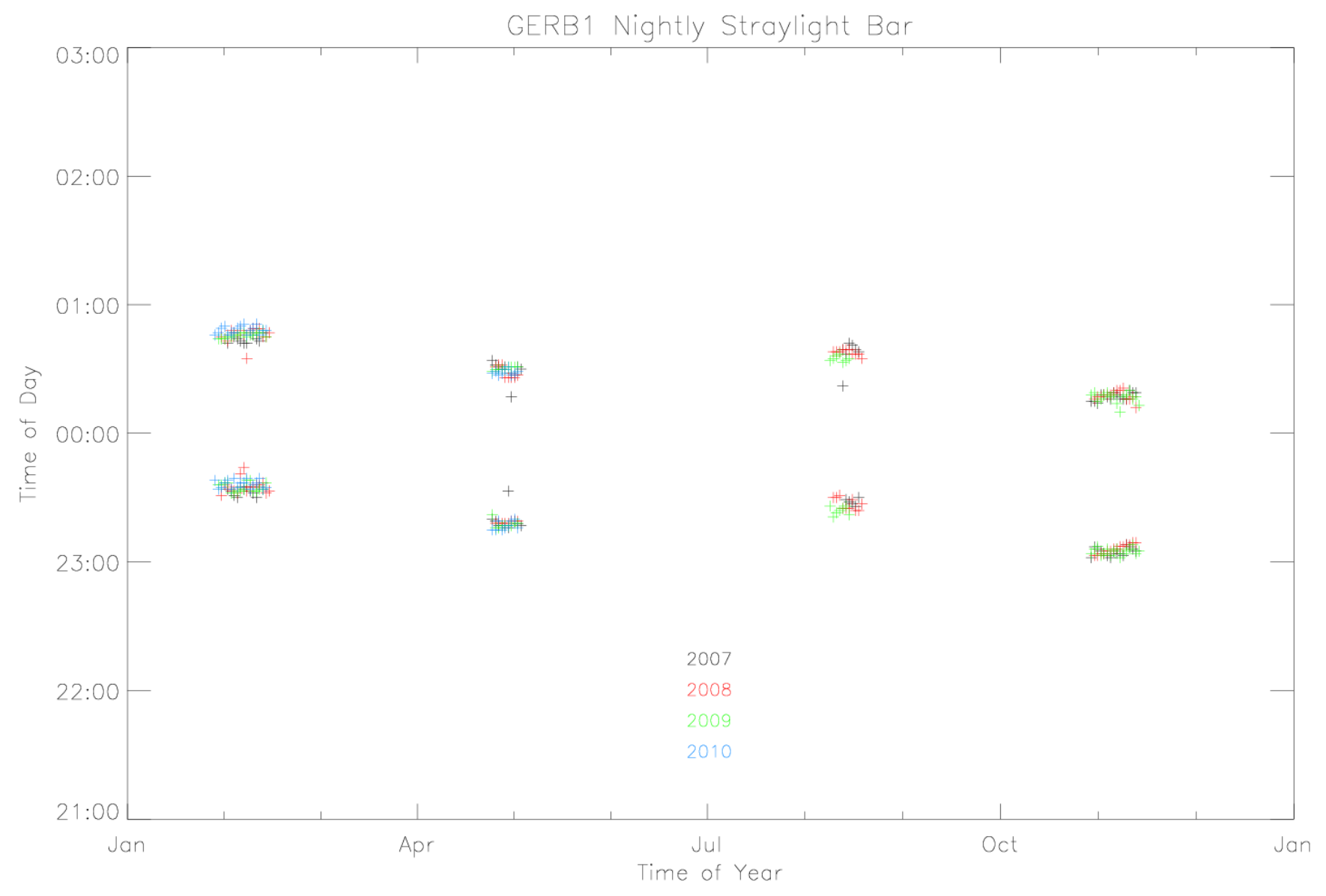

GERB1 Nightly Diffuse Straylight
03:00
02:00
01:00
00:00
23:00
22:00
21:00
Time of Day
Jan
Apr
Jul
Oct
Jan
Time of Year
2007
2008
2009
2010

Bar Stray Light Threshold

The nightly bar passing W-E across the GERB image was is shown from data taken centred around midday on the 12th Feb 2010.

A signal threshold of 250 was identified by inspection to separate the appearance of the bar structure from high levels of diffuse stray light.




GERB1 Nightly Straylight Bar
03:00
02:00
01:00
00:00
23:00
22:00
21:00
Time of Day
Jan
Apr
Jul
Oct
Jan
Time of Year
2007
2008
2009
2010

Summary

Mirror bearing performance

GERB1

- The number and duration of mirror OOL remains stable at a level which renders extended data taking in the SA season too dangerous.

GERB2

- Extended running of the ageing mirror bearing shows increasing noise although this seems to improve after long periods of inactivity.
- There is a small amount of mirror data so recent trends are tentative.
- Continue running GERB2 sparingly, test TLs again post SA season.

Stray Light

- Clear trends identified in the appearance of the GERB1 stray light.
- Extend analysis to GERB2 edition region (Feb 2004 – May 2007.)