

# ANOMALIES (01.01.2007 - 31.12.2007)

On June 22 2003 the ERS-2 tape recorder became permanently unavailable due to a technical failure. The ERS-2 tape recorders were used to record the ERS-2 Low Rate mission globally. After eight years of continuous acquisition, this service was discontinued. The ERS-2 Low Rate mission is continued within the visibility of ESA ground stations over Europe, North Atlantic, the Arctic, Antarctica and western North America.

Additionally the DLR Antarctic Receiving Station at the O'Higgins base is providing GOME data in near-real time since 22 October 2003, allowing the monitoring of the ozone hole over the South Pole to resume; during year 2006 two new stations have been added Hobart (13 February 2006), and Singapore (18 October 2006). In 2007 the station of Chetumal (Mexico, 19 October 2007) has been added. Currently GOME data are acquired at the following ground stations:

Kiruna (Sweden), Maspalomas (Canary Islands, Spain), Gatineau and Prince Albert (Canada), McMurdo (Antarctica), Matera (Italy), Singapore, Beijing (China), Miami (USA), Chetumal (Mexico), Hobart (Tasmania), O'Higgins (Antarctica)

Special GOME operations such as the operational switch off/switch-on in time tag (on calendar days 04, 14, 24 each month) are continued also after the unavailability of the tape recorders. Nevertheless due to the non completeness of data, analysis on cooler switchings and instrument switch-offs cannot be performed and detailed information is missing in the tables below.

After the high number of GOME Lamp Failures occurrences up to June 2004, the calibration lamp usage was reduced to Quarterly Calibration and special timelines (TST44) after an instrument switch-off with warm detectors.

Quarterly calibration is operated in the following way:

5 Calibration orbits are scheduled for 28 January, 28 April, 28 July, 28 October each calendar year started in October 2004.

The yearly report gives an overview on Lamp Failures as well as on nominal executed calibration lamp sequences.

**listed are:**

- 1. single event upsets**
- 2. patches of the on-board software**
- 3. cooler switchings**
- 4. list of datagaps due to anomalies or special GOME instrument operations**
- 5. timeline interruption (operation in static nadir view)**
- 6. narrow swath timeline GMNNOT41**
- 7. commanding problems - incorrect timelines executions**
- 8. moon measurements**
- 9. lamp failures**
- 10. Calibration Lamp Sequences without Lamp Failure**
- 11. other events**

**single event upsets:**

| Date | reason |
|------|--------|
|------|--------|

|             |   |
|-------------|---|
| 24/01/07    | <p>GOME anomalous behavior during orbits 61501, ~13:30 - 14:35</p> <ul style="list-style-type: none"> <li>- 3xNack flag is set contiguously</li> <li>- scan mirror position is set to 261.8deg contiguously (no scanning)</li> <li>- increase of thermal environment related to scan mirror (scan mirror unit, scan motor, etc)</li> </ul> <p>this anomaly was cured with a time tag GMN11, switch off/on of GOME at 14:35:44, data starting with orbit 61502 are nominal again</p>         |
| 14/08/07    | <p>GOME anomalous behavior during orbits 64395-64396, ~17:00 - 20:20</p> <ul style="list-style-type: none"> <li>- 3xNack flag is set contiguously</li> <li>- scan mirror position is set to 261.8 deg continuously (no scanning)</li> <li>- increase of thermal environment related to scan mirror (scan mirror unit, scan motor, etc)</li> </ul> <p>this anomaly was cured with a time tag GMN11, switch off/on of GOME at 20:18:39, data starting with orbit 64397 are nominal again</p>  |
| 19-20/09/07 | <p>GOME anomaly , start 19/09 Orbit 64906, ca. 11:00 until 20/09 09:17:36</p> <ul style="list-style-type: none"> <li>- integration times all channels not as expected (constant value of about 0.1)</li> <li>- co-adding flags not set</li> <li>- channel readouts decreased</li> </ul> <p>GOME switch-off/on executed on day 20/09 09:16:36 cured successfully the anomaly</p>   |
| 04/12/07    | <p>GOME anomalous behavior during orbits 65995-65996, ~12:00 - 15:00</p> <ul style="list-style-type: none"> <li>- 3xNack flag is set contiguously</li> <li>- scan mirror position is set to 261.4 deg continuously (no scanning)</li> <li>- increase of thermal environment related to scan mirror (scan mirror unit, scan motor, etc.)</li> </ul> <p>this anomaly was cured with a time tag GMN11, switch off/on of GOME at 15:08:20, data starting with orbit 65997 are nominal again</p> |

**patches of the on-board software:** none

**cooler switchings:**

| Date     | coolers off/on              | maximum detector warm up temperature [Kelvin]                |
|----------|-----------------------------|--|
| 30/03/07 | 00:21:26 off<br>09:24:34 on | FPA 1: 267.3<br>FPA 2: 268.2<br>FPA 3: 268.1<br>FPA 4: 268.1 |
| 13/07/07 | 04:29:18 off<br>11:01 on    | FPA 1: 272.7<br>FPA 2: 273.7<br>FPA 3: 273.5<br>FPA 4: 273.7 |

|          |  |  |
|----------|--|--|
| 29/10/07 | 02:15:58 off<br>11:16:18 on<br>i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 i <sub>c</sub> 1/2 | FPA 1: 275,4<br>FPA 2: 276,3<br>FPA 3: 276,1<br>FPA 4: 276,3 |
|----------|--|--|

**list of datagaps due to anomalies or special GOME instrument operations:** (For detailed information see monthly performance)

| Date     | Orbit                            | duration (GOME off/start of nominal operations)        | reason  |
|----------|----------------------------------|--|---|
| 30/03/07 | 62424 - 62429 i <sub>c</sub> 1/2 | 00:21:26 i <sub>c</sub> 1/2 - i <sub>c</sub> 1/2 09:21 | GOME switch off<br>i <sub>c</sub> 1/2 (see ER2-UNA2007/008)                       |
| 13/07/07 | 63929 - 63933                    | 04:29:18 - 11:01                                       | GOME switch off<br>(see unavailability report ER2-UNA2007/016)                    |
| 29/10/07 | 65474 - 64477                    | 02:53:12 - 08:07:06                                    | data gap due to instrument switch-off (see unavailability report ER2-UNA2007/023) |

**Timeline Interruption (operations in static nadir view):**

| Date     | Orbit No.   | duration                             | reason   |
|----------|-------------|--------------------------------------|--|
| 13/04/07 | 62630       | 10:29:21 i <sub>c</sub> 1/2 11:50:20 | GOME in Nadir Static View (see ER2-UNA 2007/009) due to PL synchronization |
| 22/05/07 | 63193-63194 | 18:38:35 i <sub>c</sub> 1/2 19:44:15 | GOME in Nadir Static View (see ER2-UNA 2007/009) due to PL synchronization |
| 10/06/07 | 63460       | 10:07:30 - 11:23:18                  | GOME in Nadir Static View (see ER2-UNA 2007/012) due to PL synchronization |
| 12/06/07 | 63489       | 10:44:30 -12:00:36                   | GOME in Nadir Static View (see ER2-UNA 2007/013) due to PL synchronization |
| 15/06/07 | 63532       | 11:09:00 - 12:06:18                  | GOME in Nadir Static View (see ER2-UNA 2007/014) due to PL synchronization |
| 19/07/07 | 64018       | 09:37:35 i <sub>c</sub> 1/2 10:57:54 | GOME in Nadir Static View (see ER2-UNA 2007/017) due to PL synchronization |

**Narrow Swath Timeline GMNNOT41**

| Date        | Orbit No.                      | Duration                              |
|-------------|--------------------------------|---------------------------------------|
| 04-05/01/07 | 61214 i <sub>c</sub> 1/2 61229 | ~12:00 (04/01/07) - ~13:30 (05/01/07) |
| 14-15/01/07 | 61358 i <sub>c</sub> 1/2 61371 | ~13:30 (14/01/07) - ~11:00 (15/01/07) |
| 24-25/01/07 | 61502 i <sub>c</sub> 1/2 61515 | ~15:00 (24/01/07) - ~13:00 (25/01/07) |

|             |                              |                                       |
|-------------|------------------------------|---------------------------------------|
| 04-05/02/07 | 61658 i <sub>c</sub> ½ 61671 | ~12:00 (04/02/07) - ~10:00 (05/02/07) |
| 14-15/02/07 | 61802 i <sub>c</sub> ½ 61816 | ~14:00 (14/02/07) - ~13:00 (15/02/07) |
| 24-25/02/07 | 61944 i <sub>c</sub> ½ 61959 | ~14:00 (24/02/07) - ~13:00 (25/02/07) |
| 04-05/03/07 | 62062i <sub>c</sub> ½ 62076  | ~18:00 (04/03/07) - ~15:30 (05/03/07) |
| 14-15/03/07 | 62204 i <sub>c</sub> ½ 62217 | ~16:00 (14/03/07) - ~13:30 (15/03/07) |
| 24-25/03/07 | 62348 i <sub>c</sub> ½ 62361 | ~17:30 (24/03/07) - ~15:00 (25/03/07) |
| 04-05/04/07 | 62508i <sub>c</sub> ½ 62521  | ~21:30 (04/04/07) - ~19:30 (05/04/07) |
| 14-15/04/07 | 62650 i <sub>c</sub> ½ 62663 | ~19:30 (14/04/07) - ~17:30 (15/04/07) |
| 24-25/04/07 | 62794 i <sub>c</sub> ½ 62807 | ~21:00 (24/04/07) - ~19:00 (25/04/07) |
| 04-05/05/07 | 62936i <sub>c</sub> ½ 62949  | ~19:00 (04/05/07) - ~17:00 (05/05/07) |
| 14-15/05/07 | 63079i <sub>c</sub> ½ 63093  | ~20:30 (14/05/07) - ~18:00 (15/05/07) |
| 24-25/05/07 | 63222 i <sub>c</sub> ½ 63237 | ~19:00 (24/05/07) - ~19:00 (25/05/07) |
| 04-05/06/07 | 63380i <sub>c</sub> ½ 63393  | ~19:30 (04/06/07) - ~17:00 (05/06/07) |
| 14-15/06/07 | 63524i <sub>c</sub> ½ 63537  | ~21:00 (14/06/07) - ~19:00 (15/06/07) |
| 24-25/06/07 | 63666 i <sub>c</sub> ½ 63679 | ~19:00 (24/06/07) - ~17:00 (25/06/07) |
| 04-05/07/07 | 63810i <sub>c</sub> ½ 63823  | ~20:30 (04/07/07) - ~18:00 (05/07/07) |
| 14-15/07/07 | 63952 i <sub>c</sub> ½ 63967 | ~18:30 (14/07/07) - ~19:30 (15/07/07) |
| 24-25/07/07 | 64096 i <sub>c</sub> ½ 64109 | ~20:00 (24/07/07) - ~18:00 (25/07/07) |
| 04-05/08/07 | 64254i <sub>c</sub> ½ 64267  | ~21:00 (04/08/07) - ~19:00 (05/08/07) |
| 14-15/08/07 | 64397i <sub>c</sub> ½ 64409  | ~20:30 (14/08/07) - ~17:00 (15/08/07) |
| 24-25/08/07 | 64540 i <sub>c</sub> ½ 64553 | ~20:30 (24/08/07) - ~18:00 (25/08/07) |
| 04-05/09/07 | 64698i <sub>c</sub> ½ 64711  | ~21:00 (04/09/07) - ~19:00 (05/09/07) |
| 14-15/09/07 | 64840i <sub>c</sub> ½ 64853  | ~19:30 (14/09/07) - ~19:00 (15/09/07) |
| 24-25/09/07 | 64984 i <sub>c</sub> ½ 64997 | ~21:00 (24/09/07) - ~18:30 (25/09/07) |
| 04-05/10/07 | 65124i <sub>c</sub> ½ 65137  | ~15:30 (04/10/07) - ~13:00 (05/10/07) |
| 14-15/10/07 | 65268i <sub>c</sub> ½ 65281  | ~17:00 (14/10/07) - ~15:00 (15/10/07) |
| 24-25/10/07 | 65408 i <sub>c</sub> ½ 65423 | ~12:00 (24/10/07) - ~12:30 (25/10/07) |
| 04-05/11/07 | 65566i <sub>c</sub> ½ 65579  | ~12:30 (04/11/07) - ~10:30 (05/11/07) |
| 14-15/11/07 | 65710i <sub>c</sub> ½ 65723  | ~14:30 (14/11/07) - ~12:00 (15/11/07) |
| 24-25/11/07 | 65852 i <sub>c</sub> ½ 65865 | ~11:00 (24/11/07) - ~10:00 (25/11/07) |
| 04-05/12/07 | 65997i <sub>c</sub> ½ 66010  | ~15:00 (04/12/07) - ~13:00 (05/12/07) |
| 14-15/12/07 | 66138i <sub>c</sub> ½ 66153  | ~11:30 (14/12/07) - ~13:00 (15/12/07) |
| 24-25/12/07 | 66282 i <sub>c</sub> ½ 66295 | ~12:00 (24/12/07) - ~11:00 (25/12/07) |

**Commanding Problems i<sub>c</sub>½ Incorrect Timelines Executions:**

|          |             |   |
|----------|-------------|---|
| 28/08/07 | 64150       | North Polar View Timeline                         |
| 29/10/07 | 65480-65486 | TML 3 (CAT) executed due to timeline upload error |
| 30/10/07 | 65487-65493 | TML 3 (CAT) executed due to timeline upload error |

**Moon Measurements: none**

**Lamp Failures:**

| Date     | Lamp Failure / Orbit   | remark  |
|----------|--|---|
| 28/01/07 | Lamp Failure<br>(no. 200 i <sub>c</sub> /2 204)<br>Orbit 61558 i <sub>c</sub> /2 61561 | Lamp Failures set during quarterly calibration sequences, voltage reached only a value of about 179 V   |
| 30/03/07 | Lamp Failure<br>(no. 205)<br>Orbit 62429   | Lamp Failures set during TST44, voltage decreased abruptly to a value of about 180 V 09:22:52 - 09:24:33  |
| 28/04/07 | Lamp Failure<br>(no. 206 i <sub>c</sub> /2 208)<br>Orbit 62850 i <sub>c</sub> /2 62852 | Lamp Failures occurred during quarterly calibration sequences, voltage at a value of ca. 182 V instead of nominally 198 V   |
| 29/04/07 | Lamp Failure<br>(no. 209)<br>Orbit 62853   | Lamp Failures occurred during quarterly calibration sequences, voltage at ca. 180 V instead of nominally 198 V (stop time cannot be analyzed as not inside ground station visibility) |
| 28/07/07 | Lamp Failure<br>(no. 210 i <sub>c</sub> /2 211)<br>Orbit 64154 i <sub>c</sub> /2 64155 | Lamp Failures occurred during quarterly calibration sequences.  |
| 29/07/07 | Lamp Failure<br>(no. 212 - 221)<br>Orbit 64155 i <sub>c</sub> /2 64158                 | Lamp Failures occurred during quarterly calibration sequences   |
| 29/10/07 | Lamp Failure<br>(no 222)<br>Orbit 65479  | TST 44 i <sub>c</sub> /2 Lamp Failure flag i <sub>c</sub> /2 between 11:14:37 - 11:16:19, voltage reached a value of ~180 V i <sub>c</sub> /2 nominal would be ~200 V                 |
| 29/10/07 | Lamp Failure<br>(no. 223 i <sub>c</sub> /2 231)<br>Orbit 65480 i <sub>c</sub> /2 65486 | Lamp Failures occurred during TML 3 (CAT) calibration sequences   |
| 30/10/07 | Lamp Failure<br>(no. 232 i <sub>c</sub> /2 237)<br>Orbit 65487 i <sub>c</sub> /2 65492 | Lamp Failures occurred during TML 3 (CAT) calibration sequences   |

### Calibration Lamp Sequences without Lamp Failure:

| Date     | Orbit | remark  |
|----------|-------|---|
| 28/01/07 | 61559 | 14:15:22 i <sub>c</sub> /2 i <sub>c</sub> /2 14:23:00 i <sub>c</sub> /2<br>Calibration lamp sequence without lamp failure but calibration lamp instability, voltage alternating between 198 V and 180 V (mainly at 180 V) i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 i <sub>c</sub> /2 |
| 28/01/07 | 61559 | 15:29:38 i <sub>c</sub> /2 i <sub>c</sub> /2 15:39:29<br>Calibration lamp sequence without lamp failure but calibration lamp instability, voltage mainly at 180 V (decrease from 198V short after ignition)   |
| 28/01/07 | 61560 | 16:32:23 i <sub>c</sub> /2 16:37:07 i <sub>c</sub> /2<br>Calibration lamp sequence without lamp failure but calibration lamp instability, voltage at 182 V instead of nominally 198V  |
| 28/01/07 | 61560 | 17:10:08 i <sub>c</sub> /2 i <sub>c</sub> /2 after 17:19:59 i <sub>c</sub> /2<br>Calibration lamp sequence without lamp failure but calibration lamp instability, i <sub>c</sub> /2 voltage decreased to 180 V shortly after lamp ignition  |



|          |       |  |
|----------|-------|--|
| 29/07/07 | 64158 | 04:11:41 i_c/2i_c/2 04:11:45i_c/2<br>Calibration lamp sequence without lamp failure but calibration lamp instability, voltage at ca. 177 V instead of nominally 198V   |
| 28/10/07 | 65466 | Calibration lamp sequence without lamp failure but calibration lamp instability, some values at ca 180 V instead of nominal staying at 198 V<br>lampcal mode start 13:24:47 stop after 13:34:47 (no visibility gs) i_c/2<br>voltage at ca. 180 V (nominal would be 198 V)<br>i_c/2lampcal mode start 14:07:48 stop after 14:17:46 (no visibility gs) i_c/2i_c/2<br>some values at ca. 180 V (nominal would be 198 V)i_c/2i_c/2<br>lampcal mode start 14:34:16 stop after 14:40:40 (no visibility gs) |
| 28/10/07 | 65467 | 15:05:26i_c/2 i_c/2i_c/2 15:15:23<br>Calibration lamp sequence without lamp failure and without lamp instability   |
| 28/10/07 | 65467 | 15:48:24i_c/2 i_c/2i_c/2 15:58:20<br>Calibration lamp sequence without lamp failure and without lamp instability   |
| 28/10/07 | 65468 | 16:46:01i_c/2 i_c/2i_c/2 16:55:59<br>Calibration lamp sequence without lamp failure and without lamp instability   |
| 28/10/07 | 65468 | 17:29:01i_c/2 i_c/2i_c/2 17:38:58<br>Calibration lamp sequence without lamp failure and without lamp instability   |
| 28/10/07 | 65469 | 18:11:52 i_c/2i_c/2 18:14:21<br>Calibration lamp sequence without lamp failure and without lamp instability  |
| 28/10/07 | 65470 | Calibration lamp sequence without lamp failure but calibration lamp instability, some values at ca 181 V instead of nominal staying at 198 V<br>lampcal mode start 19:50:23 stop after 19:54:59i_c/2 (no visibility gs)<br>voltage at ca. 181 V (nominal would be 198 V)<br>lampcal mode start 20:50:14 stop after 20:51:00 (no visibility gs)<br>some values at ca. 181 V (nominal would be 198 V)  |
| 28/10/07 | 65471 | 21:23:10 i_c/2i_c/2 21:35:34<br>Calibration lamp sequence without lamp failure and without lamp instability  |

## Other Events

| Date                       | Orbit             | remark  |
|----------------------------|-------------------|---|
| 10/03/07-02/05/07          | 62142 - 62896     | GOME North Polar View operations                    |
| 13/07/07                   | 63932             | GOME in Idle Mode                                   |
| 05/09/07 i_c/2<br>31/10/07 | 64712 i_c/2 65514 | GOME South Polar View operations                    |
| 19/10/07                   |                   | Activation of the ground station Chetumal i_c/2(CM) |
| 29/10/07                   | 65478             | GOME in Idle Mode                                   |

