

INTEGRAL
Mission Report
INT-MOC-SYS-RP-1001-TOS-OF
No. 021
Week 07
14.02.03
Routine Phase

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1 General

The Flight Control Team at MOC has compiled this report considering a couple of inputs provided by the Flight Dynamics Team.

It addresses the activities from 08.02.03 until 14.02.03 (both dates inclusive) and covers the revolutions 39, 40 & 41.

2 Summary of Activities

The operations were performed according to the planning inputs from ISOC combined with manual commanding of the instruments by MOC. Some time was dedicated to the upgrade of the on-board S/W for SPI and IBIS and the verification of the instrument functions.

The target of the revolutions was the Crab Nebula (RA 05:34:31.90; DEC +22:00:52.0). Observations consisted of both on-axis and off-axis staring observations.

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

3 Satellite Status

3.1 Platform

The performance of the platform was good. No unexpected behaviour / malfunction was identified.

3.1.1 AOCS

The activity level was low for the AOCS during this week, mostly spent in a few static pointings. The main event to report was a loss of the guide star and mapping abortion that could have been caused by a STR problem, and is under investigation.

The fuel consumption over the last 11 days was 0.19 Kg. The remaining propellant is in the order of 179.14 Kg on the 11th of February.

Note: Some more information concerning the AOCS operations and the fuel budget is provided in the Appendix.

3.1.2 Power

The power subsystem is working as specified. The available power is in the order of 2380 W as since the beginning of the mission, 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.

3.1.4 OBDH

The OBDH subsystem is working flawlessly. No on-board communications problem identified.

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.

A few RF link measurements have been performed in order to identify the available link margin. The analysis of the data is ongoing.

3.2 Payload

3.2.1 SPI

The status of the instrument is nominal.

In this week the instrument was manually operated in order to perform the scheduled Germanium detectors (GeD) annealing cycle and the uplink of the IASW release 4.2.0.

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

3.2.2 IBIS

Status Nominal, verification of the IASW patch on-going. Started CRAB calibration, in-axis off-axis.

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

3.2.3 JEM-X

Change Request PI-OPS-217 was implemented to activate the JEM-X1 high voltages in revolutions 39 to 45.

At the end of revolution 40, at an altitude of about 71000 km and 10 minutes before the execution of the planned JEM-X1 & 2 SAFE TCs, both JEM-X units went to SAFE mode due to high radiation counts reported by IREM.

Note: Some more information concerning the JEM-X operations is provided in the Appendix.

3.2.4 OMC

During this period, OMC operations were interrupted once because of manual SPI activities on DOY 042, which caused transition of OMC to STANDBY mode. OMC remained in STANDBY until the end of the SPI activities and completion of the reaction wheel bias operations.

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

3.2.5 IREM

The status of the unit is nominal.

4 Ground Facilities

The overall performance of the ground segment was good, well above the required 95 %. This concerns the number of executed pointings with respect to the planned pointings and the provision of real-time data to ISDC.

4.1 Mission Operations Centre

The performance of the MOC was good in the reporting period though there were a few problems within the MOC:

- Commands failed the Pre-Transmission Verification (PTV) erroneously;
- IMCS did not restart properly for revolution 42, which impacted the Long Term Archive of the telecommands;
- I/F to ISDC showed interruptions for some time, but the problems disappeared automatically after a while.

Though these problems partially impacted the execution of the Timeline the science related operations were not impacted apart from the distribution of the data to ISDC.

4.2 Ground Stations & Network

The performance of the operational network was in general good though there were a few problems related to the ground stations at Redu and at Goldstone.

The TM / TC link via Redu was disturbed a few times during one day. This was caused by interference due to some tests performed at Redu. The main impact was that some science data were lost. In order to avoid these problems in the future it was agreed to move the tests outside the INTEGRAL coverage periods.

The operations via Goldstone were rather smooth. The main problem concerns still the frequent data drops, which are due to problem sin the communications I/F. The tests that were planned in week 7 to check whether there are possible improvements of the system have not been performed. There is currently no concrete schedule concerning an upgrade of the system.

4.3 Science Ground Segment

4.3.1 ISOC

No ISOC Input has been provided

4.3.2 ISDC

No ISDC Input has been provided

5 Special Events

No special events this week.

6 Anomalies

The problems related to the ground segments are already mentioned in chapter 4. The main problem is still the frequent data gaps when receiving data from Goldstone. It is now envisaged to schedule those operations over Redu that require an uninterrupted TM link. This will be decided on a case by case basis.

The main satellite problem was the loss of the Guide Star. A preliminary analysis indicates that this was caused by the STR Bright Object anomaly that was observed by XMM but was not considered as applicable for INTEGRAL. In this case Saturn was in the FoV of the Star Tracker.

A list of the pending anomalies since Launch is presented in the Appendix. A summary of the new anomalies this week is shown below.

INT - 002218	2003/02/08	Loss of lock at DSS-16	Ground	NASA Sta.	Pending
INT - 002219	2003/02/10	IBIS: PICsIT PDMs counters SET to 0 (twice) during nominal operation	Space	IBIS	Pending
INT - 002220	2003/02/10	Wrong Scrolling Display definitions on IMCS following Import	Ground	IMCS	Pending
INT - 002221	2003/02/10	IBIS: SCI sub-mode table loaded only if forcing the sub-mode	Space	IBIS	Pending
INT - 002222	2003/02/11	Variable duration of RMU_CAL interval in rev 38-43 and missing RMU_CAL in 0042_10.POS	Ground	ISOC	Pending
INT - 002223	2003/02/11	Missing EDs DEBPG200 during HANDOVER interval (Rev 42)	Ground	ISOC	Pending

7 Future Milestones

The SPI annealing is on going.

The observations of the Crab nebula will continue.

8 Appendix

The appendix includes various detailed information.

8.1 Overview of Revolutions

Revolution 39

Revolution 39 consisted of an on-axis staring observation of the Crab (RA 05:34:31.90; DEC +22:00:52.0). During this revolution, the configuration of IBIS was set manually according to the PI Change Requests (IBIS mode EDs scheduled by ISOC were disabled from the Timeline) and SPI was undergoing annealing.

For the first ~29 hours, the TM allocation was 5 SPI, 180 IBIS, 3 JEM-X1, 3 JEM-X2, 4 OMC. Both JEM-X units were in Data Taking mode and OMC was in Standby.

Following this, the TM allocation was changed to 5 S, 167 I, 9 J1, 9 J2, 5 O and a diagnostic dump was performed on JEM-X for approx. 12 hours. OMC was in normal science mode for this observation and remained so for the rest of the revolution. During the last ~20hrs30mins of science observation time (19hrs for JEM-X which was put in SAFE mode at 70000km descending), the TM allocation was set to 5 S, 169 I, 8 J1, 8 J2, 5 O and both JEM-X units were in Data Taking (Full Imaging) mode.

Revolution 40

Revolution 40 consisted of staring observations at three target attitudes in the region of the Crab Nebula. The first was an on-axis staring (RA 05:34:31.90; DEC +22:00:52.0) lasting approximately 34 hours. The TM allocation amongst the instruments was 5 SPI, 169 IBIS, 8 JEM-X1, 8 JEM-X2, 5 OMC for the first 26 hours at this attitude. During this time, a new version of the SPI IASW was loaded. The TM allocation was then changed to 90 S, 84 I, 8 J1, 8 J2, 5 O for the remaining 8 hours and in this time a test was performed on the new SPI IASW. As part of this test, the Broadcast Packet was manipulated manually to simulate a dithering observation.

Following this, an off-axis staring at (RA 05:31:55.80; DEC +31:35:49.1) was performed for about 23 hours followed by a 3hrs40mins off-axis staring at (RA 04:53:24.00; DEC +21:08:37.2). The TM allocation for these observations was 5 S, 169 I, 8 J1, 8 J2, 5 O.

SPI was undergoing passive cooling throughout this revolution and all operations on SPI were performed manually. IBIS EDs were disabled from the Timeline during the instrument window and the configuration was set manually according to PI Change Requests. For all observations, both JEM-X units were in Data Taking (Full Imaging) mode and OMC was in normal science mode.

8.2 Consumables

8.2.1 Detailed Fuel Book-keeping

2003-01-31T20:14:07.000Z	179.3370	F	Automatic TM processing.
2003-02-01T03:38:08.000Z	179.2903	F	Automatic TM processing.
2003-02-02T13:58:11.000Z	179.2864	F	Automatic TM processing.
2003-02-04T03:23:11.000Z	179.2690	F	Automatic TM processing.
2003-02-05T08:40:58.000Z	179.2401	F	Automatic TM processing.
2003-02-05T13:25:06.000Z	179.2115	F	Automatic TM processing.
2003-02-07T03:11:58.000Z	179.1888	F	Automatic TM processing.
2003-02-08T13:12:41.000Z	179.1758	F	Automatic TM processing.
2003-02-10T03:01:09.000Z	179.1609	F	Automatic TM processing.
2003-02-11T13:01:45.000Z	179.1423	F	Automatic TM processing.

This report was generated at Wed Feb 12 08:00:08 GMT 2003

Note: The 4.24kg pressurant has now been removed from the fuel-book - the above list shows ONLY the remaining propellant

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 07/02/2003-13/02/2003

AOCs operations were executed from the Automatic Timeline.

During this period, 6 Open Loop Slews, 10 Closed Loop Slews and 5 Momentum Bias were executed. One slew was missed (last Closed Loop Slew at the end of Rev 40, and no flickering of the OTF has happened).

08/02/03 (Day of Year 039, Revolution 39)

Guide star lost, mapping interrupted: At 13:20:30, during the execution of a mapping, the guide star TM indicated "FREE" and a new mapping was commanded by the ACC. The star was magnitude 5.3, the coordinates (-23526, -1728), and the altitude approximately 153000 Km. It is not possible to make a complete analysis from the TM, but it looks as if the mapping actually stopped before finishing. This, together with the fact that Saturn was present in the FoV, more or less in the area the mapping stopped, and with a magnitude of -0.14, reminds of the XMM STR Bright Object anomaly. A STR Fault Type Register dump will be performed in the next days to confirm or deny this hypothesis.

From the operational point of view, the problem happened during the mapping after the RWB, which is performed in order to update the next slew. Since a new mapping was started autonomously by the ACC, the attitude was updated using the data from the new mapping, and there was no impact.

12/02/03 (Day of Year 043, Revolution 40)

Last Slew and Change of Guide Star of the revolution lost: The command to perform the change of guide star that is part of the Close Loop Slew sequence failed PTV. There was no reason for the failure, since all the conditions were fulfilled. This seems to be an occurrence of a very occasional IMCS problem, where the value of a PTV or a CEV is wrongly calculated by the system. Since there was no time to perform Recover Schedule before LOS, this Close Loop Slew and the subsequent Change of Guide star at the end of the revolution were skipped. This had no impact, since it was a fictitious slew anyway. The only implication is that the change of guide star had to be performed at the start of the next revolution, in order to be tracking the planned star before the RWB.

13/02/03 (Day of Year 044, Revolution 41)

Manual Change of Guide Star command failed: In the manual operation to perform the change of guide star that was missed on the previous day (see above), the PTV for the change guide star command failed. The reason was the occurrence of a STR False Event on the star in slot number 2, at exactly the same time the command was to be up-linked. The command was dispatched again, and the problem had no impact.

8.3.2 SPI Operations

Annealing

During the temperature increase phase to the annealing temperature of 104degC, it was necessary to increase the PSD (Pulse Shape Discriminator) detection thresholds in order to avoid a possible crash of the subassembly due to the high number of false event signals generated by the detector noise.

The annealing at 104degC was carried out between 8th and 9th February, for 36 hours. Afterwards the passive cooling phase started (cooling by passive radiators only).

IASW patch

During the passive cooling the IASW release 4.2.0 was up-linked, the instrument re-started (10th February) and initially tested in Photon by Photon mode with a PST of 90pkts/cycle (11th February).

The patch doesn't solve the problem of the unused TM slot. We could establish that a change in the PST layout create a change in the nr of slot used, but it does not solve the problem:

In conf mode: PST allocated=5 ==> used=5 : TM packets were artificially created with some OR commands

In Photon by Photon:

PST allocated=90 ==> used=89 : nominal PST layout with hot detectors and nominal flight configuration. This configuration produces a lot of events.

PST allocated=90 ==> used=88 : nominal PST layout with modified configuration to lower the number of events (still however to produce more than 90 pkts)

PST allocated=90 ==> used=89 : modified PST layout with no SPI transactions in the first 15 slots and modified configuration to lower the number of events

PST allocated=90 ==> used=87 : modified PST layout with no SPI transactions in the first 30 slots and modified configuration to lower the number of events

Apart the test scheduled for the TM slot unused, some slew/pointings to start the Spectra acquisition were simulated by manually manipulating the BCP. Unfortunately, the total time spent for this test was 5 hours, which doesn't represent the minimum 8 hours necessary for the long duration test, which apparently failed during ground tests of the patch. Furthermore, the number of spectra packets downloaded was not representative (only 86 pkts instead of about 400), and so the effect on the photon buffer filling was not clearly checked.

At the moment, we can conclude that the new functionalities of IASW 4.2.0 were successfully checked in flight, however we will schedule on Sunday 16th and Monday 17th other tests after the camera switch-on to confirm its nominal behaviour.

These test will be initially with spectra off in order to allow the camera performance tests and then with spectra on, to check the photon buffer filling, check the compression duration, stay in dithering mode at least 8 hours, check the PST that will be used for the crab observation (spectra accumulation time will be adapted to the current POS pointing durations).

Cryo-cooler start-up

On 13th February the 4 compressors were successfully re-started after the annealing. Currently they are running with a stroke set to 4x45raw (6.43mm). Current absorption, temperatures, phase between compressors are all nominal.

In order to check if the contamination issue has been solved (or partially solved) thanks to the annealing process, when 90K is reached (on the 17th) the stroke will be set to 4x40 and then at 89.3K to 2x38/2x37 and the evolution of the GeD temperature will be compared with the one after the last stroke tuning on 9th December 2002. The test will also allow to get a feedback to predict the required stroke to stabilise at 85K.

The change request to cool down to 85K has been approved.

8.3.3 IBIS Operations

On DOY 2003.38.19.00Z has been performed the CR PI-OPS-220 in order to fix the IBIS configuration for the CRAB OFF Axis observation on Rev 39.

Reported on DOY 2003. 38.21.18Z the OEM ID 180 Class 2 <<IBIS1 VETO COUNTER BOTTOM EXCEEDS ALERT VALUE>>. The relevant TM_para G6062-63 reported values inside limits and therefore the problem has been disregarded, as suggested by the nominal reaction to this OEM.

On DOY 2003.41.05.10Z has been performed the CR PI-OPS-223 in order to fix the IBIS configuration for the CRAB observation on Rev 39-40.

On DOY 2003.42.08.00Z has been performed the CR PI-OPS-225 in order to fix the IBIS configuration for the CRAB observation in Rev 40.

On DOY 2003.42.16.10Z has been performed the CR PI-OPS-226 in order to fix the IBIS configuration for the CRAB OFF Axis observation in Rev 40-41.

On DOY 2003.043.17.59Z the following VETO real time counters were OOLs HIGH:

TM parameters G6062-63, due to an earlier entry in the radiation belts, estimated 1:30 hours before the Critical Altitude Ascending.

Reported on DOY 2003. 44.02.27Z the OEM ID 167 Class 2<<IBIS1 PICsIT NOISY SEMIMODULE>> outside radiation belt region.

Correction to the information reported in the last report about the position of a GRB out of the FOV on 2003.035.12.45Z:

Using more accurate information derived from the counters of all the instruments on board, the event was outside the FOV: more precisely coming from the platform side -X (since ISGRI and PICsIT vetoed and SPI UCR+LCR+SSA were not showing any significant increase) with a component in the +Z axis (peak in the count rates of SPI-ACS FEE 89 and soft increasing on PDM1-2-3-5-6-7).

Considering the pointing of the satellite at that time and the declared position of the event, it was possible to calculate the correct direction of the source in spacecraft functional frame

X=-0.586745149
Y=-0.073156394
Z=0.8064599256

i.e. the event was coming from the bottom of the detector layer with a strong +Z component, an almost negligible component on -Y and a significant -X component, with an aspect angle (respect -X s/c) >50 deg .

8.3.4 JEM-X Operations

07-Feb-2003, DOY 038, Revolution 39

- Implementation of Change Request PI-OPS-217 to activate JEM-X1 high voltages in revolutions 39 to 45 (inclusive) in order to have both JEM-X units operational in these revolutions.

12-Feb-2003, DOY 043, Revolution 40

- 18:00:07, JEM-X1 and JEM-X2 to SAFE mode due to high radiation counts reported by IREM: BCP RMC#3 = 1. This was at a descending altitude of ~71000 km. The SAFE TCs were planned at 18:10:00 and therefore no recovery action was taken.

8.3.5 OMC Operations

11-Feb-2003, DOY 042, Revolution 40

- 10:45:05, OMC to STANDBY mode and its operations interrupted because the PID was set zero and back to 3 and the OTF was masked and unmasked by ground as part of the manual SPI activities. OMC resumed its normal operations, driven by the timeline, at 13:24:22 after reaction-wheel bias operations and at the start of pointing 00400004.

8.3.6 IREM Operations

The status of the instrument is nominal.

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. 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.

ARid	Date Occurrence	Subject	Segment	Element	Status
INT - 002003	2002/10/19	Command failure from TCE2 at Redu1.	Ground	ESA Sta.	Pending
INT - 002010	2002/10/22	Time correlation not applied correctly to time parameters in TM type 8 reports.	Ground	IMCS	Pending
INT - 002018	2002/10/22	Loss of TM and TC with Goldstone.	Ground	NASA Sta.	Pending
INT - 002024	2002/10/28	OEM: SPI1 Fixed print overflow	Space	SPI	Pending
INT - 002048	2002/11/08	TM Data Retrieval Jobs not executed	Ground	IMCS	Pending
INT - 002055	2002/11/09	IBIS VETO anomalous count rates.	Space	IBIS	Pending
INT - 002061	2002/11/12	TM Desktop performance collapses when de-selecting super-commutated processing.	Ground	IMCS	Pending
INT - 002062	2002/11/13	Static PTV wrongly handled by IMCS when commands are copied	Ground	IMCS	Pending
INT - 002066	2002/11/13	Data routing to ISDS	Ground	I/F to SGS	Pending
INT - 002082	2002/11/13	TM packet production lower than allocation.	Space	SPI	Pending
INT - 002070	2002/11/14	TDRS: data Retrievals cancelled	Ground	IMCS	Pending
INT - 002079	2002/11/14	Timing Problem with Tele-commands	Ground	ESA Sta.	Pending
INT - 002083	2002/11/16	SPI DPE Crash	Space	SPI	Pending
INT - 002091	2002/11/18	A-Chain Frozen	Ground	IMCS	Pending
INT - 002092	2002/11/19	Load-Dump comparison uses also non-released load commands	Ground	IMCS	Pending
INT - 002094	2002/11/19	TDRS does not work with super-commutated parameters	Ground	IMCS	Pending
INT - 002096	2002/11/19	Retrieval from the stations	Ground	IMCS	Pending
INT - 002097	2002/11/19	Unexpected dithering process when SPI spectra accumulation = 0	Space	SPI	Pending
INT - 002121	2002/11/26	ISGRI count-rates increase up to 8000 counts/sec in one module	Space	IBIS	Pending
INT - 002125	2002/11/29	Data loss between IMCS and ISDC	Ground	I/F to SGS	Pending

INT - 002128	2002/12/01	Wheel Speed monitor crashed	Ground	FDS	Pending
INT - 002122	2002/12/02	IBIS VDM4 HV broke down	Space	IBIS	Pending
INT - 002131	2002/12/04	Lost TC capability via Goldstone (Dss-16)	Ground	NASA Sta.	Pending
INT - 002132	2002/12/05	TM/TC loss via REDU	Ground	ESA Sta.	Pending
INT - 002137	2002/12/08	Handover to DSS-16 delayed due to hardware problems	Ground	NASA Sta.	Pending
INT - 002138	2002/12/09	Command failure	Ground	IMCS	Pending
INT - 002139	2002/12/09	Attitude determination Failed	Ground	FDS	Pending
INT - 002142	2002/12/11	TDRS Time Interval Setting	Ground	IMCS	Pending
INT - 002145	2002/12/15	Commands failing PTV for no reason	Ground	IMCS	Pending
INT - 002152	2002/12/18	NCTRS-A required resetting	Ground	NCTRS	Pending
INT - 002157	2002/12/20	Lost VC-7 from NCTRS	Ground	NCTRS	Pending
INT - 002174	2002/12/29	Wrong GuideStar selected.	Space	Spacecraft	Pending
INT - 002183	2003/01/01	Dyn PTV failure	Ground	IMCS	Pending
INT - 002169	2003/01/03	IREM s/w local resets due to SEU (twice)	Space	IREM	Pending
INT - 002191	2003/01/11	FDS not able to update slew parameters	Ground	FDS	Pending
INT - 002194	2003/01/16	Wrong handling of the OTF after Open Loop Slew	Space	Spacecraft	Pending
INT - 002196	2003/01/17	Automatic Stack Needed to be restarted.	Ground	IMCS	Pending
INT - 002199	2003/01/17	Incorrect handling of CLCW wraparound in CLTU mode	Ground	ESA Sta.	Pending
INT - 002197	2003/01/20	Lost Tele-commanding via REDU	Ground	IMCS	Pending
INT - 002200	2003/01/20	TM/TC Link lost via REDU	Ground	ESA Sta.	Pending
INT - 002203	2003/01/21	Telemetry Drops from Goldstone	Ground	NASA Sta.	Pending
INT - 002202	2003/01/22	NCTRS log file writing takes all the CPU making the application fail.	Ground	NCTRS	Pending
INT - 002205	2003/01/24	Telemetry Drops from Goldstone	Ground	NASA Sta.	Pending
INT - 002206	2003/01/25	Link lost to ISDC.	Ground	I/F to SGS	Pending
INT - 002204	2003/01/27	Incorrect eclipse times in BCPKT.	Ground	FDS	Pending
INT - 002207	2003/01/27	TM and TC lost due to COMMS problems	Ground	COMMS	Pending
INT - 002208	2003/01/27	Autostack: Commands that fail release do not apply any further interlock.	Ground	IMCS	Pending
INT - 002209	2003/01/27	Loss of TM/TC via DSS-24	Ground	NASA Sta.	Pending
INT - 002210	2003/01/27	Telemetry loss via DSS-24	Ground	NASA Sta.	Pending

INT - 002211	2003/01/28	Manual Stack crashed on SUN-123	Ground	IMCS	Pending
INT - 002212	2003/01/29	TDRS Interval-by-Interval TM Retrieval Problem	Ground	IMCS	Pending
INT - 002213	2003/01/29	SCOS 2000 Interval-by-Interval TM Retrieval Problem	Ground	IMCS	Pending
INT - 002214	2003/01/29	Drop in telemetry from REDU	Ground	ESA Sta.	Pending
INT - 002215	2003/01/30	Occasional TM drops on DSS-16	Ground	NASA Sta.	Pending
INT - 002216	2003/01/31	TPF generation failed	Ground	FDS	Pending
INT - 002217	2003/02/06	TC link drop	Ground	NASA Sta.	Pending
INT - 002218	2003/02/08	Loss of lock at DSS-16	Ground	NASA Sta.	Pending
INT - 002219	2003/02/10	IBIS: PICsIT PDMs counters SET to 0 (twice) during nominal operation	Space	IBIS	Pending
INT - 002220	2003/02/10	Wrong Scrolling Display definitions on IMCS following Import	Ground	IMCS	Pending
INT - 002221	2003/02/10	IBIS: SCI sub-mode table loaded only if forcing the sub-mode	Space	IBIS	Pending
INT - 002222	2003/02/11	Variable duration of RMU_CAL interval in rev 38-43 and missing RMU_CAL in 0042_10.POS	Ground	ISOC	Pending
INT - 002223	2003/02/11	Missing EDs DEBPG200 during HANDOVER interval (Rev 42)	Ground	ISOC	Pending