EUROPEAN SPACE AGENCY
DIRECTORATE OF TECHNICAL & OPERATIONAL SUPPORT
MISSION OPERATIONS DEPARTMENT

INTEGRAL
Mission Report

INT-MOC-SYS-RP-1001-TOS-OF

No. 010
Week 48

29.11.02

Commissioning Phase

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LIST OF CONTENTS

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		G. La Rosa – IBIS	1
S. Scaglioni	1	S. Brandt – JEM X	1
		E. De Miguel - OMC	1
J. Wardill	1	W. Hajdas – IREM	1
		JPL / Goldstone	
		D. Holmes	1
		T. Horton	1
		Redu	
		J. Mac Lauchlan	1

1 General

This report comprises inputs from various teams involved in the Commissioning activities:
- Flight Control Team,
- Flight Dynamics Team (Fuel book-keeping & Slew overview)
- ISOC.

This report addresses the activities from 13.11.02 until 29.11.02 (both dates inclusive). It covers the revolutions 13, 14 and parts of revolution 15.

2 Summary of Activities

The Flight Control Team did not produce a Commissioning Timeline from revolution 14 onwards because it was assumed that the Performance Verification (PV) Phase would start with revolution 14 using the planning inputs from ISOC. However, the IBIS and SPI Principle Investigators (PI) noted that the automated planning system imposes too many constraints in this phase. In order to support the instrument commissioning it was agreed to utilise the set-up that was used for the revolutions 11 to 13 also for the upcoming revolutions. This means that an automated Skeleton Timeline is produced from the planning inputs and the instruments are mainly configured by manual commands considering change requests provided by the instrument teams. The advantage is that this set-up provides more flexibility but the drawback is that there is an additional workload on the Flight Control Team (FCT).

The emphasis of this week was on the fine tuning of the IBIS and SPI configurations and the verification of the performance of the JEM-X instruments considering the degradation identified two weeks ago. The target of the observation was mainly Cygnus X1.

An important event was the identification of a Gamma Ray Burst (GRB) by SPI and IBIS on 25 November.

3 Satellite Status

3.1 Platform

The performance of the platform is in general good. There were no new anomalies identified in the reporting period. However, the loss / release of the Guide Star and the toggling of the On Target Flag (OTF) has also been monitored this week.

3.1.1 AOCS

The overall performance of the AOCS subsystem is good. A few observations have been made that require further analysis.

As during the previous weeks the Guide Star has been released in the Perigee Passage between the revolutions 14 and 15. The magnitude of the star was 7.55 and it was lost at an altitude of 9500 Km. The event was triggered by the Single Event Upset (SEU) filter.
Since the release of the Guide Star during the Perigee Passage seems to be a regular event and since this behaviour can have severe impacts on the execution of the Timeline the concept for the Perigee Passage should be reassessed. XMM is using stars with a higher magnitude and they don't have problems concerning the Perigee Passage. However, in order to be able to select bright stars as a Guide Star they perform a slew to a favourable attitude

each revolution if this is required. This slew is not envisaged so far for INTEGRAL because the slew would have to be performed potentially during the part of the orbit that is suitable for science.

There were again three events when the OTF flag was set to false. These events were not recognised by the Broadcast Packet because the events were too short. Since the OTF set to false occurred frequently during the past revolutions and since the behaviour can disturb significantly the instrument operations as soon as the nominal operations are started an increase of the OTF threshold should be considered. The current setting of the threshold is 18 arcsec. Most of the events were triggered by a move of the STR coordinate of less than 30 arcsec. A change of the threshold would mean that the pointing will be come less accurate but the loss of the OTF flag will become rare.

The fuel consumption over the last 10 days was 0.14 Kg. The remaining propellant is in the order of 180.9 Kg on 25 November.

Note: A detailed report concerning the AOCS operations, the fuel budget and an overview of the Open Loop slews is provided in the Appendix.

3.1.2 Power

The power subsystem is working as specified. The available power is in the order of 2390 W, i.e. no degradation has been identified so far.

3.1.3 Thermal

The thermal control of the satellite is working well. The temperatures are currently all within the specified operational limits.

The evolution of the temperature in the fuel lines has been explained and the implication of the lower temperatures is currently under investigation.

3.1.4 OBDH

The satellite has reached its nominal configuration, i.e. all units are switched on. The OBDH subsystem is working flawlessly.

3.1.5 RF

The RF subsystem is working properly. The link margin is sufficient to ensure proper TM reception and execution of commands with the ranging channel enabled.

3.2 Payload

The functions and performances of the various instruments are currently being assessed. The instruments work mostly as expected but some anomalies / problematic areas have been identified, see chapter 6.

3.2.1 SPI

SPI was in science mode during most of the time of the reporting period. In order to cope with the available TM data rate the TM Emergency Mode has been selected. Due to the problems with the planning inputs it was agreed to operate SPI using manual commands.

The instrument team is tuning the instrument configuration in order to verify the instrument performance while pointing at CYGNUS X1. The identified performance is promising. SPI could detect the Gamma Ray Burst on 25 November.

However, there are a few problems concerning the operations of SPI that are addressed in the chapter 6.

3.2.2 IBIS

IBIS was in nominal science mode during most of the time in the reporting period. The instrument team is tuning the instrument configuration in order to verify the instrument performance while pointing at CYGNUS X1.

The ISGRI LTA calibration has been executed and a problem has been found in the processing S/W at ISDC. As there were also problems in the planning inputs for IBIS, IBIS was also operated mainly by manual commands. However, different to SPI the planning system could be tuned so that it can be used for the upcoming revolutions.

The performance of the instrument was good during the reporting period. IBIS also identified the GRB on 25 November, which was rather strong with a duration of 20 seconds.

As for SPI the available TM data rate is not sufficient. IBIS is currently preparing a S/W patch that should improve the utilisation of the allocated data rate. It is currently foreseen to use the On-Board S/W Maintenance System (OBSMS) at ESOC to perform some functional tests of the patch before its upload.

3.2.3 JEM-X

The JEM-X instrument team is currently assessing the implications of the degradation of the instruments observed during the previous weeks. Several change requests have been implemented to modify the configuration of the instrument. In addition to the tuning of individual parameters new S/W versions have been uploaded for the Data Processing Electronics (DPE) and the Data Front End Electronics (DFEE).

It is currently foreseen to keep both JEM-X's on during the Commissioning Phase to verify their performance but to switch off one JEM-X when the Routine Mission Phases is started to keep one instrument in cold stand-by.

Note: Some more information concerning the IBIS operations is provided in the Appendix.

3.2.4 OMC

The OMC is working nominally. The OMC imaging activities are now operated from the automatic Timeline.

Note: Some further information concerning operational problems is provided in the Appendix.

3.2.5 IREM

The INTEGRAL Radiation Monitor (IREM) is working nominally. No special operations have been performed.

It was agreed during the INTEGRAL Science Working Team (ISWT) Meeting that was held this week to keep the current thresholds for the radiation belts exit (40.000 Km) and entry (60.000 Km).

4 Ground Facilities

The overall performance of the ground segment was good. However, a few operations were impacted by some malfunctions within the ground segment, see section 6.

4.1 Mission Operations Centre

The overall performance of the MOC was good and the configuration was stable. Some special problems have been identified, see section 6.

The processing of the received data and the distribution to the PI workstations located at MOC and to the ISDC is working in general well. The main problem areas are the consolidation of the TM archive and the generation of the CD ROMs needed by the ISDC for the science processing.

The Flight Dynamics System (FDS) was working properly. There were a few events when the relevant command inputs in form of the Task Parameter File (TPF) were not provided to the IMCS. Some tuning of the Flight Dynamics products is still required. This concerns in particular the planning process, e.g. the accuracy of the prediction of orbital events.

The Timelines and procedures that were prepared by the MOC were of good quality. Some updates of the procedures are needed concerning the actual behaviour of the satellite. This concerns mainly instrument procedures and planning products.

4.2 Ground Stations & Network

The performance of the operational network was in general good. However, some passes over Goldstone have been significantly impacted by communications problems concerning the interface between JPL and ESOC. The problem areas have been identified and some modifications have been implemented that seem to have cured the problems because the recent passes were OK.

The performance of the Redu station was good during the reporting period.

The performance of the Goldstone station was good in the reporting period. However, the provision of the received data to the MOC was impacted by communication and set-up problems at the data processing site at JPL and within the communications interface.

4.3 Science Ground Segment

4.3.1 ISOC

The planning inputs for the revolutions have been provided and could be processed by the MOC. Some tuning of the planning products is still required. This concerns for example the planning for the generation of Spectra by SPI.

ISOC input:
The ISOC system performance up to now has been very stable allowing very quick response to replanning requests. ISOC system version 7.8 has just been installed. Using this version removes the very occasional need to manually edit some information in a POS. This version has been used to generate the latest products for revolution 16. The problem mentioned last week has been clarified. It is basically caused by the non-nominal use of the system. No software change foreseen at the moment. In particular SPI are loosing histogram packets from time to time. The behaviour is understood but a solution is under investigation to minimize loss of histogram packets.

4.3.2 ISDC

No ISDC Input has been provided

5 Special Events

The most important event in the reporting period was the detection of a Gamma Ray Burst (GRB) by SPI and IBIS on 25 November.

6 Anomalies

A list of the pending is presented in the Appendix. A meeting is planned for next week to review the list of pending anomaly reports to identify their actual. The main anomalies that had an influence on the operations are summarised in following.

There were a couple of problems at the MOC that impacted the operations. Some of them need to be solved soon because they would impact the execution of the routine operations.

- The automatic commanding of JEM-X has again been impacted by a known failure of the dynamic Pre-Transmission Verification (PTV) function of the INTEGRAL Mission Control System (IMCS). It seems that the origin of the failure is in the SCOS 2000 infrastructure that forms the core of the IMCS. A S/W solution is currently not available. Since the automatic commanding is currently not very intensive the relevant commands could be sent manually. However, as soon as the automated Timeline will be fully applied this problem will impact the operations of JEM-X.

- The consolidation of the TM archive is still causing some problems. Some operational workarounds have been implemented to improve the situation. An upgrade of the overall system is in preparation.

- The problem concerning the production of the CD ROMs that has delayed significantly the distribution of the CD ROMs has been cured. Some additional manpower has been

allocated to accelerate the generation of the CD ROMs to catch up with the backlog as soon as possible.

- The timing of events in the planning process is still to be improved. There are occasionally differences between the Operational Timeline and the corresponding ground schedule. This is due to the fact that the foreseen planning process cannot yet be fully applied because late change requests have to be accommodated. To avoid impacts on the operations the various planning products are checked by the MOC Mission Planner.

- The execution of the Timeline was impacted a couple of times, e.g. due to the loss of the Guide Star, the corruption of the TM links from the stations or problems within the IMCS. Since the automated Timeline is currently not heavily used the impacted operations could be performed by manual commanding performed by the Flight Control Team (FCT). However, the impacts will become noticeable when the Operational Timeline is fully exploited because then the workload on the FCT would be too high to avoid all implications.

The performance if the involved ground stations (Redu and Goldstone) was good during the reporting period. While the TM and TC flow via Redu worked flawlessly the TM / TC interface to / from Goldstone was severely impacts by communication problems mainly in revolution 13. These problems were identified and cured so that the subsequent passes were OK apart from one pass over Goldstone that was impacted by strong wind.

The platform did not show any new anomalies. However, the problems with the loss of the Guide Stars and the toggling of the OTF have also been observed in this reporting period.

There are a few problems with the instruments itself, e.g. with the IBIS / ISGRI MCS counter or with the SPI Pulse Shape Discriminator but the main problems areas that impact the operations are:

- JEM-X degradation,
- Available TM data rate for IBIS and SPI,
- Timing of activities in the planning products, e.g. SPI Spectra.

The degradation of the JEM-X instruments is currently under investigation by the PI. The MOC and ISOC need some additional inputs concerning the way that the two JEM-X instruments are to be operated in the Routine Mission Phase.

The TM data rate that is available to the instruments is not sufficient to operate SPI and IBIS in an efficient way. In order to support the current commissioning activities some special arrangements are needed to reallocate some TM packets to the instrument that requires them for the special operations. This was handled mainly via change requests. IBIS and SPI are currently assessing the situation and are preparing some modifications of the On-Board S/W (OBS) to improve the utilisation of the available TM data rate.

The current timing of activities as foreseen in the ISOC planning inputs is not always appropriate and requires some tuning This concerns for example the generation of the SPI Spectra. A meeting is planned at ESOC next week involving the MOC, ISOC, the PI and the Project Scientist to update the planning process.

7 Future Milestones

The tuning of the instruments should be finished now by revolution 17, so that the proper PV phase can start with revolution 18.

The Mission Readiness Review is planned for 12 & 13 December.

8 Appendix

The appendix includes various detailed information.

8.1 Consumables

8.1.1 Detailed Fuel Book-keeping

```
The last 10 entries in the history file for INTEGRAL

2002-11-16T19:31:43Z     185.2760      F     Automatic TM processing.
2002-11-18T08:33:06Z     185.2650      F     Automatic TM processing.
2002-11-18T15:35:39Z     185.2460      F     Automatic TM processing.
2002-11-19T18:48:15Z     185.2330      F     Automatic TM processing.
2002-11-19T22:49:03Z     185.2070      F     Automatic TM processing.
2002-11-21T08:23:46Z     185.1890      F     Automatic TM processing.
2002-11-22T18:38:30Z     185.1640      F     Automatic TM processing.
2002-11-24T08:13:05Z     185.1440      F     Automatic TM processing.
2002-11-25T15:42:52Z     185.1437      F     Automatic TM processing.
2002-11-25T18:25:33Z     185.1402      F     Automatic TM processing.

This report was generated at  Wed Nov 27 08:00:07 GMT 2002


Note: fuel-book initial value included 4.24kg pressurant
      which will not be exhausted  -  thus when the fuel
      book reaches a value of 4.24kg this represents the
      ZERO PROPELLANT value.
```

8.2 Overview of Open Loop Slews

This section provides an overview of the slews performed in the revolutions 1 to 9.

```
For slew identifier 00019002
Input telemetry access time at 2002-10-18T09:50:00.000Z
Target Attitude : RA, DEC, POS =   07:13:48.82  -39:13:05.6
101:14:20.8
Open Loop Slew Parameters      =   0.3490658E+00  0.7272205E-03
0.6350000E+02
  Right ascension : 07:13:57.26
  Declination     : -39:09:32.6
  Position angle  : 101:11:48.4

  Roll Error      :     -72.4 arcsec
  Pitch Error     :      54.8 arcsec
  Yaw Error       :     228.0 arcsec
```

```
For slew identifier 00019003
Input telemetry access time at 2002-10-18T12:39:00.000Z
Target Attitude : RA, DEC, POS =   14:54:42.39  -65:59:27.2
335:40:06.5
Open Loop Slew Parameters      =   0.1166370E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 14:54:02.60
  Declination     : -65:57:47.1
  Position angle  : 335:48:41.9

  Roll Error      :     -29.6 arcsec
  Pitch Error     :     191.1 arcsec
  Yaw Error       :     180.4 arcsec
```

```
For slew identifier 00019005
Input telemetry access time at 2002-10-19T14:14:00.000Z
Target Attitude : RA, DEC, POS =   01:55:50.07  -78:20:53.8
175:09:14.5
Open Loop Slew Parameters      =   0.6206674E+00  0.9696274E-03
0.2000000E+03
  Right ascension : 01:59:53.37
  Declination     : -78:20:12.6
  Position angle  : 174:09:58.3

  Roll Error      :      18.1 arcsec
  Pitch Error     :      27.5 arcsec
  Yaw Error       :     738.1 arcsec
```

```
For slew identifier 00029001
Input telemetry access time at 2002-10-20T08:17:00.000Z
Target Attitude : RA, DEC, POS =   15:14:19.11  -70:04:47.4
333:05:30.6
Open Loop Slew Parameters      =   0.5459855E+00  0.9696274E-03
0.2000000E+03
  Right ascension : 15:13:48.40
  Declination     : -70:07:52.0
  Position angle  : 333:19:19.1

  Roll Error      :     395.3 arcsec
  Pitch Error     :     -94.4 arcsec
  Yaw Error       :     223.1 arcsec
```

```
For slew identifier 00029003
Input telemetry access time at 2002-10-22T08:39:00.000Z
Target Attitude : RA, DEC, POS =   05:02:42.78  -71:18:51.3
132:10:09.6
Open Loop Slew Parameters      =   0.6605239E+00  0.9696274E-03
0.2000000E+03
  Right ascension : 05:02:18.85
  Declination     : -71:22:09.8
  Position angle  : 132:16:21.6

  Roll Error      :      31.9 arcsec
  Pitch Error     :      48.4 arcsec
  Yaw Error       :    -224.2 arcsec
```

```
For slew identifier 00039001
Input telemetry access time at 2002-10-23T01:17:50.000Z
Target Attitude : RA, DEC, POS =   20:07:11.04  -21:33:03.6
257:52:34.3
Open Loop Slew Parameters      =   0.1427967E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 20:06:34.57
  Declination     : -21:49:03.2
  Position angle  : 257:53:27.0

  Roll Error      :    -148.0 arcsec
  Pitch Error     :     698.7 arcsec
  Yaw Error       :     831.3 arcsec
```

```
For slew identifier 00039021
Input telemetry access time at 2002-10-24T05:08:30.000Z
Target Attitude : RA, DEC, POS =   15:14:19.10  -70:04:46.0
337:01:56.3
Open Loop Slew Parameters      =   0.1173209E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 15:13:29.68
  Declination     : -70:07:25.3
  Position angle  : 337:18:45.4

  Roll Error      :     312.1 arcsec
  Pitch Error     :     -49.2 arcsec
  Yaw Error       :     294.3 arcsec
```

```
For slew identifier 00049004
Input telemetry access time at 2002-10-25T19:39:00.000Z
Target Attitude : RA, DEC, POS =   20:10:06.00  -22:46:01.2
257:43:29.6
Open Loop Slew Parameters      =   0.1150149E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 20:10:15.61
  Declination     : -22:49:38.8
  Position angle  : 257:43:06.1

  Roll Error      :      32.4 arcsec
  Pitch Error     :     -83.6 arcsec
  Yaw Error       :     240.8 arcsec
```

```
For slew identifier 00049016
Input telemetry access time at 2002-10-26T23:52:29.000Z
Target Attitude : RA, DEC, POS =   20:25:18.80  -21:57:23.6
256:18:10.0
Open Loop Slew Parameters      =   0.6295049E-01  0.7272205E-03
0.6350000E+02
  Right ascension : 20:25:20.49
  Declination     : -21:57:21.4
  Position angle  : 256:17:28.6

  Roll Error      :     -31.9 arcsec
  Pitch Error     :     -23.4 arcsec
  Yaw Error       :       3.4 arcsec
```

```
For slew identifier 00049013
Input telemetry access time at 2002-10-27T02:33:56.000Z
Target Attitude : RA, DEC, POS =   15:31:30.69  -73:23:24.0
336:03:34.1
Open Loop Slew Parameters      =   0.1194987E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 15:29:57.36
  Declination     : -73:27:18.4
  Position angle  : 336:31:16.8

  Roll Error      :     320.9 arcsec
  Pitch Error     :     -54.3 arcsec
  Yaw Error       :     459.9 arcsec
```

```
For slew identifier 00059001
Input telemetry access time at 2002-10-28T16:37:00.000Z
Target Attitude : RA, DEC, POS =   20:16:07.20  -24:30:39.6
257:25:26.3
Open Loop Slew Parameters      =   0.1115942E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 20:16:19.72
  Declination     : -24:33:31.3
  Position angle  : 257:25:19.4

  Roll Error      :      71.0 arcsec
  Pitch Error     :    -129.4 arcsec
  Yaw Error       :     204.8 arcsec
```

```
For slew identifier 00059012
Input telemetry access time at 2002-10-30T02:25:56.000Z
Target Attitude : RA, DEC, POS =   07:48:30.72  -22:15:03.6
105:18:07.0
Open Loop Slew Parameters      =   0.2361751E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 07:48:31.51
  Declination     : -22:21:06.0
  Position angle  : 105:19:40.0

  Roll Error      :      97.5 arcsec
  Pitch Error     :     106.4 arcsec
  Yaw Error       :    -346.6 arcsec
```

```
For slew identifier 00069014
Input telemetry access time at 2002-10-31T12:23:00.000Z
Target Attitude : RA, DEC, POS =   11:21:15.12  -60:37:22.8
055:18:48.4
Open Loop Slew Parameters      =   0.9458491E+00  0.9696274E-03
0.2000000E+03
  Right ascension : 11:21:08.11
  Declination     : -60:37:03.1
  Position angle  : 055:21:32.9

  Roll Error      :      72.9 arcsec
  Pitch Error     :     -31.2 arcsec
  Yaw Error       :      45.5 arcsec
```

```
For slew identifier 00069001
Input telemetry access time at 2002-11-01T18:19:43.000Z
Target Attitude : RA, DEC, POS =   14:39:40.26  +42:12:03.4
182:17:06.2
Open Loop Slew Parameters      =   0.2755225E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 14:30:34.62
  Declination     : +42:12:07.3
  Position angle  : 179:39:04.6

  Roll Error      :   -3983.9 arcsec
  Pitch Error     :      40.0 arcsec
  Yaw Error       :   -6062.7 arcsec
```

```
For slew identifier 00069002
Input telemetry access time at 2002-11-01T19:33:19.000Z
Target Attitude : RA, DEC, POS =   02:00:00.00  +70:00:00.0
352:03:56.4
Open Loop Slew Parameters      =   0.1179437E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 01:54:49.81
  Declination     : +69:57:20.5
  Position angle  : 350:32:50.9

  Roll Error      :   -1093.6 arcsec
  Pitch Error     :      87.4 arcsec
  Yaw Error       :    1598.6 arcsec
```

```
For slew identifier 00069011
Input telemetry access time at 2002-11-01T21:49:03.000Z
Target Attitude : RA, DEC, POS =   01:44:54.20  +66:00:26.1
350:53:01.8
Open Loop Slew Parameters      =   0.8425358E-01  0.7272205E-03
0.5700000E+02
  Right ascension : 01:44:45.68
  Declination     : +65:59:59.1
  Position angle  : 350:45:09.3

  Roll Error      :    -355.7 arcsec
  Pitch Error     :     -18.3 arcsec
  Yaw Error       :      55.6 arcsec
```

```
For slew identifier 00069015
Input telemetry access time at 2002-11-02T00:08:31.000Z
Target Attitude : RA, DEC, POS =   02:20:20.55  +65:41:26.6
354:28:49.5
Open Loop Slew Parameters      =   0.8725665E-01  0.7272205E-03
0.5700000E+02
  Right ascension : 02:20:27.89
  Declination     : +65:40:58.4
  Position angle  : 354:32:48.2

  Roll Error      :     138.4 arcsec
  Pitch Error     :     -32.4 arcsec
  Yaw Error       :     -42.4 arcsec
```

```
For slew identifier 00069021
Input telemetry access time at 2002-11-02T03:38:39.000Z
Target Attitude : RA, DEC, POS =   01:28:38.49  +72:55:27.3
347:04:23.2
Open Loop Slew Parameters      =   0.6059561E-01  0.7272205E-03
0.5700000E+02
  Right ascension : 01:28:35.41
  Declination     : +72:55:29.2
  Position angle  : 346:58:34.6

  Roll Error      :    -304.5 arcsec
  Pitch Error     :       4.9 arcsec
  Yaw Error       :      12.8 arcsec
```

```
For slew identifier 00069022
Input telemetry access time at 2002-11-02T04:14:00.000Z
Target Attitude : RA, DEC, POS =   01:36:16.22  +75:43:03.0
346:55:51.7
Open Loop Slew Parameters      =   0.6041210E-01  0.7272205E-03
0.5700000E+02
  Right ascension : 01:36:28.59
  Declination     : +75:43:16.4
  Position angle  : 346:56:32.2

  Roll Error      :    -139.3 arcsec
  Pitch Error     :       2.7 arcsec
  Yaw Error       :     -47.6 arcsec
```

```
For slew identifier 00069025
Input telemetry access time at 2002-11-02T06:00:42.000Z
Target Attitude : RA, DEC, POS =   01:03:34.36  +83:28:50.2
336:36:16.7
Open Loop Slew Parameters      =   0.6189634E-01  0.7272205E-03
0.5700000E+02
  Right ascension : 01:03:18.29
  Declination     : +83:28:54.2
  Position angle  : 336:32:27.7

  Roll Error      :      10.4 arcsec
  Pitch Error     :      14.5 arcsec
  Yaw Error       :      23.5 arcsec
```

```
For slew identifier 00069026
Input telemetry access time at 2002-11-02T06:36:06.000Z
Target Attitude : RA, DEC, POS =   23:36:45.99  +85:14:29.4
317:20:33.9
Open Loop Slew Parameters      =   0.6282619E-01  0.7272205E-03
0.5700000E+02
  Right ascension : 23:36:28.52
  Declination     : +85:14:10.0
  Position angle  : 317:14:16.1

  Roll Error      :    -116.7 arcsec
  Pitch Error     :       0.5 arcsec
  Yaw Error       :      29.1 arcsec
```

```
For slew identifier 00069029
Input telemetry access time at 2002-11-02T08:22:51.000Z
Target Attitude : RA, DEC, POS =   16:37:02.44  +84:52:09.6
210:02:48.0
Open Loop Slew Parameters      =   0.6458591E-01  0.7272205E-03
0.5700000E+02
  Right ascension : 16:36:13.41
  Declination     : +84:52:56.8
  Position angle  : 209:50:20.5

  Roll Error      :     -15.1 arcsec
  Pitch Error     :      -8.1 arcsec
  Yaw Error       :     -80.5 arcsec
```

```
For slew identifier 00069032
Input telemetry access time at 2002-11-02T10:09:36.000Z
Target Attitude : RA, DEC, POS =   15:26:13.50  +77:26:42.5
195:04:01.9
Open Loop Slew Parameters      =   0.6461100E-01  0.7272205E-03
0.5700000E+02
  Right ascension : 15:26:29.06
  Declination     : +77:26:33.1
  Position angle  : 195:07:02.4

  Roll Error      :     -47.4 arcsec
  Pitch Error     :      -4.1 arcsec
  Yaw Error       :      51.5 arcsec
```

```
For slew identifier 00069046
Input telemetry access time at 2002-11-02T19:02:09.000Z
Target Attitude : RA, DEC, POS =   14:40:51.68  +41:16:16.0
184:14:12.1
Open Loop Slew Parameters      =   0.6113158E-01  0.7272205E-03
0.5700000E+02
  Right ascension : 14:40:41.60
  Declination     : +41:16:05.6
  Position angle  : 184:11:10.9

  Roll Error      :     -81.4 arcsec
  Pitch Error     :      18.7 arcsec
  Yaw Error       :    -112.6 arcsec
```

```
For slew identifier 00069052
Input telemetry access time at 2002-11-02T22:32:54.000Z
Target Attitude : RA, DEC, POS =   14:35:14.70  +36:06:32.0
184:22:48.9
Open Loop Slew Parameters      =   0.8641804E-01  0.7272205E-03
0.5700000E+02
  Right ascension : 14:35:32.77
  Declination     : +36:06:43.1
  Position angle  : 184:29:48.4

  Roll Error      :     259.7 arcsec
  Pitch Error     :     -28.1 arcsec
  Yaw Error       :     217.5 arcsec
```

```
For slew identifier 00069071
Input telemetry access time at 2002-11-03T01:37:53.000Z
Target Attitude : RA, DEC, POS =   14:44:55.11  +56:23:01.6
183:36:37.9
Open Loop Slew Parameters      =   0.3454162E+00  0.7272205E-03
0.5700000E+02
  Right ascension : 14:45:27.25
  Declination     : +56:22:31.5
  Position angle  : 183:41:14.7

  Roll Error      :    -124.7 arcsec
  Pitch Error     :      13.1 arcsec
  Yaw Error       :     268.3 arcsec
```

```
For slew identifier 00069072
Input telemetry access time at 2002-11-03T02:54:46.000Z
Target Attitude : RA, DEC, POS =   17:16:45.60  -85:06:36.0
318:05:57.9
Open Loop Slew Parameters      =   0.3049143E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 17:36:20.03
  Declination     : -84:41:17.5
  Position angle  : 312:58:14.4

  Roll Error      :    -916.5 arcsec
  Pitch Error     :     -18.9 arcsec
  Yaw Error       :   -2180.2 arcsec
```

```
For slew identifier 00079002
Input telemetry access time at 2002-11-03T12:09:45.000Z
Target Attitude : RA, DEC, POS =   01:42:00.75  -74:31:49.2
192:19:25.1
Open Loop Slew Parameters      =   0.3276596E+00  0.9696274E-03
0.2000000E+03
  Right ascension : 01:43:14.30
  Declination     : -74:33:10.7
  Position angle  : 192:01:59.8

  Roll Error      :      18.1 arcsec
  Pitch Error     :      17.6 arcsec
  Yaw Error       :     304.6 arcsec
```

```
For slew identifier 00079010
Input telemetry access time at 2002-11-03T20:33:44.000Z
Target Attitude : RA, DEC, POS =   09:59:21.79  -00:58:55.2
105:54:24.8
Open Loop Slew Parameters      =   0.1722463E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 10:00:55.57
  Declination     : +00:12:24.5
  Position angle  : 106:21:41.5

  Roll Error      :    1647.8 arcsec
  Pitch Error     :     144.1 arcsec
  Yaw Error       :    4502.6 arcsec
```

```
For slew identifier 00089001
Input telemetry access time at 2002-11-07T09:22:49.000Z
Target Attitude : RA, DEC, POS =   06:37:17.13  -54:12:59.7
126:07:21.2
Open Loop Slew Parameters      =   0.1181382E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 06:36:36.45
  Declination     : -54:18:49.8
  Position angle  : 126:16:53.1

  Roll Error      :      76.7 arcsec
  Pitch Error     :     -80.7 arcsec
  Yaw Error       :    -493.0 arcsec
```

```
For slew identifier 00089002
Input telemetry access time at 2002-11-07T19:22:50.000Z
Target Attitude : RA, DEC, POS =   09:59:21.79  -00:58:55.2
106:52:37.5
Open Loop Slew Parameters      =   0.1182639E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 09:59:43.58
  Declination     : -00:42:58.7
  Position angle  : 106:57:30.0

  Roll Error      :     297.5 arcsec
  Pitch Error     :      33.6 arcsec
  Yaw Error       :    1010.2 arcsec
```

```
For slew identifier 00089004
Input telemetry access time at 2002-11-09T02:59:40.000Z
Target Attitude : RA, DEC, POS =   08:40:00.00  -15:00:00.0
107:13:24.4
Open Loop Slew Parameters      =   0.4226417E+00  0.7272205E-03
0.5700000E+02
  Right ascension : 08:40:02.53
  Declination     : -15:01:03.6
  Position angle  : 107:13:01.5

  Roll Error      :     -13.1 arcsec
  Pitch Error     :      53.9 arcsec
  Yaw Error       :     -49.8 arcsec
```

```
For slew identifier 00099001
Input telemetry access time at 2002-11-09T11:25:00.000Z
Target Attitude : RA, DEC, POS =   20:00:00.00  +30:00:00.0
248:16:58.9
Open Loop Slew Parameters      =   0.2840169E+01  0.9696274E-03
0.2000000E+03
  Right ascension : 19:57:45.23
  Declination     : +31:18:38.4
  Position angle  : 247:52:54.7

  Roll Error      :    -411.5 arcsec
  Pitch Error     :    -152.9 arcsec
  Yaw Error       :   -5026.3 arcsec
=====================================================================
```

8.3 Detailed Satellite Information

This section contains some detailed information concerning the various subsystems of the satellite and instruments.

8.3.1 AOCS SUMMARY OPERATIONS REPORT 16/11/2002-28/11/1002

These are the main AOCS events in the reporting period:

22/11/2002 (Day of Year 326, Revolution 13)

Nominal AOCS operations executed from the Automatic Timeline.

23/11/2002 (Day of Year 327, Revolution 13)

Nominal AOCS operations executed from the Automatic Timeline.

Inertia Calibration

In this revolution the complete inertia calibration was repeated. The reason is that in the one done after LEOP the guide star was not completely centred in the STR FoV for the roll slews. This introduced a coupling from the other two axes that decreased the quality of the results. In this occasion the results were also improved by keeping the same guide star during all the offset slews. In order to achieve this, a special Event Designator was used for the first time in flight (AECCS_00). The new ED, basically the same as the normal offset (AECSL_00), but without the change of the guide star, was used from the Automatic Timeline without problems. Operations started at 03:55, and were completed at 07:30. The slews involved were 1 normal offset slew to acquire the initial attitude, 7 calibration offsets and 1 normal offset to go back to the original attitude. From the science planning point of view, the period was covered by a single pointing ID, 00130002. Normal observations re-started at 12:30, with the Pointing Request 00130003.
Although not an AOCS point, it should maybe be mentioned that during this operation, OMC was issuing the On Event Message:

SCI WINDOW REJECTED

This is normal taking into account that, due to the calibration offsets, the attitude was changing with respect to the one used to calculate and command the coordinates for the OMC windows.

All operations were done from the Automatic Timeline with the exception of some STR Search/Track commands to monitor the position of additional stars.

On Target Flag set to False

At 09:53:28 the ACC issued the On Event Message:

ACC PITCH ERROR OOL

This message is issued when the threshold for the OTF in pitch is exceeded. The reason for the problem was an instantaneous change in the guide star detected position, for one cycle, which seems a case of undetected False Event in the STR CCD:

Time	Mag	CCDY	CCDZ
09:53:28	.149	7.70	1 0
09:53:28.649		7.55	-100 -17
09:53.29.149		7.70	0 1

The change of magnitude is below the False Event threshold in the STR (relative change in energy bigger than 0.22 with respect to the previous cycle), but the change in the STR Y coordinate was of 101 CCD units, or 24.5''. This is above the OTF threshold for pitch (18'').
The ACC Pointing Bit (OTF), was set to FALSE for 0.5 seconds, but this was not seen by the sampling used in the Broadcast Packet and consequently was not transmitted to the Payload.
The height in the orbit at the moment of the event was 134000 Km.

24/11/2002 (Day of Year 328, Revolution 13-14)

Nominal AOCS operations executed from the Automatic Timeline.

On Target Flag set to False (out of coverage)

At revolution 14, at AOS after perigee passage, the following OEM was in the ACC OEM buffer:

07:31:27.520 ACC YAW ERROR OOL

Since there was no TM at the occurrence of the event, no additional information is available.
The star magnitude was 6.75, the coordinates (-12326, 3236), and the altitude around 13500 Km.

On Target Flag set to False

After AOS, the ACC generated the message:

07:49:17 ACC YAW ERROR OOL

The star data at the time were:

Time	Mag	CCDYCCDZ	
07.49.16.858	6.75	-12329	3238
07.49.17.358	6.65	-12347	3329
07.49.17.858	6.70	-12327	3237

In this case, the change in the STR Z coordinate was of 91 CCD units, or 22''. This is above the OTF threshold for yaw (18'').
The ACC Pointing Bit (OTF) was set to FALSE for 0.5 seconds. It was not reflected in the Broadcast Packet.
The height in the orbit at the moment of the event was ≈16000 Km.

25/11/2002 (Day of Year 329, Revolution 14)

Nominal AOCS operations executed from the Automatic Timeline.

Command not verified by the Control System (no impact)

At 16:49 the command A3085 “RC SUN STEER INI” staid “Unverified” in the TC History. This command was part of the sequence AESSS_00 to re-enable the Sun Steering Law at the end of an Open Loop Slew. It generates a report packet containing the latest loaded SSL parameters. The control system compares this report packet with the last TC packet where these parameters were loaded, and the CEV is based on a successful comparison. In order to find the relevant TC packet, the control system looks into the last 100 telecommands uplinked. The reason for the command staying unverified in this case was that in between the time of the load (before the start of the slew), and the time of the report, intense manual commanding for the payload took place, which put more than 100 commands in the archive. In this particular case the problem had no impact, since the purpose of the dump in this

sequence is to provide the report packet to the next command for pre-transmission verification checks, and this was O.K.

Slew parameters not updated

The parameters for the Offset Slew ID 00140003 at 17:12 were not updated in real time, because the corresponding TPF (Task Parameter File), was not generated by the Flight Dynamics System. The reason was a misidentification of one of the stars present in the mapping. Due to this misidentification the star exceeded the maximum error criteria that the FDS applies to consider the attitude determination as valid. Since there was no real error in the attitude, and the guide star to be selected before the offset was not the current guide star, this problem did not affect the Timeline execution. The next slew was updated correctly.

26/11/2002 (Day of Year 330, Revolution 14)

Nominal AOCS operations executed from the Automatic Timeline.

27/11/2002 (Day of Year 331, Revolution 14-15)

Nominal AOCS operations executed from the Automatic Timeline.

Change of Guide Star executed manually

The last change of guide star in revolution 14 was scheduled in the timeline at 02:48, but the End Of Track for Goldstone was scheduled at 02:45, due to a change in the visibility caused by the orbital evolution from the time the timeline was first generated to the time of the actual execution. This was realised by the Spacon well in advance and the change of guide star was executed manually, using the same parameters as the ones provided by the Flight Dynamic System for the update of the Automatic Timeline. The operation was executed at 02:29.

Guide star released (SEU Filter Trigger)

At AOS in revolution 15, it was realised that the guide star was different from the one before LOS. The dump of the ACC Onboard Event Message buffer contained the message:

06:22:51 ACC STR THR EX

Which means that the SEU Filter was triggered. The message was followed by the other normal messages in these cases (IMU ON, start of STR mapping, DCA and RGA change). The SEU filter is in place to prevent the usage of STR data in the control law in the presence of an excessive rate of SEU's in the CCD (the STR freezes the reported star coordinates to the last value when a False Event is detected). The current values used are:

Every time the STR reports a False Event, counter is increased by 1.
Every ACC cycle (0.5 s) that the STR does not report False Event, counter is decreased by 1.
If the accumulated counter reaches 7, the SEU Filter triggers.

From the OEM's it can be seen that a new guide star was immediately acquired, and 4 seconds after the event the ACC was again tracking on STR data.

The magnitude of the released star was 7.55, the coordinates in the CCD (17322, -4202), and the altitude in the orbit was 9500 Km.
From the operational point of view, the new star fulfilled the conditions for the first Reaction Wheel Bias of the revolution, and therefore no action was taken. A STR mapping was performed anyway, that confirmed that the attitude was O.K., but the object been tracked was in principle not a valid guide (it was the superposition of a diffused nebula and a star). Nevertheless tracking was solid and stable and the RWB was executed without problems.

28/11/2002 up to 19:00 (Day of Year 332, Revolution 15)

Nominal AOCS operations executed from the Automatic Timeline.

TPF for the RMU calibration not transferred to the Control System

The Task Parameter File containing the results of the RMU Drift Calibration performed at 08:15 was not transferred to the control system. The reason was that after an upgrade of the operating system in the Flight Dynamics workstations, their instance of the IFTS (Integral File Transfer System) was not re-started. Once this was noticed the re-start was performed by Sofware Support, and the TPF was successfully transferred and uplinked at 09:11.

8.3.2 JEM-X Operations

OVERVIEW

During the reporting period, the following activities were performed on JEMX1 and JEMX2:
- Upgrade of the DPE S/W to version 0.0.2
- Upgrade of the DFEE S/W to version 4.2.0
- Uplink of new Energy Linearization tables
- New setting for the upper limit of accepted anode signals
- New setting for the low level discriminator

At the beginning of revolution 14, the JEMX2 anode high voltage setting command from the automatic timeline failed due to an IMCS problem.

Both JEMX units are being switched to SAFE mode at 90 minutes before the BCP radiation belt entry time.

DETAILS

22-Nov-2002, DOY 326, Revolution 14

- 10:01:53, TC LU0003A form the KEHVON01 ED failed release. The reason was that the wait state of the Dynamic PTV was not cleared although the previous command had passed all the verification stages. This problem was also seen later during manual activation of JEMX2 with the same TC sequence and from the manual timeline. The problem is reported to software support and is being investigated. However, a correction to the system might not come in the near future. This implies a manual activation of the JEMX instruments upon failure of the automatic commanding. The other solution would be the removal of the interlock between the two affected TCs from the ED. JEMX2 was manually activated and set to data taking mode at 11:02:00.

- 11:07:00, Time-tag commands to set JEMX1 and JEMX2 to SAFE mode 90 minutes before BCP radiation belt entry time were uplinked.

25-Nov-2002, DOY 329, Revolution 14

- 07:45:00, commanding from the automatic timeline to JEMX1&2 was disabled and both units were commanded to SAFE mode in order to execute a series of change requests:

    1. The new Energy Linearization tables were uplinked to both JEMX units. These tables translate the raw ADC scale into a compressed telemetry scale and were updated to match the reduced HV settings.

2. Using the OBSMS system the DPE S/W was upgraded to version 0.0.2. The S/W change is meant to prevent the loss of data in connection with the loss of synchronization on the High Speed Line. As part of the OBSM DPE patch procedure, the DPE was rebooted while the DFEE was ON and in SAFE mode. The impacts of this on DFEE were not clear and after discussing with the PI, it was decided to make a power cycle on the DFEE. Later this case was followed up and it became clear that before a DPE reboot, the DFEE should be switched OFF. This implies a change in the DPE S/W patch procedures.

3. The JEMX1 DFEE was switched OFF and a complete activation of the DFEE was performed. This included the uplink of the new DFEE S/W version 4.2.0. The new S/W modifies the selection criteria to identify X-rays according to the new low operating voltages. During the DFEE activation, the upper limit for acceptable anode signals was set to the new value of 750 raw decimal. This new setting prevents the transmission of events with energies above 50 KeV, which are mostly caused by hard X-rays originating in the S/C itself.

4. Before performing the JEMX2 DPE patch, the DFEE was switched off and then the new DPE patches were uplinked to upgrade the JEMX2 DPE S/W to version 0.0.2. As for JEMX1, the S/W change is meant to prevent the loss of data in connection with the loss of synchronization on the High Speed Line.

5. JEMX2 DFEE was reactivated and the new DFEE S/W, version 4.2.0, was uplinked. The new S/W modifies the selection criteria to identify X-rays according to the new low operating voltages. During the DFEE activation, the upper limit for acceptable anode signals was set to the new value of 800 raw decimal.

6. 17:00:00, commanding from the automatic timeline was re-enabled to JEMX after HV switch ON and commanding both JEMX to DATA TAKING mode.

- During the DFEE activation it was noticed that the control system is not able to correctly interpret the values held by parameters K5305 and L5305, which report the last update time of DFEE parameters. Later it was realized that the data base definition was incorrect. These parameters hold absolute time values and are 6 bytes wide with 3 bytes coarse time and 3 bytes fine time. However in the DB they were defined as 4 bytes coarse time and 2 bytes fine time. The DB is already corrected and the fixes will be on the system with the next DB propagation.

- Since the DFEEs and DPEs were rebooted after the uplink of the new Energy Linearization tables, the tables were lost on-board. JEMX PI later notified this fact to MOC, which required the re-uplink of the tables.

26-Nov-2002, DOY 330, Revolution 14

- 23:30:00, JEMX1 to SAFE by time-tag TC
- 23:30:05, JEMX2 to SAFE by time-tag TC

27-Nov-2002, DOY 331, Revolution 15

- 09:45:00, after radiation belt exit, commanding from the automatic timeline to JEMX was disabled in order to re-uplink the new Energy Linearization tables. The tables were uplinked and the HVs were activated by manual commanding.

- 11:06:00, both JEMX units were commanded to data taking and the JEMX commanding from the automatic timeline was re-enabled.

- 16:47:50, Time-tag commands were uplinked to put JEMX1 and JEMX2 in SAFE mode at 90 minutes before BCP radiation belt entry time.

28-Nov-2002, DOY 332, Revolution 15

- 11:40:00, Start implementation of change request from PI to perform data taking with different values of low-level discriminator. After the test, the PI concluded that the best performance was observed with a discriminator value of 2 and made another request to set the discriminator value to 2 for the rest of revolution 15.

- In another change request, it is requested to change the nominal operational value of the low-level discriminator from 10 to 2. These values are currently set to 10 by event designators after radiation belt exit. The change requires an update of the procedures and the event designators. Therefore, the new settings cannot be applied by the automatic timeline until the next data base propagation and should be done manually.

8.3.3 OMC Operations

OVERVIEW

During the reporting period OMC has been functioning nominally and according to the automatic timeline, except for one instance when OMC image acquisition was interrupted due to manual mask/unmask of the OTF.

DETAILS

- If centering shots are commanded during long staring observations, OMC application software generates two OEM 179s (CENT CYCLE) when one shot completes and the next shot begins. These OEMs have exactly the same time-stamp and cause an error message from the control system. When there is enough time for a shot sequence to complete and then re-start automatically, one OEM 179 is issued to flag the reset of Centering parameters. Shortly after that the Centering algorithm starts and OMCAS issues another OEM 179.

24-Nov-2002, DOY 328, Revolution 14

- 11:27:22, OMC nominal operations was interrupted by the manual OTF Mask/Unmask operation, which was performed to initiate SPI spectra building. This set OMC to STANDBY mode. To recover, the last OMC imaging commands from the EPOS were manually resent and OMC restarted normal operations at 11:58:50.

8.4 List of Anomalies since Launch

The following table presents the list of all identified anomalies that have been registered since Launch and that are still pending (Status: 29.11.02). Though these Anomaly Reports still have a pending status most of the problems have been analysed and solutions or at least workarounds are already in place. The ARs have just not yet been formally closed.

ARid	Date Occurrence	Subject	Segment	Element	Status
INT - 002003	19/10/2002	Command failure from TCE2 at Redu1.	Ground	ESA Sta.	Pending
INT - 002007	22/10/2002	Command sequence TENPE_00 is incorrect.	Space	Procedures	Pending
INT - 002010	22/10/2002	Time correlation not applied correctly to time parameters in TM type 8 reports.	Ground	IMCS	Pending
INT - 002018	22/10/2002	Loss of TM and TC with Goldstone.	Ground	NASA Sta.	Pending
INT - 002021	22/10/2002	JEM-X: Unexpected OEM during HV ramp up.	Space	JEM-X	Pending
INT - 002017	23/10/2002	INCTRB crashed.	Ground	NCTRS	Pending
INT - 002013	24/10/2002	VETO LSL error.	Space	IBIS	Pending
INT - 002015	24/10/2002	HSL error (loss of SYNCH).	Space	JEM-X	Pending
INT - 002023	27/10/2002	SPI: ACS status error.	Space	SPI	Pending
INT - 002025	28/10/2002	Telemetry and Telecommand outagesd due to Antenna Mispointing	Ground	NASA Sta.	Pending
INT - 002026	28/10/2002	Sun144 forced logout whilst SPACON was commanding!	Ground	IMCS	Pending
INT - 002036	03/11/2002	TM Desktop running very slow	Ground	IMCS	Pending
INT - 002037	03/11/2002	Telemetry loss from REDU	Ground	ESA Sta.	Pending
INT - 002058	06/11/2002	Telemetry Play Back Failed	Ground	NASA Sta.	Pending
INT - 002049	07/11/2002	Beginning of a gradual erosion of the anodes on the microstrip plates	Space	JEM-X	Pending

INT - 002059	07/11/2002	Problems with handover to GoldStone	Ground	NASA Sta.	Pending
INT - 002048	08/11/2002	TM Data Retrieval Jobs not executed	Ground	IMCS	Pending
INT - 002051	09/11/2002	Loss of Guide Star	Space	Spacecraft	Pending
INT - 002054	09/11/2002	OEM on SPI Spectra Building.	Space	SPI	Pending
INT - 002055	09/11/2002	IBIS VETO anomalous count rates.	Space	IBIS	Pending
INT - 002053	12/11/2002	AD verification failed twice with Vilspa	Ground	ESA Sta.	Pending
INT - 002061	12/11/2002	TM Desktop perfomance collapses when de-selecting supercommutated procesing.	Ground	IMCS	Pending
INT - 002062	13/11/2002	Static PTV wrongly handled by IMCS when commands are copied	Ground	IMCS	Pending
INT - 002064	13/11/2002	Failed to handover to VIL-2	Ground	ESA Sta.	Pending
INT - 002066	13/11/2002	Data routing to ISDS	Ground	I/F to SGS	Pending
INT - 002082	13/11/2002	TM packet production lower than allocation.	Space	SPI	Pending
INT - 002070	14/11/2002	TDRS: data Rerievals cancelled	Ground	IMCS	Pending
INT - 002071	14/11/2002	Generation of OEM ID 5 and 6 by JEMX-1 in Diagnostic Dump Mode	Space	JEM-X	Pending
INT - 002078	14/11/2002	Antenna Tracking Problems	Ground	ESA Sta.	Pending
INT - 002079	14/11/2002	Timing Problem with Telecommands	Ground	ESA Sta.	Pending
INT - 002075	15/11/2002	Provision of TPF failed	Ground	FDS	Pending
INT - 002077	15/11/2002	SPI Spectra at Belt Exit	Space	SPI	Pending
INT - 002083	16/11/2002	SPI DPE Crash	Space	SPI	Pending
INT - 002086	17/11/2002	Link to ISDC interrupted	Ground	I/F to SGS	Pending
INT - 002091	18/11/2002	A-Chain Frozen	Ground	IMCS	Pending
INT - 002092	19/11/2002	Load-Dump comparison uses also non-released load commands	Ground	IMCS	Pending

INT - 002093	19/11/2002	Incorrect MOUT in POS/EPOS/TSF	Ground	ISOC	Pending
INT - 002094	19/11/2002	TDRS does not work with supercommutated parameters	Ground	IMCS	Pending
INT - 002095	19/11/2002	TDRS incomplete retrievals.	Ground	IMCS	Pending
INT - 002096	19/11/2002	Retrieval from the stations	Ground	IMCS	Pending
INT - 002097	19/11/2002	Unexpected dithering process when SPI spectra accumulation = 0	Space	SPI	Pending
INT - 002098	19/11/2002	FEE 3 has 2 occurences of 3 status parameters OOL	Space	SPI	Pending
INT - 002099	20/11/2002	SPI1 periodic task overun	Space	SPI	Pending
INT - 002106	20/11/2002	Redu Ranging Problems	Ground	ESA Sta.	Pending
INT - 002107	21/11/2002	TDRS produces gaps in the retrieval, that don't correspond to gaps in the archive	Ground	IMCS	Pending
INT - 002109	23/11/2002	Invalid PSD telemetry	Space	SPI	Pending
INT - 002118	25/11/2002	Autostack crashed	Ground	IMCS	Pending
INT - 002119	25/11/2002	TPF was not delivered	Ground	FDS	Pending
INT - 002120	25/11/2002	MCE stops producing science data	Space	IBIS	Pending
INT - 002121	26/11/2002	ISGRI countrates increase up to 8000 counts/sec in one module	Space	IBIS	Pending
INT - 002116	27/11/2002	SPI Spectra process / cycle stopped	Ground	ISOC	Pending
INT - 002117	27/11/2002	Command releaser failed	Ground	IMCS	Pending