



# Commands Rejected Anomaly Report

		Date	Signature
<b>Author:</b>	Mirna van Hoek	August 24, 2010	
<b>Checked:</b>	Jacques Claas	August 25, 2010	
<b>Approved:</b>			
<b>Archive:</b>			



**Distribution list:**

***OMI Science team***

Jacques Claas	KNMI
Mirna van Hoek	KNMI
Quintus Kleipool	KNMI
Pieterneel Levelt	KNMI
René Noordhoek	KNMI
Pepijn Veeffkind	KNMI

***Industry***

Leo van Lent	Dutch Space
Ayman Mekhail	NGES
Michael Yang	NGES
Mark Anderson	NGES

***Agency***

Angie Kelly	NASA/GSFC
Jacob Williams	NASA/GSFC
Dimitrios Mantziaras	NASA/GSFC
Bill Guit	NASA/GSFC

**Change status:**

Issue	Date	Comments	Affected pages
Draft	11 August 2010	Draft issue	All
1	24 August 2010	First issue	All



## 1 Anomaly Description

### 1.1 Summary

On July 17<sup>th</sup> 2008 yellow alarms appeared at 01:54:32 for the following 2 telemetry parameters:

OMI\_NR\_SIHSGCR - IAM generic command reject

OMI\_NR\_SICPOMICMSR - OMI command reject

Analysis showed that the IAM command reject is caused by too less time between the last instruction from the Dark SIS executed as part of the “N1\_trop\_long” orbit-type activity and the first command of the next “N1\_spec\_long” orbit-type activity, the SCS #8 command.

### 1.2 Background

In order to investigate the row anomaly new orbit-type activities were developed.

- The “N1\_trop\_long” orbit-type activity is as a “Nominal\_1” orbit-type activity, but with the tropical measurements extended until after S/C day-night transition.
- The “N1\_spec\_long” orbit type activity is the same as the “N1\_trop\_long” orbit-type activity but with special gain settings and it starts the south arctic measurements before S/C night-day transition.

These two special orbit-type activities were run once every two weeks in the period of July 2<sup>nd</sup> 2008 until November 20th 2008.

### 1.3 Investigation

Just before the anomaly occurred the Dark SIS was running as part of the “N1\_trop\_long” orbit-type activity. When it is finished it exited normally generating a SIS exit value of 7. As long as a SIS is executing, i.e. the SIS exit value is 0, the IAM will reject commands from the S/C.

Time (S-band TM)	# commands rejected	SIS exit value
2008-199-01:54:00.319	0	0
2008-199-01:54:04.322	0	0
2008-199-01:54:08.322	0	0
2008-199-01:54:12.322	0	0
2008-199-01:54:16.322	0	0
2008-199-01:54:20.322	0	0
2008-199-01:54:24.322	0	0
2008-199-01:54:28.322	0	0
2008-199-01:54:32.322	1	0
2008-199-01:54:36.322	6	7
2008-199-01:54:40.322	6	7
2008-199-01:54:44.322	6	7
2008-199-01:54:48.322	6	7
2008-199-01:54:52.322	6	7

Table 1 The Command rejected counter and the SIS exit value around the time the anomaly occurred.

According to the echo file, the last instruction from the Dark SIS has a timestamp 01:54:30. Table 1 shows that at 01:54:32 the SIS is still executing (exit value 0). Apparently, there is some time between the last SIS instruction and the actual end of the SIS execution. The time between the last SIS instruction and the SCS command is 3 seconds when the activities are scheduled, but only 2 seconds by the time the MCL is produced as can be seen in Table 2.



MCL Time	Schedule Report Time	Echo file	
01:53:27	01:53:27		Start Dark SIS
		01:54:30	Last instruction Dark SIS
01:54:32	01:54:33		Start SCS #8
01:54:42	01:54:43		ROD = image
01:54:42			S/C night-day transition

Table 2 The timing of instructions according to the MCL report, the Schedule report and the file with echoed instructions around the time of the anomaly on July 17<sup>th</sup> 2008.

A 3 seconds difference between the last SIS instruction and the first SCS command, as observed at the time the activities were scheduled, would not have caused an anomaly. This has been observed on previous occasions when this special orbit type activity was also run.

On July 2<sup>nd</sup> 2008, for instance, the special orbits were also scheduled.

No IAM command rejects took place. The command sequence can be seen in Table 3.

MCL Time	Echo File Time	
05:54:40		Start Dark SIS
	05:55:43	Last instruction Dark SIS
05:55:46		Start SCS #8

Table 3 The timing of instructions according to the MCL report and the echoed instructions file on July 2<sup>nd</sup> 2008.

The timestamp values in the MCL and Schedule Report were identical for the July 2<sup>nd</sup> 2008 case.

According to the echo file, the last instruction from the Dark SIS has a timestamp of 05:55:43. So, there are 3 seconds in between the last SIS instruction and the SCS command. This is 1 second more than when the anomaly took place.

## 2 Causes and Contributing Factors

### 2.1 Root cause conclusion

The IAM command reject is caused by too less time between the last instruction from the Dark SIS executed as part of the “N1\_trop\_long” orbit-type activity and the first command of the next “N1\_spec\_long” orbit-type activity, the SCS #8 command.

## 3 Impact

On July 17<sup>th</sup> 2008 at 01:54:32 the “N1\_spec\_long” orbit-type activity started. Due to the IAM command reject anomaly the first measurement in this activity, the south arctic measurement, was taken with the wrong measurement settings. This measurement lasted until 02:07:19 and was followed by the south midlat measurement which had the correct settings.

## 4 Proposed anomaly solutions

Since the commands rejected anomaly was caused by too less time between the last instruction of the previous “N1\_trop\_long” orbit-type activity and the first command of the next “N1\_spec\_long” orbit-type activity it was decided to update the “N1\_spec\_long” orbit-type activity and start the south arctic measurements 7s later than the original activity and shorten the south arctic measurements by 7s.



## 5 Resolution

On July 31 2008 at 3:50:32 the updated version of the “N1\_spec\_long” orbit-type activity ran without causing rejected commands.