



Workshop Program

Session Overview

GNSS Session A: Synergy of SLR and GNSS Data Products

Chairs: E. Pavlis, D. Thaller, C. Noll, V. Glotov

- Who is analyzing the GNSS SLR data? (Reports from the users e.g., GNSS missions)
- What products are being derived?
- Is the ILRS satisfying their present requirements? Data volume? Data Accuracy? Data coverage? What are the short falls?
- What is the projection for future requirements? Timeframe?
- What do we see from SLR-GNSS co-location?
- Is SLR having an impact on GNSS products?

GNSS Session B: ILRS Network Performance and Improvement

Chairs: G. Bianco, Z. Zhongping, G. Appleby, F. Koidl

- What is limiting our performance? Are we trying to track too many satellites?
- How can procedures be improved to improve performance?
- Are we using the right tracking strategy?
- What wisdom can be shared by some of the most productive stations?
- How should future systems be designed for better performance?

Space Debris Session

Chairs: G. Kirchner, L. Grunwaldt, C. Marzo, T. Flohrer

- Description of the technique. How do we do it?
- Who are the users? Is it having any impact for them? Are we getting good PR? Where?
- What is the experience of the stations? What is limiting our performance? Is this having any impact on the ranging data?
- How can procedures be improved to improve performance?
- Are we using the right tracking strategy?
- What wisdom can be shared by some of the most productive stations?
- How should future systems be designed for better performance?

Time Transfer Session

Chairs: U. Schreiber, E. Samain, J-M Torre

- Review of current techniques and missions; How are we doing?
- Who is analyzing the data? What are the data products? Who uses the products?
- Are we satisfying their needs? What are the shortfalls?
- What are the future missions and the applications?
- What will be needed from the network to satisfy requirements?
- How can procedures be tuned to improve performance?
- Are we using the right tracking strategy?
- What wisdom can be shared by some of the most productive stations?
- How should future systems be designed for better performance?
- What is the real potential? Who will use it?

System Biases Session A: Analytic Results

Chairs: C. Luceri, T. Otsubo, H. Mueller

- How do we estimate our system biases in our processing and analysis systems?
- What examples of biases have been seen from the Q/C and final processing systems?
- What are the likely sources of biases? What are the big issues?

System Biases Session B: Station Issues

Chairs: I. Prochazka, J. Eckl

- Which biases should be seen at the stations?
- What are the procedures used by the stations to compute their corrections and quality control their data? How do we stabilize calibration?
- What station hardware, equipment, software, etc. would give the stations greater ability to detect biases?
- What changes in procedures and processes would give the stations greater ability to detect biases?
- What consideration should be given in the design of new systems to minimize biases?

MONDAY 26 OCTOBER 2015

9.00	9.30	0	Welcome addresses
			Prof. Roberto Battiston, President of ASI (telecon)
			Prof. Giovanni Schiuma, Deputy Major, City of Matera
			Dr. Michael Pearlman, Director of the Central Bureau, ILRS
			Dr. Giuseppe Bianco, Chairman of the Governing Board, ILRS

9.30	17.30	1	GNSS session A: Synergy of SLR and GNSS Data Products
			Chairs: E. Pavlis, D. Thaller, C. Noll, V. Glotov

9.30	9.40		Session introduction by the chair
9.40	10.00	1.1	ITRF2014: Preliminary results and ILRS contribution (<i>Z. Altamimi, P. Rebischung, L. Métivier, X. Collilieux</i>)
10.00	10.15	1.2	SLR on GPS III (<i>T. Johnson</i>)
10.15	10.30		<i>Discussion</i>

10.30 11.00 COFFEE BREAK

11.00	11.15	1.3	GLONASS-M Satellite Geometry and Attitude Models for Precise GNSS Data Processing (<i>R. Fatkulin, S. Revnivvykh, V. Mitrikas, V. Pasyukov</i>)
11.15	11.30	1.4	SLR measurements and their importance for Galileo (<i>W. Enderle, D. Navarro-Reyes, F. Gonzalez, E. Schoenemann, R. Zandbergen</i>)
11.30	11.45	1.5	SLR global tracking of Beidou and its needs for SLR (<i>Xiaoya Wang, Xiaogong Hu, Bing He, Qunhe Zhao, Bin Wu, Zhongping Zhang</i>)
11.45	12.00	1.5b	Role of SLR on QZSS operation (<i>Yoshimi Ohshima</i>)
12.00	12.30		<i>Discussion</i>

12.30 14.00 LUNCH BREAK

14.00	14.15	1.6	SLR data usage in the verification of GLONASS data processing methods. IAC PNT analysis of GLONASS SLR data in LARGE experiment (<i>V. Glotov, A. Pafnutyev, M. Zynkovsky, V. Mitrikas</i>)
14.15	14.30	1.7	Using SLR for GNSS orbit model validation (<i>C. Flohrer, T. Springer, M. Otten, C. Garcia Serrano, F. Dilssner, W. Enderle, E. Schönemann</i>)
14.30	14.45	1.8	Orbit Validation On Navigation Satellites Using Satellite Laser Ranging (<i>Gang Zhao, Xuhua Zhou</i>)
14.45	15.00	1.9	Systematic effects in SLR measurements to GNSS satellites (<i>K. Sošnica, R. Dach, D. Thaller, A. Maier, D. Arnold, L. Prange, A. Jäggi</i>)
15.00	15.30		<i>Discussion</i>

15.30 16.00 COFFEE BREAK

16.00	16.12	1.10	SLR in the framework of the EGSIEM project (<i>A. Maier, A. Sušnik, D. Arnold, K. Sosnica, U. Meyer, R. Dach, A. Jäggi</i>)
16.12	16.24	1.11	Phases Ambiguities Resolution Combining Precise Point Positioning (PPP) and SBAS Augmentation Methods (<i>N. Kheloufi</i>)
16.24	16.36	1.12	Satellite radio laser ranging stations for GNSS application: requirements for technical characteristics and methods of their implementation (<i>M.A. Sadovnikov, V.D. Shargorodskiy</i>)
16.36	16.48	1.13	POD improvements of GNSS satellites through the measurements of their non-gravitational accelerations by means of an onboard accelerometer (<i>D. M. Lucchesi, E. Fiorenza, C. Lefevre, M. Lucente, C. Magnafico, R. Peron, F. Santoli and V. A. Iafolla</i>)
16.48	17.00	1.14	An SLR campaign on Galileo satellites 5 and 6 for a test of the gravitational redshift (<i>P. Delfa, F. Deleflie, P. Exertier and S. Loyer</i>)
17.00	17.30		<i>Discussion</i>

TUESDAY 27 OCTOBER 2015

9.00	15.30	2	GNSS session B: ILRS Network Performance and Improvement
			Chairs: G. Bianco, Zhang Zhongping, G. Appleby, F. Koidl

9.00	9.10		Session introduction by the chair
9.10	9.30	2.1	Summary of Results from ILRS GNSS Tracking Campaigns (<i>C. Noll , M. Pearlman, M. Torrence</i>)
9.30	9.50	2.1	Preliminary results of Russian laser ranging network performance in the third GNSS tracking campaign (<i>Pasynkov V.V., Sadovnikov M.A., Shargorodskiy V.D., Zhukov A.N.</i>)
9.50	10.10	2.3	Recent SLR tracking improvements at Herstmonceux (<i>G.Appleby, C.Potter, J.Rodriguez, R.Sherwood, V.Smith, T.Shoobridge, M.Wilkinson</i>)
10.10	10.30	2.4	Maximizing the output of SLR station Graz: Tracking 140 targets (<i>G. Kirchner, F. Koidl</i>)

10.30 11.00 COFFEE BREAK

11.00	11.15	2.5	Theoretical Performance of NASA's SGSLR System Ranging to GNSS Satellites (<i>J. Degnan</i>)
11.15	11.30	2.6	Thermo-optical vacuum testing of Galileo IOV laser retro-reflectors of GALILEO IOV LRA (<i>L. Porcelli, S. Dell'Agnello, A. Boni, C. Cantone, E. Ciocci, S. Contessa, G. Delle Monache, N. Intaglietta, C. Lops, C. Mondaini, M. Maiello, M. Martini, G. Patrizi, L. Salvatori, M. Tibuzzi, P. Tuscano</i>)
11.30	11.45	2.7	Thermo-optical vacuum testing of IRNSS LRA qualification model (<i>L. Porcelli, S. Dell'Agnello, R. Venkateswaran, P. Chakraborty, V. V. Ramana Reddy, K. V. Sriram, A. Boni, C. Cantone, E. Ciocci, S. Contessa, G. Delle Monache, N. Intaglietta, C. Lops, C. Mondaini, M. Maiello, M. Martini, G. Patrizi, L. Salvatori, M. Tibuzzi, P. Tuscano</i>)
11.45	12.00	2.8	Retroreflector Array for an Eccentric Orbit (<i>D. Arnold</i>)
12.00	12.30		<i>Discussion</i>

12.30 14.00 LUNCH BREAK

14.00	14.15	2.9	The COPERNICUS Sentinel-3 mission (<i>J. Fernández, F. Ayuga , P. Féménias , H. Peter</i>)
14.15	14.30	2.10	INRRI-EDM/2016: the First Laser Retroreflector Payload on Mars (<i>Delle Monache G., Dell'Agnello S., Vittori R., Porcelli L., Tibuzzi M., Boni A., Intaglietta N., Salvatori L., Tuscano P., Ciocci E., Martini M., Contessa S., Patrizi G., Mondaini C., Lops C., Maiello M., Bianco G., Cantone C</i>)
14.30	15.30		Poster session and discussion

15.30 16.00 COFFEE BREAK

16.00	17.30	3	Space Debris Session
			Chairs: G. Kirchner, L. Grunwaldt, C. Marzo, T. Flohrer

16.00	16.10		Session introduction by the chair
16.10	16.30	3.1	Laser ranging initiatives at ESA in support of operational needs and space surveillance and tracking (<i>T. Flohrer, H. Krag</i>)
16.30	16.50	3.2	Light Curve Measurements with Single Photon Counters at Graz SLR (<i>Georg Kirchner, Franz Koidl, Michael Steindorfer, Wang Peiyuan</i>)
16.50	17.10	3.3	The feasibility of a Space Debris Laser Ranger at HartRAO (<i>S.Ndlovu , L.Combrinck</i>)
17.10	17.30	3.3b	Zimmerwald Laser Observations to Determine Attitude States of Space Debris (<i>T. Schildknecht, J.N. Pittet, J. Silha, M. Prohaska, M. Ploner</i>)

WEDNESDAY 28 OCTOBER 2015

9.00	12.30	3	Space Debris Session (cont'd)
Chairs: G. Kirchner, L. Grunwaldt, C. Marzo, T. Flohrer			

9.00	9.20	3.4	Orbital Debris Laser Ranging Station Stuttgart (<i>D. Hampf, W. Riede, P. Wagner, F. Sproll, L. Humber</i>)
9.20	9.40	3.5	The Application of Superconducting Nanowire Single-photon detector in Laser Ranging and Preliminary Measuring Results (<i>Zhang Zhongping, Meng Wendong, Wu Zhibo, Zhang Haifeng, Li Pu, Deng Huarong</i>)
9.40	10.00	3.6	Review of Solid State Photon Counters for Laser Tracking of Orbital Space Debris (<i>I. Prochazka, J. Kodet, J. Blazej, G. Kirchner, F. Koidl</i>)
10.00	10.30		Poster session

10.30 11.00 COFFEE BREAK

11.00	11.20	3.7	MORAL: Alt-Azimuth one meter class mount for SLR (<i>N.Bellini, S.Naldi, D.Rastelli, M.Valdatta</i>)
11.20	11.40	3.8	SP-DART: Single-Photon Detection, Alignment and Reference Tool (<i>G. Kirchner, F. Koidl, M. Steindorfer, W. Peiyuan</i>)
11.40	12.00	3.9	Analysis on Detection Capability for Space Debris Laser Ranging (<i>Zhao You, Yu Huanhuan, Gao Pengqi, Shen Ming, Guo Xiaozhong, Yang Datao, Zhou Weiping, Sun Mingguo, Liu Tong</i>)
12.00	12.30		<i>Discussion</i>

12.30 14.00 LUNCH BREAK**14.00 18.00 VISIT TO THE ASI MATERA SPACE GEODESY CENTRE**

THURSDAY 29 OCTOBER 2015

9.00	12.30	4	Time Transfer session
			Chairs: U. Schreiber, E. Samain, J.M. Torre

9.00	9.10		Session introduction by the chair
9.10	9.30	4.1	All Optical Time and Frequency Distribution for Space Geodesy (<i>U. Schreiber, J. Kodet, J. Eckl, G. Herold, G. Kronschnabl, C. Plötz, A. Neidhardt</i>)
9.30	9.50	4.2	Why Geodesy Needs Time! (<i>A. Schlicht</i>)
9.50	10.10	4.3	Requirements on SLR System for Participation in ELT and Future Laser Time Transfer Experiments (<i>I. Prochazka, J. Kodet, J. Blazej</i>)
10.10	10.30		Poster session and discussion

10.30 11.00 COFFEE BREAK

11.00	11.20	4.4	Collation and transfer of time scales with sub-nanosecond accuracy by laser range and pseudo-range measurements (<i>V.D. Shargorodskiy, M.V. Baryshnikov, M.A. Sadovnikov</i>)
11.20	11.40	4.5	Synchronization of distant Laser stations thanks to Time Transfer by Laser Link : Proposal for a dedicated campaign (<i>A. Belli, P. Exertier, E. Samain, C. Courde, J.M. Torre, F. Vernotte</i>)
11.40	12.00	4.6	Satellite Quantum Communications exploiting SLR at MLRO (<i>G. Vallone, D. Dequal, M. Tomasin, F. Vedovato, M. Schiavon, V. Luceri, G. Bianco and P. Villoresi</i>)
12.00	12.30		<i>Discussion</i>

12.30 14.00 LUNCH BREAK

14.00	15.30	5	System Biases session A: Analytic Results
			Chairs: C. Luceri, T. Otsubo, H. Mueller

14.00	14.15		Session introduction by the chair
14.15	14.45	5.1	Systematic range error 2014-2015 (<i>T. Otsubo</i>)
14.45	15.00	5.2	Impact of range biases on global reference frames (<i>H. Mueller, M. Blossfeld</i>)
15.00	15.15	5.3	ILRS Stations' range biases revealed by a 20-year analysis of LAGEOS observations 1993-2014 (<i>G.M. Appleby, J.C. Rodriguez Perez</i>)
15.15	15.30		<i>Discussion</i>

15.30 16.00 COFFEE BREAK

16.00	17.30	6	System Biases session B: station issues
			Chairs: I. Prochazka, J. Eckl

16.00	16.15	6.1	Improving the Local Ties of a Fundamental Station by a Multi-Technique Ground Target (<i>J. Kodet, U. Schreiber, J. Eckl, G. Herold, G. Kronschnabl, C. Plötz, A. Neidhardt, S. Mähler, T. Schüller, T. Klügel</i>)
16.15	16.30	6.2	Single Photon Tracking under difficult condition (<i>J. J. Eckl, K. U. Schreiber</i>)
16.30	16.45	6.3	Analysis of Yunnan Observatories' 1.2m Telescope Laser Ranging System Biases (<i>Li Zhulian, Zhai Dongsheng, Fu Honglin, Li Rongwang, Li Yuqiang, He Shaohui, Zhang Yuncheng, Xiong Yaoheng</i>)
16.45	17.00	6.4	SLR Station Biases (<i>I. Prochazka</i>)
17.00	17.10		Posters
17.10	17.30		<i>Trigger paper (chairs)</i>

20.00 22.30 WORKSHOP DINNER

FRIDAY 30 OCTOBER 2015

9.00	12.30	7	Closing Session
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9.00	10.30		Session Reports
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10.30 11.00 COFFEE BREAK

11.00	12.00		Discussion
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12.00	12.30		Agreement on next steps and path forward
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12.30 14.00 LUNCH BREAK

14.00 17.00 MATERA CITY TOUR