

17th International Workshop on Laser Ranging

Bad Kötzing, Germany
May 16 – 20, 2011

PROGRAM

SUNDAY, MAY 15

- 15:00 Registration
17:00 Ice Breaker
18:00 Program Committee Meeting

MONDAY, MAY 16

- 9:00 Opening Ceremony
9:30 Invited Keynote Talk:
GOCE and its challenging gravimetric sensor system
Reiner Rummel (Technical University Munich)
- 10:00 – 10:30 COFFEE BREAK**
- Session 1: Science Session (10:30 – 12:30 / 14:00 – 14:30)**
Session Chairs: G. Appleby, P. Bianco
- 10:30 LARETS Laser Relativity Satellite
I. Ciufolini, A. Paolozzi, E. Pavlis, R. Koenig, J. Ries, R. Matzner, D. Arnold, R. Neubert, H. Neumayer, D. Rubincam, G. Sindoni, V. Slabinski, C. Paris, M. Ramiconi, D. Spano and C. Vendittozzi
- 10:45 Benefits of SLR in epoch reference frames
Mathis Bloßfeld, Horst Müller, Detlef Angermann
- 11:00 The SLR monitoring crustal movement in South America
Yin Zhiqiang, Han Yanben, R. Podesta, Liu Weidong, A. Pacheco, A. Ester
- 11:15 Assessment on the non gravitational forces acting on the Lageos satellites
Florent Deleflie, Jean-Michel Lemoine, Gilles Metris, and François Barlier
- 11:30 Constraining spacetime torsion with Lunar Laser Ranging, Mercury Radar Ranging, LAGEOS, next lunar surface missions and BepiColombo
R. March, G. Bellettini, R. Tauraso, S. Dell'Agnello
- 11:45 On the Calibration of TanDEM-X Precise Baselines via SLR
R. Koenig, Y. Moon, L. Grunwaldt
- 12:00 The Global Geodetic Observing System: Space Geodesy Networks for the Future
Michael Pearlman, Erricos Pavlis, Zuheir Altamini, and Carey Noll
- LUNCH -**
12:30 – 14:00
- 14:00 The Vector Approach to the Problem of Physical Libration of the Moon: the Linearized Problem
Kondratyev Boris Petrovich

- 14:15 New version of EPM –ERA Lunar theory
Krasinsky G.A., Prokhorenko S.O., Yagudina E.I.
- Session 2: Operations: Spatial and Temporal Coverage (14:30 – 15:30)**
Session Chairs: M. Pearlman, H. Müller
- 14:30 Introduction: Where do we stand and what do we need?
Michael Pearlman
- Statistical Analysis of SLR tracking in 20xx
Horst Mueller
- 14:45 The Contribution of Korean Side to the International Laser Ranging Service
Jong Uk Park, Hyung-Chul Lim, Sungki Cho and Jae-Cheol Yoon
- 15:00 Current situation and future of cooperative San Juan SLR station between Chinese-Argentinean
Liu Weidong et al.
- 15:15 Hazards and Risk @ SLR Network, A Preliminary Overview
del Pino, Jorge
- 15:30 – 15:45 COFFEE BREAK**
- Session 3: Atmospheric Refraction Correction: Hardware and Modeling (15:45 – 17:00)**
Session Chairs: Stefan Riepl, F. Koidl
- 15:45 Introduction: Multi Color Laser Ranging for Refraction Remote Sensing
E.Pavlis, S.Riepl
- 16:00 Atmospheric range correction for two-frequency SLR measurements
Dudy D. Wijaya and Fritz K. Brunner
- 16:15 Atmospheric Refraction Correction Using Multiple Wavelength Laser Ranging
Ben Greene, Craig Smith, Jizhang Sang and Nasr A. Al-Sahhaf
- 16:30 The Photoconductive Antenna - A new device for Spacegeodetic Applications
S.Riepl, Christian Plötz, Reinhard Zeitlhöfler, Axel Nothnagel
- 16:45 Multi Color Activities at 7405
M. Häfner
- Session 4 : SLR Techniques (17:00 – 18:15)**
Session Chairs: U. Schreiber, K. Arsov, J. Garate
- 17:00 Co-optical Path KHz SLR
Li Zhulian, Fu Honglin, Zheng Xiangming, He Shaohui, Xiong Yaoheng, Li Rongwang
- 17:15 Experimental Laser System for Monitoring of GLONASS Time/Frequency Synchronization
V.L. Moshkov, M.A. Sadovnikov, A.A. Fedotov and V.D. Shargorodsky
- 17:30 Graz 10 kHz SLR
Georg Kirchner, Franz Koidl, Farhat Iqbal
- 17:45 High-energy picosecond laser systems between 10 Hz and 2 kHz for next-generation laser ranging
M. Schmidt, N. Graf, H. Huber, R. Kelnberger, J. Aus der Au
- 18:00 New KHz-capable SLR software in Metsähovi
Arsov K.
- 18:15 – 19:15 Data Formats & Procedures Working Group Meeting**
Chair: R. Rickleffs

TUESDAY MAY, 17**Session 6: Modeling and Bias issues (9:00 – 11:30)***Session Chairs: T. Otsubo, D. Thaller, C. Luceri*

- 9:00 Introduction: Introduction to Modeling and Bias Issues
Toshi Otsubo
- 9:15 Improvements in Understanding Systematic Effects in Laser Ranging Observations
Graham Appleby, Vincenza Luceri and Toshimichi Otsubo
- 9:30 Improving ILRS products after an in-depth characterization of station biases
V. Luceri, G. Bianco, C. Sciarretta
- 9:45 GNSS satellites as co-locations for a combined GNSS and SLR analysis
D. Thaller, K. Sosnica, R. Dach, A. Jäggi, G. Beutler, M. Mareyen, B. Richter
- 10:00 Spin of Ajsai: influence of Solar Irradiation on the spin period and precession of the spin axis measured by the Graz 2kHz SLR system
Daniel Kucharski, Georg Kirchner, Toshimichi Otsubo, Franz Koidl, Mihoko Kobayashi

10:15 – 10:45 COFFEE BREAK

- 10:45 A New Approach for the Spin Axis Determination of LAGEOS
D. G. Currie
- 11:05 BLITS: spin parameters and its optical response measured by the Graz 2 kHz SLR system
Daniel Kucharski, Georg Kirchner, Hyung-Chul Lim, Franz Koidl

Session 7: Improving Ranging Accuracy, Calibration and Local Ties I. (11:30 – 12:30)*Session Chairs: I. Prochazka, Y. Artyukh, L. Grunwaldt*

- 11:30 Introduction: Improving Ranging Accuracy and Calibration
I. Prochazka
- 11:45 ILRS Standardization of Hardware, Software, and Procedures
Randall L. Ricklefs
- 12:00 Event Timer A033-ET: Current State and Typical Performance Characteristics
Vedin Vadim, co-authors: Artyukh Yu., Bepal'ko V., Boole E.
- 12:15 Main Directions of Riga Event Timer Development and Current Results
Boole Eugene, co-authors: Artyukh Yu., Bepal'ko V., Stepin V., Stepin D., Vedin V.

12:30 – 14:00 WPLTN - Meeting

- LUNCH -
12:30 – 14:00

Session 8: Improving Ranging Accuracy, Calibration and Local Ties II. (14:00 – 15:30)*Session Chairs: I. Prochazka, Y. Artyukh, L. Grunwaldt*

- 14:00 New technologies for sub – millimeter laser ranging
Ivan Prochazka, Jan Kodet, Josef Blazej, Petr Panek
- 14:20 Statistical studies of the calibration of the Helwan-SLR
Makram Ibrahim
- 14:40 Local Ties at the Geodetic Observatory Wettzell
Thomas Kluegel, Svetlana Maehler, Christian Schade
- 15:00 Ground survey at Space Geodesy site (tentative title)
Sten Bergstrand

Session 9: Introduction to the Observatory Excursion (15:30 – 16:00)*Coordinator: U. Schreiber*

- 15:30 Recent Progress in Sagnac Interferometry
Robert Hurst (Univ. of Canterbury, Christchurch, NZ)
- 15:45 Introduction to the VLBI 2010 TWIN Telescopes
Gerhard Kronschnabl (Bundesamt fuer Kartographie und Geodaesie)
- 16:00 – 17:00 COFFEE BREAK**
- 17:00 **Transfer to Wettzell by bus**
Self guided tour around the observatory, Wettzell-Poster, Discussions + Buffet
- ≈ 21:00 **Transfer to hotels by bus**

WEDNESDAY MAY, 18**Session 10: Improving support for GNSS and other challenging missions (9:00 - 11:30)***Session Chairs: G. Kirchner, M. Wilkinson, Zhang Zhongping*

- 9:00 Introduction: Beam Divergence: Introduction, results of measurements
M. Davis
- Tracking many GNSS targets: Introduction for GNSS problems
M. Wilkinson
- 9:15 Measuring sub-mm range differences caused by polarization effects
Georg Kirchner, Franz Koidl
- 9:30 The achievements of the dedicated Compass SLR system with 1m aperture telescope: GEO satellite daylight tracking and laser time transfer (LTT)
Zhang Zhongping, Yang Fumin, Zhang Haifeng, Meng Wendong, Chen Juping, Chen Wenzhen, Wu Zhibo
- 9:45 Comparative verification of return rate on GNSS LRA
Shinichi Nakamura, Ryo Nakamura, Takahiro Inoue, Hiroyuki Noda, and Motohisa Kishimoto

10:00 – 10:30 COFFEE BREAK

- 10:30 Improvements at NASA's NGSLR in support of GNSS ranging
Jan McGarry, Thomas Zagwodzki
- 10:50 Direction of the Light Deviation Vector during Satellite Laser Ranging
Yuriy V. Ignatenko, Vladimir M. Tryapitsyn, Andriy A. Makeyev, Igor Yu. Ignatenko
- 11:10 Polarisation at SGF, Herstmonceux
Matthew Wilkinson, Toby Shoobridge

Session 11: Satellite Subsystems: Retroreflector Arrays (11:30 – 15:15)*Session Chairs: R. Neubert, S. Wetzel, T. Otsubo*

- 11:30 Introduction: Retroreflector and its Array
Toshimichi Otsubo
- 11:45 Design of LRA for Compass GEO and IGSO satellites and observations
Chen Wanzhen, Yang Fumin, Zhang Zhongping, Wang Yuanming, Li Pu
- 12:00 GNSS array performance prediction using ZEMAX
Mark Davis

12:15 Considerations for the next GNSS Array
Scott Wetzel, Ed Aaron

- LUNCH -
12:30 – 14:00

14:00 ETRUSCO-2: an ASI-INFN Project of Development and SCF-Test of GNSS Retroreflector Arrays (GRA) for Galileo and the GPS-3
S. Dell'Agnello, G. O. Delle Monache, D. G. Currie, R. Vittori, C. Cantone, M. Garattini, A. Boni, M. Martini, C. Lops, N. Intaglietta, R. Tauraso, D. A. Arnold, M. R. Pearlman, G. Bianco et al

14:15 SCF-Test of the NASA-GSFC "LAGEOS Sector" and of a Hollow Retroreflector
A. Boni, S. Berardi, M. Maiello, M. Garattini, S. Dell'Agnello, G. O. Delle Monache, C. Lops, C. Cantone, N. Intaglietta, J. F. McGarry, M. R. Pearlman, D. A. Arnold, T. W. Zagwodzki

14:30 Far-field diffraction pattern analysis of cube corner reflectors
A.L.Sokolov, M.A.Sadovnikov, V.D.Shargorodsky, V.P.Vasiliev

14:45 Single Open Reflector for MEO/GNSS Type Satellites. A Status Report
Reinhart Neubert, Ludwig Grunwaldt, Christian Schopf, Engelbert Hofbauer, Jost Munder, Mark Herding, Rolf Sand

15:00 BLITS: The first autonomous zero-signature satellite in orbit
V.P. Vasiliev, V.D. Shargorodskiy, N.N. Parkhomenko

15:15 – 15:45 COFFEE BREAK

15:15 – 18:00 Poster Session

17:15 – 18:00 Missions Working Group Meeting
Chair: G. Appleby

18:30 – 20:00 Governing Board Meeting

THURSDAY MAY, 19

Session 12: Interaction between Data-User and Stations (9:00 - 10:00)
Session Chairs: M. Torrance, K. Arsov, L. Combrinck, S. Schillak

9:00 Introduction: "Setting the Stage"
Ludwig Combrinck

9:15 The estimation of the SLR data by analysis centers and possibility of closely cooperation between stations and analysts
Stanislaw Schillak

9:30 New performance assessment for laser ranging stations
Toshimichi Otsubo, Mihoko Kobayashi

9:45 Measures of Network Performance
P. Dunn, M. Torrence

10:00 A Second Look at Engineering Data Files
K.Salminsh

10:15 – 10:45 COFFEE BREAK

Session 13: New Laser Ranging Technologies and Capabilities that must be developed to support future missions (10:45 – 12:30)
Session Chairs: J. Degnan, U. Schreiber

- 10:45 Introduction: Introduction to Two-Way Transponder Technique for Ranging and Time Transfer
J. Degnan
- Introduction to One-Way Ranging Technique (confirmation pending)
E. Samain
- The first ILRS transponder laser ranging mission: LR to NASA's Lunar Reconnaissance Orbiter (LRO)
J. McGarry
- 11:15 Laser Ranging Experiment on Lunar Reconnaissance Orbiter: Timing Determination and Orbit Constraints
Dandan Mao, David D. Rowlands, Jan F. McGarry, Maria T. Zuber, David E. Smith, Mark H. Torrence, Gregory A. Neumann, Erwan M. Mazarico, James Golder, Xiaoli Sun, Thomas W. Zagwodzki, John F. Cavanaugh
- 11:30 Simulation of Two-Way Laser Transponder Links – The Wettzell Experience
U. Schreiber, H. Michaelis
- 11:45 GETEMME – An ESA Mission Proposal to Explore the Martian Satellites and the Fundamentals of Solar System Physics
J. Oberst et al.
- 12:00 The European Laser Timing Experiment (ELT) and Data Centre (ELT-DC)
Schlicht A., Schreiber U., Prochazka I.
- 12:15 Simulation of optical response for next-generation single-reflector LLR targets
Toshimichi Otsubo, Hiroo Kunimori, Hirotomo Noda, Hideo Hanada, Hiroshi Araki

- LUNCH -
12:30 – 13:30

Session 14: Lunar Laser Ranging (13:30 – 15:00)

Session Chairs: J. Müller, E. Samain

- 13:30 Introduction: LLR – Challenges and Achievements
J. Müller
- 13:45 Recent progress at APOLLO (tentative title)
T. Murphy (presented by U. Schreiber)
- 14:00 Lunar Laser Ranging Retroreflector for the 21st Century
D. G. Currie, S. Dell'Agnello & G. O. Delle Monache
- 14:15 Development of pulse detection IC for LIDAR on planetary lander
Takahide MIZUNO, Hirokazu IKEDA, Kousuke KAWAHARA
- 14:30 Ground Stations for the Next Generation Lunar Retroreflectors
D. G. Currie
- 14:45 Lunar Laser Ranging: Two Tools for assisting observers
Sebastian Bouquillon et al.

15:00 – 15:30 COFFEE BREAK

Session 15: In-Sky-Laser-safety (15:30 – 17:00)

Session Chairs: H. Donovan, G. Appleby, F. Pierron

- 15:30 Introduction: What are stations doing and what should we be doing?
H. Donovan, G. Appleby, F. Pierron

- 15:45 Ranging Jason2 from Paris Observatory for Time transfer experiment in summer 2010, operations and security achievements
F. Pierron
- 16:00 Implementation of the LASER Traffic Control System at the Haleakala Observatories
D. O’Gara, E. Kiernan-Olson, C. Giebink, D. Summers
- 16:15 Skyguide and Flarm - 2 in-sky-laser-safety systems used at Zimmerwald
Martin Ploner, Adrian Jaeggi, Johannes Utzinger
- 16:30 Aircraft transponder paper
M. Ettl, J. Eckl, ...
- 16:45 Air traffic patterns near SLR site Riga and In-Sky laser safety
K.Salminsh
- 17:00 – 18:00 Transponder WG Meeting**
Chair: J. Degnan, U. Schreiber
- 19:30 ≈ 22:30 Banquet (Haus des Gastes)**

FRIDAY MAY, 20

Session 16: System Automation (9:00 – 10:15)

Session Chairs: A.Neidhardt, C. Moore, M. Ploner

- 9:00 Introduction: **title pending**
A. Neidhardt, ...?
- SLR Station Automation - Factors to Consider
Chris Moore
- 9:15 Automated Data Management of SLR Data and Products at the EUROLAS Data Center (EDC)
C. Schwatke
- 9:30 Controlling Laser Ranging with RTAI-based Real-Time Linux
Evan Hoffman, R. Rickleffs
- 9:45 SLR Automation for the New Space Geodesy Multi-Technique Sites
J. McGarry et al.
- 10:00 SLR-2.0: An overview about the new SLR/LLR Control software from Wettzell
Martin Ettl, Alexander Neidhardt, Pierre Lauber, Johann Eckl, Martin Riederer, Lea Schreiber, Andreas Leidig, Reiner Dassing
- 10:15 – 10:45 COFFEE BREAK**
- 10:45 – 11:30 Workshop Summary**
- 11:30 – 13:00 General Assembly**
- 13:00 Adjourn**
- 14:00 – 16:00 Analysis Working Group**
Chair: Cinzia Luceri