

ILRS

Governing Board Meeting

September 28, 2007

12:30-14:30



Palais des Congrès
Grasse, France

ILRS Governing Board Meeting

Friday, September 28, 2007
12:30 – 14:30

Agenda

- | | |
|---|----------------------|
| 1. Opening Remarks (5 min.) | W. Gurtner |
| 2. ILRS Status/Action Items (20 min.) | M. Pearlman |
| 3. Working Group Actions (5 min. each) | WG Chairs |
| a. Analysis | E. Pavlis/C. Luceri |
| b. Missions | G. Appleby |
| c. Data Formats and Procedures | W. Seemueller |
| d. Networks and Engineering | G. Kirchner |
| e. Transponders | U. Schreiber |
| 4. Galileo Support (5 min.) | W. Gurtner |
| 5. Laser Retroreflector Recommendation Update (10 min.) | M. Pearlman |
| 6. Future Workshops (10 min.) | M. Pearlman |
| 7. Journal of Geodesy special issue (5 min.) | E. Pavlis |
| 8. New Business | W. Gurtner/WG Chairs |
| 9. Other Business | W. Gurtner |



ILRS Governing Board

Ex-Officio Members:

| | |
|--------------------------------|-----------------|
| Director, Central Bureau: | Mike Pearlman |
| Secretary, Central Bureau: | Carey Noll |
| President of IAG Commission I: | Zuheir Altamimi |

Members Appointed or Elected by Organizations:

| | |
|----------------------------------|--|
| EUROLAS Network Representatives: | Giuseppe Bianco Werner Gurtner, Chair |
| NASA Network Representatives: | David Carter Jan McGarry |
| WPLTN Representatives: | Yang Fumin Hiroo Kunimori |
| IERS Representative: | Bob Schutz |

Members Elected by their International Peers:

| | |
|-----------------------------|-----------------------------------|
| Analysis Representatives: | Erricos Pavlis Vincenza Luceri |
| Data Center Representative: | Wolfgang Seemueller |
| LLR Representative: | Juergen Mueller |
| At-Large Representatives: | Georg Kirchner Graham Appleby |

Former Members:

Francois Barlier (former At-Large Member, 1998-2000)
Gerhard Beutler (former CSTG President, 1998-1999)
John Bosworth (former Director, ILRS Central Bureau, 1998-2001)
John Degan (former Chairman and NASA Network Representative, 1998-2002)
Herman Drewes (former President of IAG Commission I, 1998-2006)
Richard Eanes (former Analysis Center Representative, 1998-2000)
Yang Fumin (former WPLTN Network Representative, 1998-2002)
Ben Greene (former WPLTN Network Representative, 2002-2006)
John Luck (former At-Large Member, 1998-2002)
Ron Noomen (former Analysis Center Representative, 1998-2006)
Wolfgang Schlueter (former EUROLAS Network Representative, 1998-2002)
Ulrich Schreiber (former At-Large Member, 2002-2006)
Peter Shelus (former LLR Representative, 1998-2006)

ILRS Governing Board ILRS Status Review

Network Items:

- EUROLAS
 - FTLRS
 - Working with colleagues at Canberra and Hobart universities to collaborate on FTLRS occupation in Tasmania for Jason-1 calibration/validation (occupation in ~11/2007-04/2008)
- WPLTN
 - SALRO
 - Interest in joint activity with IGN to include DORIS beacon and site survey
 - Wuhan
 - Off-line since 12/18/2005
 - TROS
 - 3+-month tracking campaign in Korea planned for 2007
 - Simosato
 - System down since 06/2007 due to problem with laser controller unit; funding issues may prevent immediate repair
 - GPS receiver (SMST) to join IGS soon
 - San Juan
 - Station contacted CB for GPS receiver and upgrade recommendations; letter sent to Drs. Lu Yong-xiang and Cao Jian-lin
 - Russian network
 - Data cannot be released due to an old law forbidding release of precise (30m) site coordinates; affects new stations, Komosomolsk
 - Mendeleev, not operational since 2002 and will most likely not operate in future
- NASA
 - CPF operational at all NASA systems with the exception of MOBLAS-8 (Tahiti) and TLRS-3 (Arequipa)
 - Restricted tracking procedures installed at TLRS-4 (Haleakala) and TLRS-3 (Arequipa)
 - Tahiti
 - System down since 03/2007; awaiting repair
 - White paper on system being developed for NASA HQ; new agreement in process
 - NGSLR (Next Generation SLR, formerly SLR2000)
 - No additional money received in 2007 for prototype completion
 - Still no word on funding for replacement of MOBLAS systems with NGSLR
 - Satellite tracking at night with eye-safe laser is essentially hands-off (open-loop) for LEO and LAGEOS
 - Still working the automated closed-loop tracking
 - LRO-LR laser and radar are installed and in testing; expect to track satellites with LRO laser soon

Site Surveys:

- Haleakala survey of new location completed 10/2006; preliminary data released
- Arequipa survey completed in 04/2007; final survey report released
- Survey analysis comparison underway with GA, INAF and HTSI using Yarragadee and Medicina survey data

Analysis and Data Issues:

- GA accepted as official ILRS Analysis Center (04/2007)
- Benchmark evaluations of GRGS and University of Newcastle solutions continue
- Reanalysis of older LAGEOS data (1976-1992) submitted from ASI, JCET, GA, and NERC; input of early data from DGFI, GFZ in process; combination underway
- Pilot Test Project for QA assessment activity for new stations based on data quality, reliability, stability being defined by the
- SLR scaled ITRF 2005 issued

ILRS Status Review (continued)

Mission Items:

- Galileo
 - GIOVE-A
 - Request received from for six campaigns from 06/2007 to 03/2008
 - Second campaign currently underway
 - GIOVE-B (GSTB v2/B) launch scheduled for 12/2007
- GPS satellites
 - Dialog continues on placement of reflectors on GPS-III satellites
 - IAG endorses reflectors on all GNSS satellites
- GLONASS
 - GLONASS-102 replaced GLONASS-89 in ILRS tracking roster (05/2007)
- ANDE-RR
 - NRL working to improve presently poor predictions using SLR data
- TerraSAR-X
 - Launched 06/15/2007
- LRO-LR
 - Launch scheduled for October 2008
 - Mission support request submitted and approval by GB underway
 - Support solicited from network stations
 - Splinter meeting with stations interested in participating at Fall ILRS Workshop
- T2L2
 - Instrument on Jason-2; launch planned for June 2008
 - Jason-2 mission support request submitted and approved (07/2007)
- ETS-8
 - Predictions highly variable; best quality when experiments are underway
 - Models for solar radiation and drag may be problematic; unannounced maneuvers also a problem
 - Reasonable amount of data received (418 pass segments since 03/2007)
- GOES-R
 - Recent inquiry on possible inclusion of retroreflector on geostationary satellite
- Other new missions: COMPASS, Sentinel, SARAL (end 2009), HY2A (China/France)

Retroreflectors for GNSS Satellites

- Study underway at GSFC on hollow cube technology; D. Arnold working on array performance studies
 - Hollow cubes (in quartz) for mechanical testing due early October; Zerodur cubes due in November
 - Test setup at GGOA being defined
- INFN chamber ready for tests
 - LAGEOS sector and GPS array at INFN for testing in early October
- ILRS specification document created; specification needs modification for the higher Galileo satellites

ILRS Web Site:

- New sections to station and satellite pages showing tracking by station/satellite (see below)
- CoM pages continue to be updated (new values for GFO-1 and ERS-2)

Reports:

- ILRS 2005-2006 report
 - In assembly process at GSFC
 - Publish early fall 2007

ILRS Status Review (continued)

Operations:

- Predictions (CPF Implementation)
 - Status of CPF implementation
 - All but a few active SLR stations converted
 - MLRS converted for LLR
 - LRO CPF predictions in testing
 - TIV generation is not guaranteed beyond the end of 2007
- Consolidated Laser Ranging Data (CRD) format:
 - Format and test data are available on ILRS Website
 - Pilot implementations by MLRS, Stromlo, and JCET are underway; a few changes to the format are being worked as a result of these tests
 - Working toward a way of accepting and providing CRD files at CDDIS and EDC through operations centers (HTSI, EDC)
 - LRO will accept and create CRD files
 - Near term goals:
 - Have HTSI/CDDIS and EDC able to accept and make available CRD files by end of year
 - Have all consequential revisions to the format completed by end of year
 - Flow CRD (and old format) data from at least 2 stations by end of year
 - Have at least 2 analysis groups examining the CRD data by end of year
 - Have all LRO observing stations and the LRO analysis center able to produce CRD files by launch (late 2008)
 - Assess progress by EGU next spring and recommend goals for network-wide implementation

Meetings:

- September 25-28, 2007: Fall ILRS Workshop and associated ILRS meetings, Grasse France
- December 10-14, 2007: Fall AGU, San Francisco CA
 - Unified Analysis Workshop (12/05-07/2007) (Pavlis, Luceri, Sciarretta, Appleby, H. Müller, J. Müller are ILRS reps)
- March 03-07, 2008: Fifth IVS General Meeting, St. Petersburg Russia
- April 13-18, 2007: EGU, Vienna Austria
- June 02-08, 2008: IGS Analysis Workshop, Miami Beach FL
- September 22-26, 2008: 16th International Workshop on Laser Ranging, Posnan Poland
- 2009: IAG Scientific Assembly, Buenos Aires Argentina
- 2011: IUGG General Assembly, Melbourne Australia

Other Items:

- GGOS
 - GGOS accepted as permanent activity of the IAG
 - ILRS, IVS, IGS, IDS, IERS are all basic elements of GGOS
 - GGOS 2020 reference document detailing the role of GGOS in Earth Science activities is being circulated for comment
 - Activities of the Ground Networks and Communications Working Group continue
 - Scope the size and capability of the ground network of co-located SLR, VLBI, GNSS, and DORIS systems
 - Examine options for ground survey monitoring of co-located instruments
 - Next Steering Committee Meeting is schedule for Frascati Italy, November 5-6, 2007

Remaining Governing Board Action Items

EGU, Vienna Austria (April 26, 2005):

1. CB will contact the IAG Outreach to suggest that the IAG make its participants aware of the issue of service recognition issue in publications, papers, reports, and presentations.
 - IGS, IVS, ILRS, and IDS continue to work on a joint activity to:
 - Jointly request that the IAG take positive action (Web site notice, messages to the community, etc) to activate its community;
 - Consider contacting relevant journals and journal referees to help enforce this citation.
2. CB should browse all existing mission Web sites and search for references to the service and information about the role of SLR for the mission; if not found, have webmasters add it.
 - Webmasters contacted; summary of results provided separately here
3. A subgroup of technology and science representatives should write a white paper on the future vision for SLR. (*assigned 04/2005*)
4. Appleby will provide station signal strength regimes to the CB for placement in the site logs with perhaps a separate table automatically updated/extracted and linked to the CoM pages on the ILRS Web site. The information is not in the site log now so the format will have to be modified. (*assigned 04/2005*)
5. An ILRS orbit product committee should be formed to develop a plan for the new product (Noomen). (*assigned 04/2005*)
6. Review data analysis/station feedback capabilities within the ILRS. (*assigned 04/2005*)
 - DGFI will propose a procedure to incorporate inputs from analysis groups, assess quality of stations, provide feedback to the station on a best-possible epoch station position and velocity (to be included in the site log, by the station), and report on plans in Canberra
 - ASI will use the combination results to develop a review process and develop a simple report which gives an overview of (LAGEOS) data production and their use for the pos+eop product, for submission to stations and managers (*Noomen, Luceri, Gurtner*).

Eastbourne UK (October 10, 2005):

1. Examine the issue of the internal SLR reference frame. (Noomen) (*assigned 11/2005*)
2. Examine the eccentricity files to see if they could serve as a source for the list of key information. (Noomen) (*assigned 11/2005*)
3. Consolidate the presentations to Geoscience Australia into a 1 hour talk (*assigned 11/2005*)

Vienna, Austria (April 26, 2006):

1. Establish the ILRS Special Issue editorial board. (Noomen) (*assigned 04/2006*)

Canberra, Australia (October 19, 2006):

1. Check with DGFI on the status of a data performance feed back system for the stations. (Pearlman) (*assigned 10/2006*)
2. Organize a joint AWG/N&E activity to assess the site-tie situation and develop a plan of action. (Bianco) (*assigned 10/2006*)

Vienna, Austria (April 16, 2007):

1. Pavlis will provide contacts to Appleby for known future missions requiring ILRS tracking support; Appleby will contact these missions and inform them of ILRS requirements for support requests. (*assigned 04/2007*)

ILRS Satellite Tracking Priorities September 2007

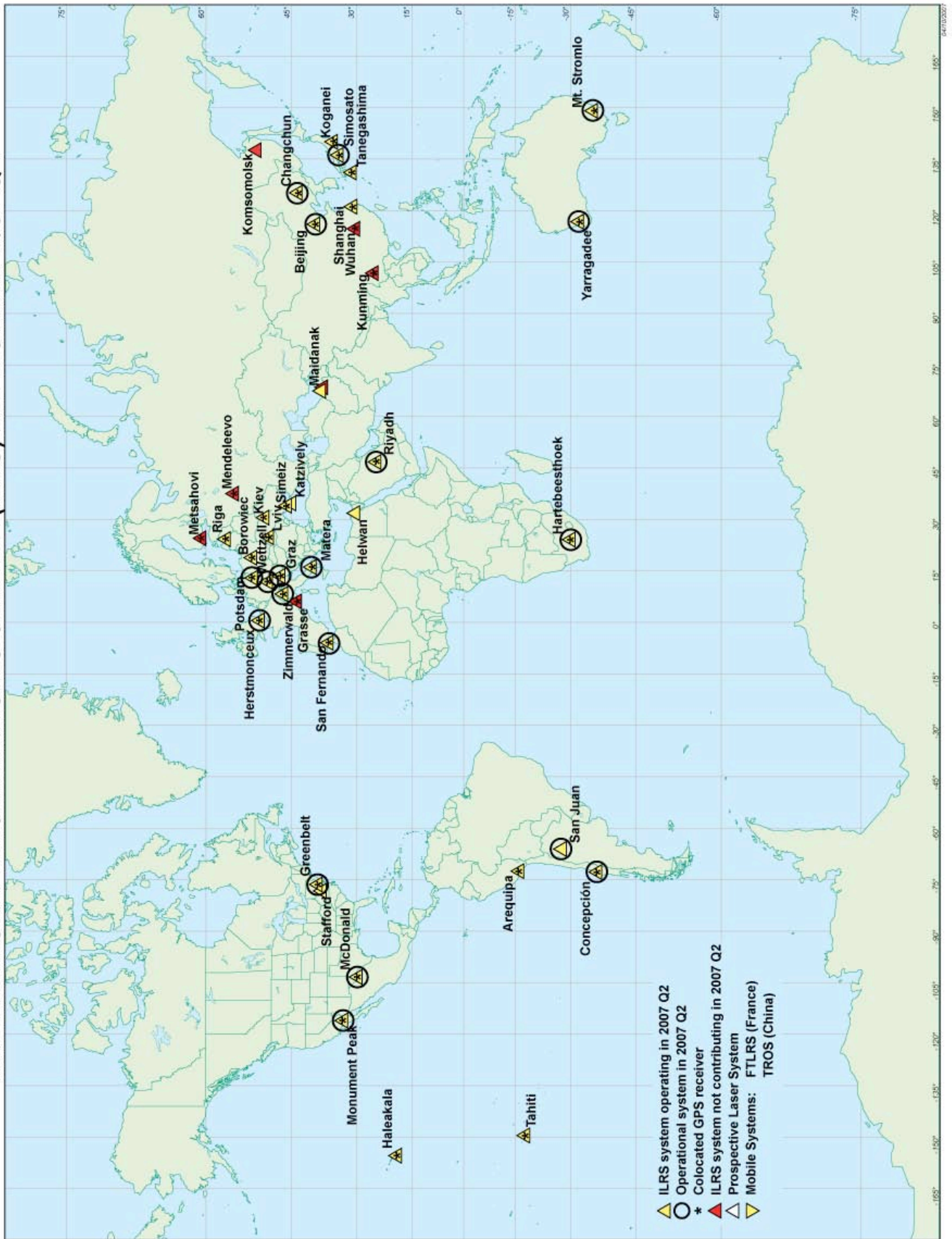
1. Priorities decrease with:
 - a. increasing orbital altitude; and
 - b. increasing orbital inclination (at a given altitude).
2. Priority of some satellites may then be increased to intensify support for:
 - a. active missions (such as altimetry);
 - b. special campaigns (such as IGLOS); or
 - c. post-launch intensive tracking phases; and
3. Some slight reordering may be done to give higher priority missions with increased importance to the analysis community.

| Priority | Mission | Sponsor | Altitude (km) | Inclination (degrees) | Comments |
|----------|-----------------|-----------------------|---------------|-----------------------|--|
| 1 | TerraSAR-X | Infoterra/DLR/GFZ/CSR | 514 | 97.44 | New mission |
| 2 | GRACE-A, -B | GFZ/JPL | 485-500 | 89 | Tandem mission |
| 3 | CHAMP | GFZ | 429-474 | 87.3 | |
| 4 | GFO-1 | US Navy | 790 | 108.0 | Altimetry/no other tracking technique |
| 5 | Envisat | ESA | 796 | 98.6 | Tandem with ERS-2 |
| 6 | ERS-2 | ESA | 800 | 98.6 | Tandem with Envisat |
| 7 | Jason-1 | NASA/CNES | 1,350 | 66.0 | |
| 8 | ANDE-RR Active | NRL | 400 | 51.6 | |
| 9 | ANDE-RR Passive | NRL | 400 | 51.6 | |
| 10 | Larets | IPIE | 691 | 98.2 | |
| 11 | Starlette | CNES | 815-1,100 | 49.8 | |
| 12 | Stella | CNES | 815 | 98.6 | |
| 13 | Ajisai | NASDA | 1,485 | 50 | |
| 14 | LAGEOS-2 | ASI/NASA | 5625 | 52.6 | |
| 15 | LAGEOS-1 | NASA | 5850 | 109.8 | |
| 16 | Beacon-C | NASA | 950-1,300 | 41 | Upgraded from campaign to ongoing mission (Jan-02) |
| 17 | GIOVE-A | ESA | 29,601 | 56 | September 2007 campaign |
| 18 | Etalon-1 | Russian Federation | 19,100 | 65.3 | |
| 19 | Etalon-2 | Russian Federation | 19,100 | 65.2 | |
| 20 | GLONASS-99 | Russian Federation | 19,100 | 65 | Replaced GLONASS-87 on 01/12/2007 |
| 21 | GLONASS-95 | Russian Federation | 19,100 | 65 | Replaced GLONASS-84 on 08/26/2005 |
| 22 | GLONASS-102 | Russian Federation | 19,100 | 65 | Replaced GLONASS-89 on 05/04/2007 |
| 23 | GPS-35 | US DoD | 20,100 | 54.2 | |
| 24 | GPS-36 | US DoD | 20,100 | 55.0 | |

Lunar Tracking Priorities

| Priority | Retroreflector Array | Sponsor | Altitude (km) |
|----------|----------------------|--------------------|---------------|
| 1 | Apollo 15 | NASA | 356,400 |
| 2 | Apollo 11 | NASA | 356,400 |
| 3 | Apollo 14 | NASA | 356,400 |
| 4 | Luna 21 | Russian Federation | 356,400 |
| 5 | Luna 17 | Russian Federation | 356,400 |

INTERNATIONAL LASER RANGING SERVICE (ILRS) NETWORK IN 2007 Q2



ILRS Quarterly Report Card (Table 1a, 2007 Q2, 07/01/2006-06/30/2007)

| Site Information | | Data Volume | | | | | | | | | Data Quality | | |
|------------------|----------------|---------------------|------------------------|----------------------|---------------------|---------------------|------------------------|----------------------|-----------------|------------------------|-----------------|-----------------|----------------|
| Column 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| Location | Station Number | <u>LEO pass Tot</u> | <u>LAGEOS pass Tot</u> | <u>High pass Tot</u> | <u>Total passes</u> | <u>LEO NP Total</u> | <u>LAGEOS NP Total</u> | <u>High NP Total</u> | <u>Total NP</u> | <u>Minutes of Data</u> | <u>Cal. RMS</u> | <u>Star RMS</u> | <u>LAG RMS</u> |
| Baseline | | 1000 | 400 | 100 | 1500 | | | | | | | | |
| Yarragadee | 7090 | 8854 | 1914 | 1328 | 12096 | 173336 | 25655 | 12662 | 211653 | 81489 | 4.7 | 8.5 | 9.3 |
| Zimmerwald_423 | 7810 | 5778 | 1210 | 833 | 7821 | 96256 | 15734 | 5531 | 117521 | 41126 | 14.6 | 17.7 | 20.2 |
| Zimmerwald_846 | | 5684 | 1220 | 755 | 7659 | 93122 | 17286 | 4904 | 115312 | 40477 | 25.8 | 23.8 | 25.8 |
| San_Juan | 7406 | 5242 | 1145 | 1209 | 7596 | 75506 | 13178 | 6805 | 95489 | 41838 | 6.2 | 9.0 | 11.8 |
| Graz | 7839 | 5692 | 944 | 665 | 7301 | 115152 | 10827 | 5675 | 131654 | 36503 | 2.3 | 3.9 | 7.8 |
| Wetzell | 8834 | 5016 | 1137 | 653 | 6806 | 59510 | 9192 | 3405 | 72107 | 26722 | 5.0 | 14.7 | 18.9 |
| Mount_Stromlo_2 | 7825 | 5052 | 1280 | 445 | 6777 | 64085 | 13287 | 3052 | 80424 | 32211 | 3.3 | 6.3 | 9.0 |
| Riyadh | 7832 | 4249 | 1051 | 824 | 6124 | 56838 | 9473 | 4764 | 71075 | 29419 | 8.1 | 10.8 | 14.9 |
| Changchun | 7237 | 4420 | 643 | 504 | 5567 | 54419 | 5226 | 2691 | 62336 | 18368 | 15.9 | 15.8 | 19.1 |
| Herstmoncex | 7840 | 3937 | 988 | 449 | 5374 | 62639 | 12768 | 2040 | 77447 | 23312 | 7.2 | 11.0 | 14.2 |
| Monument_Peak | 7110 | 3909 | 839 | 328 | 5076 | 76264 | 9182 | 3166 | 88612 | 24883 | 5.0 | 13.0 | 14.5 |
| Matera_MLRO | 7941 | 2718 | 900 | 239 | 3857 | 38874 | 10170 | 2120 | 51164 | 21568 | 2.2 | 4.7 | 5.4 |
| Concepcion_847 | 7405 | 1970 | 907 | 179 | 3056 | 27766 | 11399 | 1388 | 40553 | 20674 | 8.9 | 38.9 | 69.9 |
| Concepcion_423 | | 114 | 33 | | 147 | 1264 | 304 | | 1568 | 607 | | | |
| Hartebeesthoek | 7501 | 2131 | 498 | 92 | 2721 | 31660 | 4884 | 707 | 37251 | 11062 | 6.0 | 8.0 | 9.4 |
| San_Fernando | 7824 | 2313 | 372 | 8 | 2693 | 35761 | 3027 | 61 | 38849 | 6808 | 4.8 | 11.7 | 16.2 |
| Potsdam_3 | 7841 | 2182 | 356 | | 2538 | 41737 | 4345 | | 46082 | 7491 | 12.9 | 15.6 | 20.9 |
| Simosato | 7838 | 1844 | 492 | 4 | 2340 | 35490 | 7256 | 35 | 42781 | 11802 | 5.8 | 6.4 | 8.6 |
| McDonald | 7080 | 1439 | 443 | 308 | 2190 | 16240 | 3924 | 1265 | 21429 | 8916 | 9.9 | 12.0 | 11.9 |
| Greenbelt | 7105 | 1730 | 303 | 76 | 2109 | 38170 | 3231 | 478 | 41879 | 7631 | 4.8 | 8.9 | 9.3 |
| Beijing | 7249 | 1536 | 228 | 89 | 1853 | 20192 | 2093 | 622 | 22907 | 6517 | 7.0 | 11.8 | 16.5 |
| Katzively | 1893 | 1195 | 215 | 42 | 1452 | 20454 | 1801 | 238 | 22493 | 4686 | 34.3 | 44.5 | 42.3 |
| Shanghai_2 | 7821 | 1290 | 112 | 10 | 1412 | 15995 | 1124 | 69 | 17188 | 3195 | 12.4 | 22.1 | 32.0 |
| Arequipa | 7403 | 964 | 101 | | 1065 | 9751 | 716 | | 10467 | 2090 | 5.0 | 7.3 | 6.5 |
| Maidanak_1 | 1864 | 659 | 152 | 193 | 1004 | 7269 | 1220 | 774 | 9263 | 4290 | | 58.8 | 61.3 |
| Riga | 1884 | 867 | 107 | 7 | 981 | 16182 | 1131 | 41 | 17354 | 2148 | 8.5 | 9.1 | 10.2 |
| Haleakala | 7119 | 804 | 172 | | 976 | 12498 | 1909 | | 14407 | 3500 | 4.8 | 10.1 | 10.7 |
| Borowiec | 7811 | 732 | 140 | 8 | 880 | 11591 | 1419 | 29 | 13039 | 2664 | 14.6 | 22.2 | 20.6 |
| Koganei | 7308 | 428 | 136 | 136 | 700 | 6785 | 1492 | 942 | 9219 | 5323 | 9.1 | 12.9 | 14.8 |
| Simeiz | 1873 | 428 | 105 | | 533 | 4948 | 927 | | 5875 | 1676 | | 50.0 | 58.2 |
| Papeete | 7124 | 386 | 85 | | 471 | 5629 | 752 | | 6381 | 1346 | | | |
| Tanegashim | 7358 | 222 | 40 | 26 | 288 | 3091 | 375 | 167 | 3633 | 1197 | 3.1 | 4.2 | 6.4 |
| Lviv | 1831 | 130 | 2 | | 132 | 2270 | 13 | | 2283 | 233 | 14.1 | 57.6 | 95.6 |
| Helwan | 7831 | 17 | | | 17 | 169 | | | 169 | 1 | 6.0 | | |
| NRL | 7865 | 9 | | | 9 | 131 | | | 131 | | | | |
| Kiev | 1824 | 1 | | | 1 | 12 | | | 12 | 4 | | | |

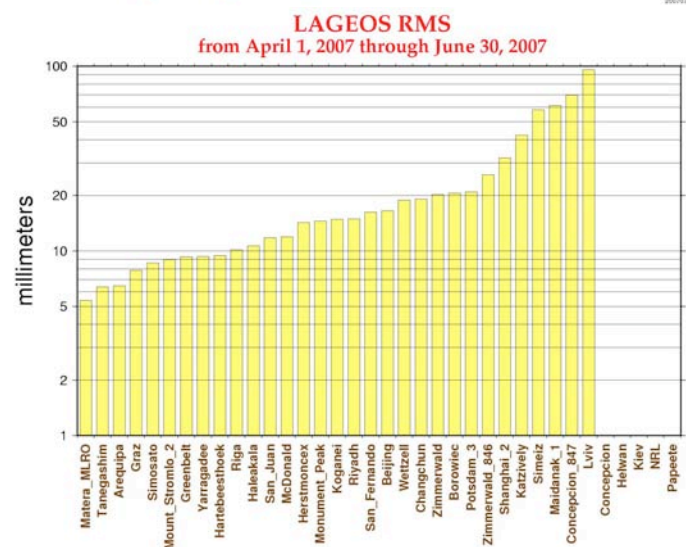
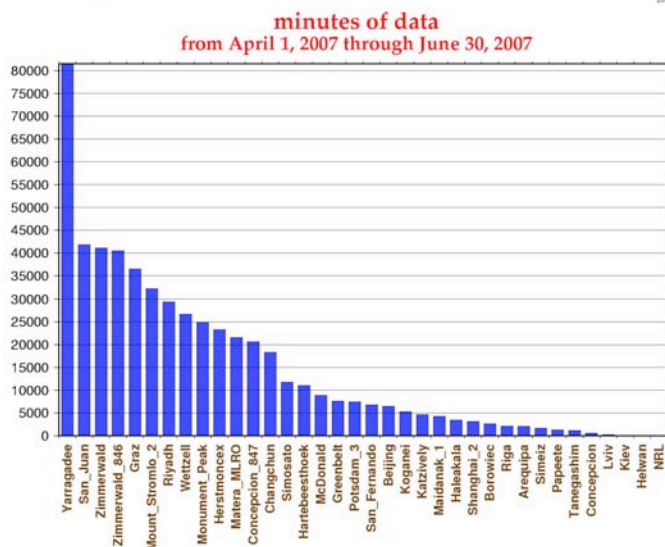
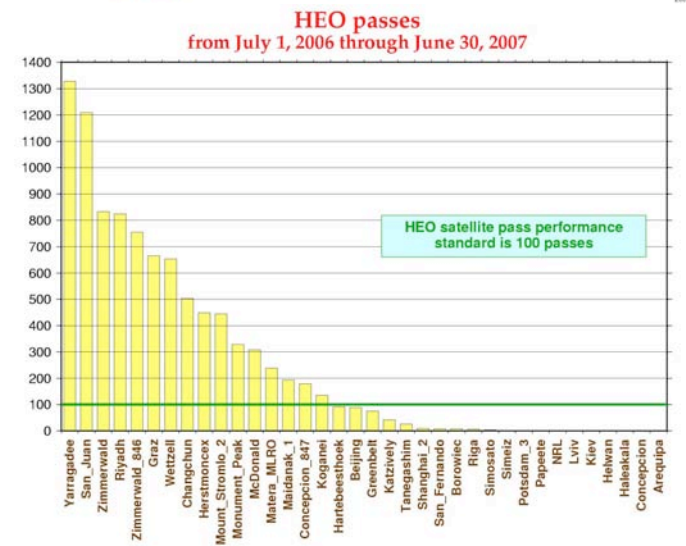
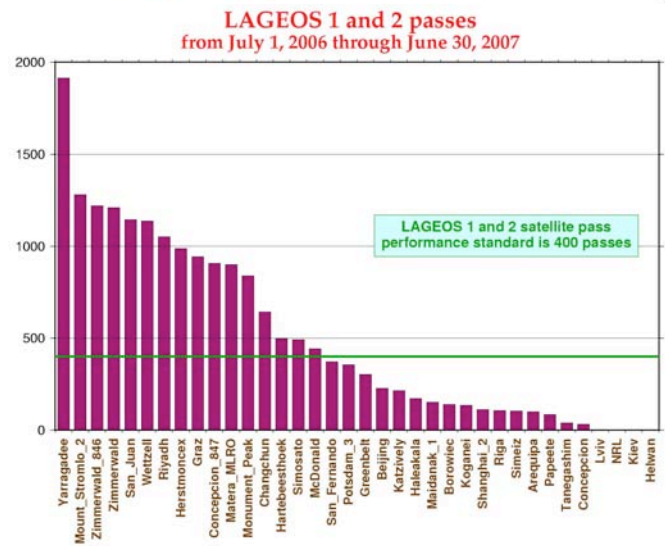
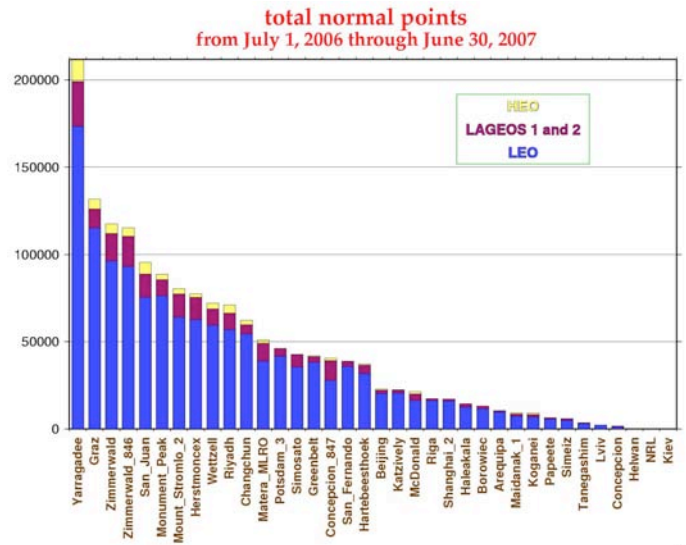
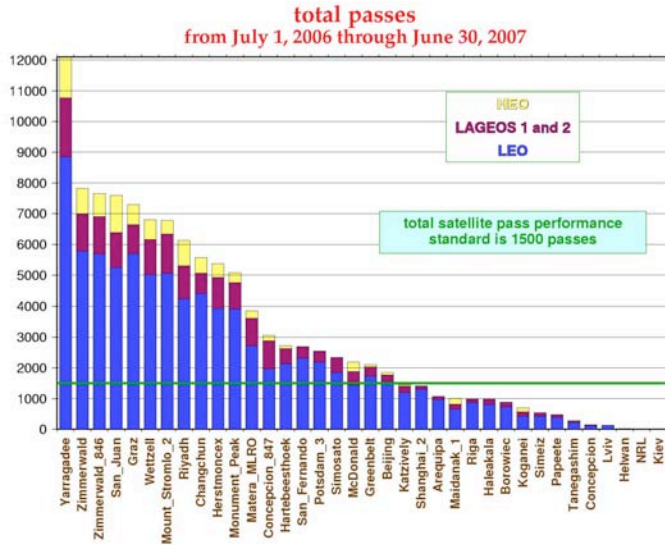
ILRS Quarterly Report Card (Table 1b Lunar, 2007 Q2, 07/01/2006-06/30/2007) (continued)

| Site Information | | Data Information | | | |
|------------------|----------------|---------------------------------|---------------------|---------------------|------------------------|
| Column L1 | L2 | L3 | L4 | L5 | L6 |
| Location | Station Number | num nights tracking last 12 mon | num npt last 12 mon | num npts last 3 mon | ave npt rms last 3 mon |
| McDonald | 7080 | 60 | 98 | 6 | 31.2 |
| Matera_MLRO | 7941 | 1 | 2 | 2 | 54.1 |

ILRS Quarterly Report Card (Table 2, 2007 Q2, 07/01/2006-06/30/2007)

| Site Information | | Hitotsubashi Univ. Orbital Analysis | | | | MCC Orbital Analysis | | | | SHAO Orbital Analysis | | | |
|------------------|----------------|-------------------------------------|-----------------|----------------|----------------|----------------------|-----------------|----------------|----------------|-----------------------|-----------------|----------------|----------------|
| Station Location | Station Number | LAG NP RMS (mm) | short term (mm) | long term (mm) | % good LAG. NP | LAG NP RMS (mm) | short term (mm) | long term (mm) | % good LAG. NP | LAG NP RMS (mm) | short term (mm) | long term (mm) | % good LAG. NP |
| Baseline | | 10.0 | 20.0 | 20.0 | 95 | 10.0 | 20.0 | 20.0 | 95 | 10.0 | 20.0 | 20.0 | 95 |
| Yarragadee | 7090 | 1.8 | 8.0 | 1.4 | 100.0 | 2.1 | 12.9 | 7.1 | 98.9 | 2.1 | 14.5 | 2.2 | 96.0 |
| Zimmerwald_423 | 7810 | 3.0 | 7.5 | 2.7 | 99.6 | 3.4 | 8.9 | 10.3 | 95.3 | 2.6 | 11.5 | 2.6 | 94.5 |
| Zimmerwald_846 | | 4.0 | 8.5 | 2.9 | 99.8 | | | | | 3.5 | 11.4 | 2.7 | 95.1 |
| San_Juan | 7406 | 2.3 | 21.1 | 4.7 | 99.9 | 3.7 | 17.6 | 5.7 | 99.8 | 2.8 | 24.2 | 6.6 | 96.3 |
| Graz | 7839 | 1.1 | 6.0 | 1.1 | 100.0 | 1.8 | 7.1 | 3.7 | 99.7 | 1.3 | 14.4 | 2.1 | 96.5 |
| Wetzell | 8834 | 3.2 | 14.2 | 1.7 | 99.9 | 2.8 | 14.2 | 9.1 | 98.1 | 2.6 | 19.5 | 2.6 | 95.8 |
| Mount_Stromlo_2 | 7825 | 3.3 | 9.5 | 1.8 | 99.9 | 3.9 | 15.2 | 3.2 | 94.5 | 2.9 | 16.6 | 2.4 | 95.7 |
| Riyadh | 7832 | 3.3 | 12.4 | 3.7 | 100.0 | 3.6 | 16.8 | 4.7 | 96.5 | 3.0 | 27.4 | 4.2 | 96.5 |
| Changchun | 7237 | 7.2 | 26.8 | 7.5 | 99.9 | 7.3 | 22.7 | 15.9 | 95.2 | 6.0 | 27.9 | 7.6 | 95.3 |
| Herstmoncex | 7840 | 1.6 | 8.2 | 5.2 | 100.0 | 2.5 | 7.6 | 6.3 | 99.4 | 1.8 | 12.6 | 3.9 | 97.0 |
| Monument_Peak | 7110 | 2.2 | 10.3 | 1.5 | 100.0 | 2.4 | 15.9 | 3.7 | 98.5 | 2.0 | 15.8 | 2.6 | 94.6 |
| Matera_MLRO | 7941 | 1.9 | 10.0 | 11.6 | 99.8 | 2.4 | 12.3 | 10.0 | 97.3 | 2.3 | 28.5 | | 97.8 |
| Concepcion_423 | 7405 | | | | | | | | | 2.2 | 23.8 | 4.3 | 97.5 |
| Concepcion_847 | | 1.6 | 10.8 | 3.9 | 100.0 | 2.9 | 13.5 | 5.5 | 100.0 | | | | |
| Hartebeesthoek | 7501 | 1.7 | 12.7 | 3.0 | 100.0 | 1.9 | 16.8 | 4.0 | 98.6 | 1.8 | 24.7 | 5.3 | 97.5 |
| San_Fernando | 7824 | 4.3 | 14.9 | 9.8 | 99.8 | 4.7 | 16.7 | 13.0 | 99.2 | 3.7 | 25.6 | 12.6 | 95.4 |
| Potsdam_3 | 7841 | 4.3 | 9.8 | 3.9 | 99.8 | 3.9 | 9.0 | 12.1 | 91.4 | | | | |
| Simosato | 7838 | 3.0 | 14.2 | 5.9 | 100.0 | 4.3 | 14.4 | 4.0 | 99.7 | 3.8 | 20.2 | 6.9 | 94.8 |
| McDonald | 7080 | 2.3 | 13.0 | 3.6 | 99.8 | 2.8 | 14.8 | 7.0 | 96.4 | 2.3 | 18.3 | 4.5 | 95.3 |
| Greenbelt | 7105 | 1.6 | 12.4 | 5.6 | 99.9 | 2.2 | 17.6 | 11.6 | 98.9 | 1.7 | 17.7 | 4.5 | 93.9 |
| Beijing | 7249 | 7.3 | 26.8 | 7.2 | 98.6 | 7.7 | 26.8 | 20.3 | 97.2 | 6.0 | 27.2 | 9.1 | 96.0 |
| Katzvively | 1893 | 8.7 | 20.2 | 6.6 | 98.5 | 8.3 | 20.3 | 5.1 | 90.9 | 8.4 | 23.0 | 26.5 | 92.5 |
| Arequipa | 7403 | 2.3 | 19.8 | 9.3 | 100.0 | 3.0 | 17.4 | 11.5 | 95.6 | 2.3 | 27.7 | | 96.9 |
| Maidanak_1 | 1864 | 20.2 | 17.5 | 12.2 | 95.1 | 19.7 | 22.7 | 11.3 | 83.6 | 15.8 | 26.2 | | 86.2 |
| Riga | 1884 | 2.8 | 15.9 | 15.8 | 100.0 | 5.8 | 17.1 | 21.5 | 99.6 | 4.2 | 21.7 | 10.5 | 94.4 |
| Haleakala | 7119 | 2.0 | 14.5 | | 99.9 | | | | | 5.9 | 21.8 | | 91.3 |
| Borowiec | 7811 | 5.9 | 6.5 | 7.7 | 100.0 | 5.7 | 8.1 | 7.3 | 98.1 | 3.8 | 14.2 | 7.6 | 92.4 |
| Koganei | 7308 | 4.0 | 17.4 | 18.5 | 100.0 | 4.5 | 20.4 | 15.3 | 98.3 | 3.6 | 29.5 | 18.2 | 96.2 |
| Simeiz | 1873 | 74.1 | 46.2 | 42.2 | 97.1 | | | | | 33.5 | 23.2 | 29.7 | 64.8 |
| Tanegashim | 7358 | 1.7 | 20.8 | 13.6 | 100.0 | | | | | | | | |

ILRS Quarterly Report Card Plots (2007 Q2, 07/01/2006-06/30/2007)



New ILRS Satellite Data Webpages

(by satellite)

(http://ilrs.gsfc.nasa.gov/satellite_missions/list_of_satellites/index.html)

Satellite GIOVE-A

ILRS http://ilrs.gsfc.nasa.gov/satellite_missions_2/list_of_satellites/gioa_site Google

NASA CDDIS IGS ILRS IVS IDS IERS ITRF GGOS INDIGO Headlines Weather Apple Amazon Yahoo! News (757)

ILRS Home → List of Satellites → GIOVE-A Satellite Information

General RetroReflector Info **ILRS Mission Support** Array Offset Site Data Info

GIOVE-A information

as a function of local time and satellite range

timespan is May 1, 2006 through May 30, 2007

| site | local time | | | range | | | site | local time | | | range | | |
|---|------------|-----|------------|-------|-----|------------|---|------------|-----|------------|-------|-----|------------|
| | npt | rms | numFR /npt | npt | rms | numFR /npt | | npt | rms | numFR /npt | npt | rms | numFR /npt |
| Arequipa, Peru AREL, 7403 | n/a | | | | | | Matera, Italy (MLRO) MATM, 7941 | | | | | | |
| Beijing, China BEIL, 7249 | | | | | | | McDonald Observatory, Texas MDOL, 7080 | | | | | | |
| Borowiec, Poland BORL, 7811 | | | | | | | Monument Peak, California MONL, 7110 | | | | | | |
| Changchun, China CHAL, 7237 | | | | | | | Potsdam, Germany POT3, 7841 | n/a | | | | | |
| Concepcion, Chile CONL, 7405 | | | | | | | Riga, Latvia RIGL, 1884 | n/a | | | | | |
| Golosiv, Ukraine GLSL, 1824 | n/a | | | | | | Riyadh, Saudi Arabia RIYL, 7832 | | | | | | |
| Tanegashima, Japan GMSL, 7358 | | | | | | | San Fernando, Spain SFEL, 7824 | n/a | | | | | |
| Greenbelt, Maryland GODL, 7105 | | | | | | | Shanghai, China SHA2, 7821 | n/a | | | | | |
| Graz, Austria GRZL, 7839 | | | | | | | Simeiz, Ukraine SIML, 1873 | n/a | | | | | |
| Haleakala, Hawaii HA4T, 7119 | n/a | | | | | | Simosato, Japan SISL, 7838 | n/a | | | | | |
| Hartebeesthoek, South Africa HARL, 7501 | | | | | | | San Juan, Argentina SJUL, 7406 | | | | | | |
| Herstmonceux, United Kingdom HERL, 7840 | | | | | | | Stafford, Virginia STAL, 7865 | n/a | | | | | |
| Helwan, Egypt HLWL, 7831 | n/a | | | | | | Mt Stromlo, Australia STL3, 7825 | | | | | | |
| Koganei, Japan(CRL) KOGC, 7308 | | | | | | | Tahiti, French Polynesia THTL, 7124 | n/a | | | | | |
| Katzively, Ukraine KTZL, 1893 | | | | | | | Wetzell, Germany (WLRS) WETL, 8834 | | | | | | |
| Lviv, Ukraine | n/a | | | | | | Yarragadee, Australia | | | | | | |

New ILRS Satellite Data Webpages (by station) (<http://ilrs.gsfc.nasa.gov/stations/sitelist/index.html>)

Stations Zimmerwald
http://ilrs.gsfc.nasa.gov/stations/sitelist/ZIML_satdata.html
Google

NASA CDDIS IGS ILRS IVS IDS IERS ITRF GGOS INDIGO
Headlines Weather Apple Amazon Yahoo! News (757)

ILRS Home
Stations
Site Listing
Zimmerwald

Active Sites
General Site Log Meteorological Data LAGEOS Performance Satellite Data Info

Arequipa (AREL)
Beijing (BEIL)
Borowiec (BORL)
Changchun (CHAL)
Concepcion (CONL)
Golosiiv (GLSL)
Grasse (LLR) (GRSM)
Graz (GRZL)
Greenbelt (GODL)
Haleakala (HA4T)
Hartebeesthoek (HARL)
Helwan (HLWL)
Herstmonceux (HERL)
Katsively (KTZL)
Koganei (CRL) (KOGC)
Komsomolsk (KOML)
Kunming (KUNL)
Lviv (LVIL)
Maidanak1 (MAIL)
Maidanak2 (MAID)
Matera (MLRO) (MATM)
McDonald

Zimmerwald, Switzerland satellite information as a function of local time and satellite range

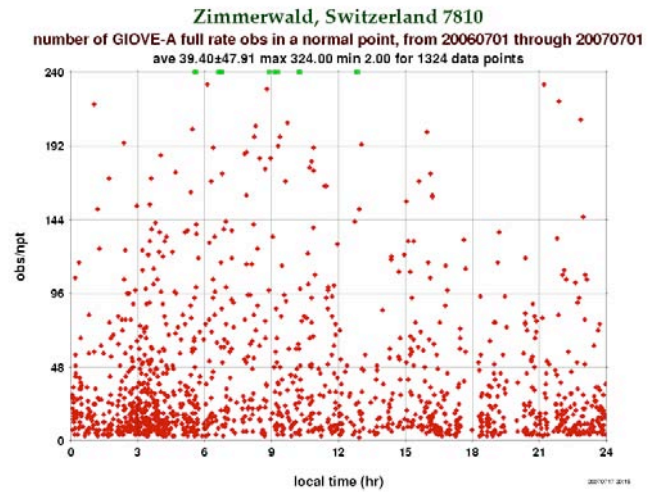
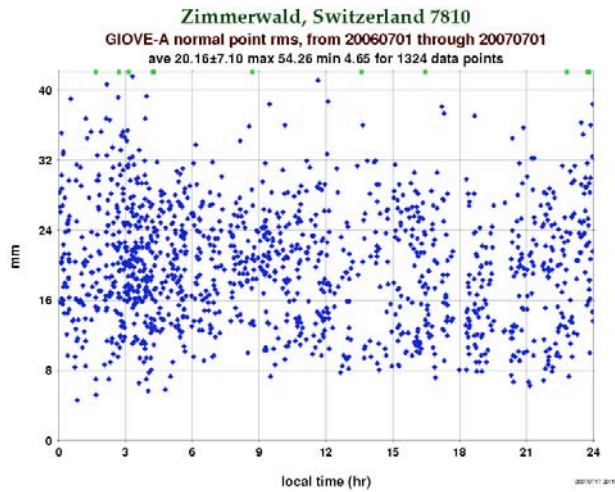
timespan is May 1, 2006 through May 30, 2007

| site | local time | | npt rms | numFR /npt | range | | site | local time | | npt rms | numFR /npt | | |
|------------------|------------|-----|---------|------------|-------|-----|--------------------|------------|--------------------|---------|------------|--|--|
| | npt | rms | | | npt | rms | | npt | rms | | | | |
| ANDE-Act 5 sec | | | | | | | Jason-1 15 sec | | | | | | |
| ANDE-Pas 5 sec | | | | | | | Ajisai 30 sec | | | | | | |
| CHAMP 5 sec | | | | | | | LAGEOS-2 120 sec | | | | | | |
| Grace-A 5 sec | | | | | | | LAGEOS-1 120 sec | | | | | | |
| Grace-B 5 sec | | | | | | | Etalon-1 300 sec | | | | | | |
| ICESat 5 sec | | | | | | | Etalon-2 300 sec | | | | | | |
| OICETS 30 sec | n/a | | | | n/a | | | | GLONASS-78 300 sec | n/a | | | |
| GP-B 15 sec | n/a | | | | n/a | | | | GLONASS-86 300 sec | n/a | | | |
| Larets 30 sec | | | | | | | GLONASS-87 300 sec | | | | | | |
| ALOS 15 sec | | | | | | | GLONASS-89 300 sec | | | | | | |
| ERS-2 15 sec | | | | | | | GLONASS-95 300 sec | | | | | | |
| Envisat 15 sec | | | | | | | GLONASS-99 300 sec | | | | | | |
| GFO-1 15 sec | | | | | | | GPS-35 300 sec | | | | | | |
| Starlette 30 sec | | | | | | | GPS-36 300 sec | | | | | | |
| Stella 30 sec | | | | | | | GIOVE-A 300 sec | | | | | | |

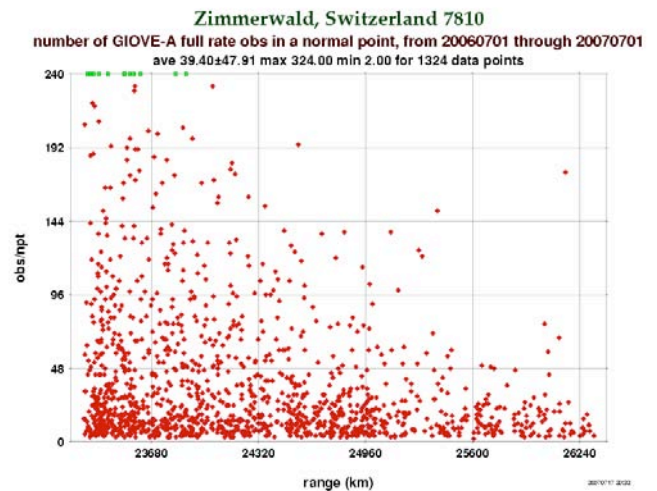
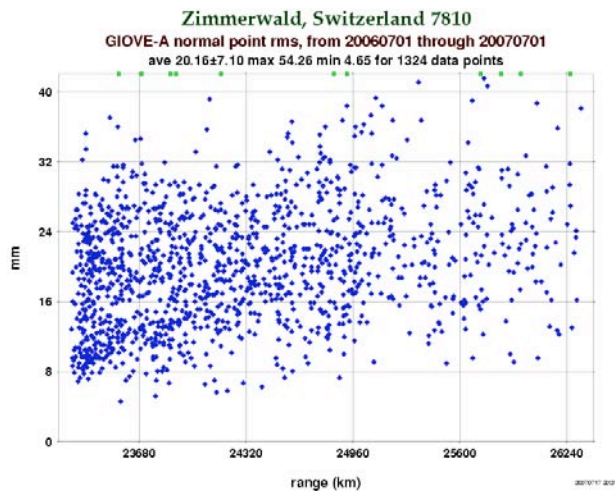
Go to "http://ilrs.gsfc.nasa.gov/stations/sitelist/TmeRngPlt/ZIML_Etalon-1_FROBS_frRng.gif"

New ILRS Satellite Data Webpages

- Plots of normal point RMS, number of full-rate data points per normal point by station and satellite, as a function of local time and satellite range
- Updated monthly (future)
- Accessible on the ILRS Website through both the satellite and station sections:
 - http://ilrs.gsfc.nasa.gov/satellite_missions/list_of_satellites/index.html
 - <http://ilrs.gsfc.nasa.gov/stations/sitelist/index.html>



Zimmerwald GIOVE-A NPT RMS (Local Time) **Zimmerwald GIOVE-A No. FR/NPT (Local Time)**



Zimmerwald GIOVE-A NPT RMS (Range)

Zimmerwald GIOVE-A No. FR/NPT (Range)