Scientific and Fundamental Aspects of GNSS

7th International Colloquium

Programme

Wednesday 4 September

08:30	REGISTRATION

Room E3

Plenary Session
Chair: Prof. M. Rothacher (ETH Zurich), Dr. J. Ventura-Traveset (ESA/ESAC)

09:00	Colloquium Opening
09:30	Keynote 1: Prof. G. Beutler (U. Bern), Monitoring Earth Rotation since 1846 with state-of-the-art tools
10:15	Keynote 2: J. Parker (NASA), New Frontiers in Space Use of GNSS: Moon and Beyond
11:00	COFFEE BREAK

PANEL: GNSS for Climate Change
Chair: Prof. G. Lachapelle (U. Calgary)

11:30	Panelists: J. Belliure (U Alcala), A. Geiger (ETH Zurich), G. Guerova (Sofia Univ), J. Jones (MetOffice), R. Van Malderen (Royal Meteo Inst. Belgium), J. Wickert (GFZ)
12:50	LUNCH

Room E3 *Room E4*

Precise Orbit Determination I
Chair: Prof. M. Rothacher (ETH Zurich)

Timing I
Chair: Dr. P. Defraigne (Royal Obs. Belgium)

14:00	Steigenberger *DLR*	Precise Orbit Determination of GPS III "Vespucci" *Invited*	Petit *BIPM*	Frequency transfer with Galileo PPP with integer ambiguity resolution *Invited*
14:20	Enderle *ESA/ESOC*	ESOC – State-of-the-art Precise Orbit Determination	Qin *National Time Service*	Enhancing real-time precise point positioning time and frequency transfer with receiver clock modeling
14:40	Bury *Wrocław University Of Environmental*	Challenges in the modeling of perturbing forces acting on Galileo orbits	Yao *National Geodetic Survey*	The Reverse Precise-Point-Positioning Processing for GPS Satellite Clock Observation
15:00	Wang *National Time Service C. (CAS)*	Multi-GNSS orbit determination using iGMAS and MGEX tracking networks	Formichella *INRIM*	Periodic Variations and the J2 Relativistic Effect in the Galileo Satellite Clocks
15:20	COFFEE BREAK			

Precise Orbit Determination II
Chair: Dr. E. Schoenemann (ESA/ESOC)

Timing II
Chair: Dr. P. Defraigne (Royal Obs. Belgium)

15:50	Michalak *GFZ Helmholtz Centre Potsdam*	Precise orbit and reference frame determination supported by LEO satellites, inter-satellite links and synchronized clocks of a future GNSS	Garbin *GMV*	PulChron: A new pulsar-based time scale realization
16:10	Schlicht *Technical Univ. Munich*	Concept for continuous wave laser ranging and time transfer to Galileo using an active laser retroreflector	Dierikx *VSL*	Comparing Optical Fibre versus GNSS Time and Frequency Transfer Supporting Galileo Infrastructure
16:30	Strugarek *Wroclaw University of Environmental*	Realization of the terrestrial reference frame based on integrated SLR measurements to LEO, LAGEOS, and Galileo satellites	Achkar *Observatoire De Paris*	First Calibration of the UTC TWSTFT Link between LNE-SYRTE and PTB Using a Travelling SDR Receiver
16:50	Koch *ETH Zürich*	Evaluation of GNSS precise orbit products using kinematic orbit determination and satellite clock modelling	Uhrich *LNE-SYRTE / Observatoire De*	A pirate signal nearby L1-Band jamming GNSS stations in Observatoire de Paris
17:10	Fullana I Alfons *Univ. Politèc. De València*	Satellite orbits in perturbed space-time: Numerical simulations.	Kuusniemi *University of Vaasa*	Towards resilient GNSS timing in energy distribution networks
17:30 - 18:30	**Poster Session 1** *Chairs: M. Castillo, L. Mendes (ESA/ESAC)*			
	ICEBREAKER			

Thursday 5 September

08:00	REGISTRATION

Room E3 *Room E4* *Room E9*

Fundamental Physics I
Chair: Dr. P. Delva (SYRTE, Obs. de Paris)

Space Service Volume I
Chair: Dr. J. Ventura-Traveset (ESA/ESAC)

Remote Sensing: Troposphere and Weather I
Chair: Dr. J. Dousa (RIGTC)

09:00	Roberts *University of Queensland*	Searching for dark matter and exotic physics with atomic clocks in space and on the ground *Invited*	Giordano *ESA*	Use of GNSS for lunar missions and ESA plans for Lunar IOD	Van Malderen *Royal Meteo. Institute Of Belgium*	Using GNSS ZTD retrievals for climate applications *Invited*
09:20	Bertrand *Royal Observatory Of Belgium*	Fundamental physics tests using the propagation of GNSS signals	Tegedor *Fugro Norway AS*	Next generation technology for high-accuracy real-time positioning and timing on-board LEO satellites	Wilgan *ETH Zurich*	Quality assessment of tropospheric estimates from GNSS and meteorological observations on a UAV
09:40	Vespe *Agenzia Spaziale Italiana*	Dark Matter Search by GALILEO	Huang *Deutsches Geoforschungszentr*	Improvement of GPS Orbit and PCO determination by integrated process with LEO satellites	Václavovic *Research Institute of Geodesy,*	Real-time multi-GNSS analysis for atmospheric sounding
10:00	Lucchesi *National Institute For Astrophysics*	The Galileo for Science (G4S_2.0) project: planning of the activities for the relativistic measurements and preliminary results	Botteron *Syderal Swiss*	GNSS Space Receiver for On-board Precise Time and Frequency and Signal Regeneration	Diamantidis *Chalmers University Of Technology*	Long continuous time series of GNSS tropospheric parameters derived from the Kalman filter analysis
10:20	Tartaglia *Inaf/oato*	Relativistic Positioning and Sagnac-like measurements for fundamental physics in space	Duan *Technical University Of Munich*	Phase Biases of GPS and Galileo Signals for the Purpose of Zero-difference Ambiguity Resolution	Marques *Airbus Defence And Space*	Towards tropospheric delay estimation using GNSS smartphone receiver network
10:40	COFFEE BREAK					

Fundamental Physics II
Chair: Dr. F. Vespe (Space Geodetic Centre, ASI)

Space Service Volume II
Chair: Dr. W. Enderle (ESA/ESOC)

Remote Sensing: Troposphere and Weather II
Chair: Dr. J. Dousa (RIGTC)

11:10	Delva *Observatoire De Paris, Sorbonne*	A gravitational redshift test using eccentric Galileo satellites	Meindl *ETH Zürich*	A Galileo-capable GNSS payload with low-cost commercial-of-the-shelf receivers	Mascitelli *Sapienza University Of Rome*	3D-Var Assimilation of GNSS Single Frequency Receiver data in RAMS NWP model: Impact Studies over Italy
11:30	Herrmann *Universität Bremen*	Testing General Relativity with GSAT-0201 and GSAT-0202	Savastano *Spire Global, Inc.*	The Unique GNSS-Based Atmospheric and Ionospheric Measurements Obtained from Spire's Growing Constellation of CubeSats	Guerova *Sofia University*	BalkanMed real time severe weather service: progress and prospects in Bulgaria
11:50	Delva *Observatoire De Paris, Sorbonne*	Chronometric geodesy: geopotential determination using clock comparisons	Dielacher *Ruag Space Gmbh*	Expected performance for GNSS-Reflectometry on the PRETTY CubeSat	Weber *TU-Vienna*	Tropospheric delay parameters derived from GNSS-tracking data of a fast moving fleet of trains
12:10	Sanz Subirana *Univ. Politècnica de Catalunya (UPC)*	New approach for computing satellite clocks focused on testing general relativity with Galileo satellites	Martin-Porqueras *ESA*	Towards the provision of Global GNSS Space Users Data for scientific applications	Geiger *ETH Zurich*	GNSS – The Challenge of Path Delay Estimation and Modelling in Mountainous Areas
12:30	Sośnica *Wroclaw University of Environmental*	Measurements of the Galileo orbit geometry deformations caused by the general relativity	Christensen *Ruag Space*	MetOp GRAS Radio Occultation GNSS Instrument and NWP Assimilation in the Troposphere	Deniz *Zonguldak Bülent Ecevit University*	An empirical orthogonal function (EOF) analysis of Tropospheric Zenith Delay (ZTD)
12:50	LUNCH					

Room E3 *Room E4* *Room E9*

Geophysics
Chair: Prof. U. Hugentobler (TU Munich)

Clocks
Chair: Dr. F. Arias (SYRTE, Obs. de Paris)

Remote Sensing: Land, Sea, Snow
Chair: Prof. G. Elgered (Chalmers Univ. of Tech.)

14:00	Mazzoni *Sapienza University of Rome*	A review of the GNSS Variometric Approach: from seismology to navigation	Mileti *Univ. Neuchatel*	Atomic clocks for ground and for space *Invited*	Pinat *Royal Observatory Of Belgium*	Seasonal variation of snow height in East Antarctica using GNSS Interferometric Reflectrometry technique
14:20	Paziewski *University of Warmia and Mazury*	GRaSS: Galileo foR Seismography System – application of high-rate Galileo observations to seismic studies	Lorini *LNE-SYRTE, Observatoire De*	High Stability Rb Fountains for Time Scale Generation	Geiger *ETH Zurich*	GNSS: Determination of Snow Depth and Water Equivalent
14:40	Vespe *Agenzia Spaziale Italiana*	Lunisolar body tides speed up plates?	Affolderbach *University Of Neuchatel*	Long-term stability analysis at 10^-14 level of a highly compact vapour-cell atomic clock for GNSS applications	Wickert *Gfz Potsdam*	Ocean Monitoring with Space-borne GNSS-R: Promises in Wind Speed and Prospects in Rain Detection
15:00	Rossi *ETH Zurich*	The combination of accelerometers and GNSS sensors for strong ground motions and its validation with an industrial robot arm	Wang *Orolia Switzerland SA (Spectratime)*	ONCLE (ONe CLock Ensemble) for Galileo Next Generation Robust Timing Systems	Savastano *Spire Global, Inc.*	Earth Surface Observations using GNSS Bistatic Radar (Reflectometry) on Spire's Constellation of CubeSats
15:20	COFFEE BREAK					

Geodesy
Chair: Dr. R. Zandbergen (ESA/ESOC)

GNSS Infrastructure and Archives
Chair: Prof. S. Oszczak (U. Warmia and Mazury in Olsztyn)

Remote Sensing: Ionosphere
Chair: Prof. J. Sanz (Catalonia Polytechnic University)

15:50	Steindorfer *Space Research Institute, Austrian*	Galileo attitude determination via high resolution satellite laser ranging	Navarro *ESA*	GNSS Science Support Centre (GSSC) - Integrating Big Data, Machine Learning and Notebook technologies for Open Science	Belehaki *National Observatory Of*	Progress achieved in the TechTIDE-Horizon2020 project for the identification of traveling ionospheric disturbances in real-time *Invited*
16:10	Herrera Pinzón *Eth Zürich*	Assessment of Differencing Strategies for SLR to GNSS satellites	Cegarra *GMV*	ESA GNSS Science Support Centre, A World-Wide reference GNSS Environment for Scientific Communities	Castillo-Fraile *ESA/ESAC*	GESTA: Galileo Experimentation & Scientific Tests in Antarctica
16:30	Zajdel *Institute Of Geodesy And Geoinformatics*	Galileo-based Earth rotation parameters derived with a daily and sub-daily resolution	Prange *University of Bern*	Overview of CODE's MGEX solution with the focus on Galileo.	Wielgosz *University of Warmia and*	Ionospheric modelling for enhanced precise GNSS services and transference to the Industry (HORION, PIOM-FIPP and ATOMIC ESA - funded projects)
16:50	Svehla *ETH Zurich*	Noise Model of the Galileo "mm-Clock" and the Relativistic Effects	Moore *University of Nottingham*	Next Generation CORS Station Based on All-band-IF-recording, and Its Applications	Galera Monico *Unesp Universidade Estadual Paulista*	PPP effects due to the September 6 to 10, 2017 magnetic storm over Brazilian low latitudes
17:10	Katsigianni *CNES*	Galileo Precise Positioning with Ambiguity Resolution and its contribution to Earth Rotation solutions	Bégin *SixSq*	Edge-to-Cloud Architecture for GNSS Big Data Analyses	Ghoddousi-Fard *Natural Resources Canada*	Higher order ionospheric effects during geomagnetic storms: Impact on GNSS satellites orbit and clock estimation
17:30 - 18:30	**Poster Session 2** *Chairs: V. Navarro, F. Martin Porqueras (ESA/ESAC)*					
	CONFERENCE DINNER					

Friday 6 September

08:30	REGISTRATION

Room E3 *Room E4*

Precise Positioning and Navigation I
Chair: Prof. T. Moore (U. Nottingham)

Scientific Payloads
Chair: R. Prieto-Cerdeira (ESA/ESTEC)

09:00	Luo *Leica Geosystems*	Assessing the Benefits of Galileo to High-Precision GNSS – RTK, PPP and Post-Processing	Anghileri *Airbus*	Scientific Use Cases for Experimental Payloads on Next Generation Navigation Satellites *Invited*
09:20	Brockmann *Swiss Federal Office of*	Impact of Multi-GNSS observations on precise geodetic applications used at the Swiss Mapping Agency swisstopo	Haas *Chalmers University Of*	Co-location in Space: Connecting Galileo and VLBI *Invited*
09:40	Krawinkel *Leibniz University*	Improved Carrier Phase-based GNSS Position and Velocity Determination Using a Transportable Passive Hydrogen Maser	Hugentobler *Technical University of*	Galileo - An ideal Gamma Ray Burst Observatory *Invited*
10:00	D'Angelo *Deimos Space*	HD-GNSS: real-time absolute navigation at sub-centimetre level	Muff *Thales Alenia Space Schweiz AG*	Optical Communication Payload for Galileo *Invited*
10:20	Lutz *Swiss Federal Office of*	Robot field calibration for multi-GNSS receiver antennas at ETH Zurich	Courde *CNRS-Geoazur / OCA*	Review and evolution of the T2L2 project for its use in GNSS satellites *Invited*
10:40	COFFEE BREAK			

Precise Positioning and Navigation II
Prof. G. Lachapelle (U. Calgary)

GNSS Science Transversal
Chair: Prof. H. Kuusniemi (Finnish Geospatial Research Inst.)

11:10	Hutchinson *Nottingham Scientific*	Carrier Phase Positioning Techniques for Mass Market GNSS Receivers: Enhancement of MSP3 Precise Point Positioning (PPP) Software	Gonzalez *ESA/ESTEC*	Galileo Satellite Metadata for scientific products, source and future updates.
11:30	Bisnath *York University*	Positioning performance of mass-market GNSS hardware with augmentation corrections	Grejner-brzezinska *The Ohio State University*	Deployment of autonomous vehicles in smart cities: primary challenges
11:50	Hadas *Wroclaw University Of*	Performance of Galileo-only positioning using the current Galileo constellation	Volckaert *Septentrio*	RTK-INS hybridization for UAV application
12:10	Blechschmied *Federal Agency for*	Precise point positioning of surveying vessels in the Baltic Sea	Belliure *University of Alcalá*	Penguin movements and ocean dynamics: the role of animal tracking in a changing world

Room E3

12:30	**BEST PRESENTATION/POSTER AWARDS. CLOSING REMARKS**
	END OF COLLOQUIUM
13:30	LUNCH (Self-organised)

LAST UPDATED

03-Sep-19

Poster Session 1

Azcue, *National Geographic*	GNSS Analyses at the National Geographic Institute of Spain. Scientific projects and impact of including Galileo observables in the processing
Bhuiyan, *Finnish Geospatial Researc*	Implementation and Performance Analysis of Galileo E5a and E5b signals in a Software-defined Multi-GNSS Receiver
Bolmgren, *University Of Bath*	Tomographic imaging of a large scale TID during a geomagnetic storm
Brack, *GFZ Deutsches*	Precision Analysis of Local GNSS Ionospheric Sensing
Craddock, *JPL*	Recent Achievements and Activities of the International GNSS Service
Dähnn, *Norwegian Mapping*	Galileo performance monitoring in Northern Europe
Dawidowicz, *Univ. Of Warmia And*	ASTRI/UWM EGNSS receiver antenna calibration facility: current status
Douša, *RIGTC*	Development of Galileo products for precise point positioning at GOP
Gallardo López, *Dlr Gfr, Upm*	SCER spoofing attacks on OS-NMA and anti-spoofing protection based on data mining techniques.
Kröger, *Leibniz Universität*	Determination of phase center corrections for Galileo signals
Kwaśniak, *University Of Warmia*	Using the modified ambiguity function approach for Precise Positioning based on Galileo and GPS data
Martín, *Univ. Polit. De València*	Soil Moisture monitoring using GNSS-IR technique and low cost sensors. A case study in Valencia (Spain)
Melman, *European Space Agency*	GNSS User Integrity Assessment in Different Environments using a Fisheye Camera System
Ning, *Lantmäteriet (the Swedish*	GPS-derived trends in the atmospheric water vapour content: comparisons and correlations to results from other techniques and to trends in the a
Sanz Subirana, *UPC - Universitat*	A static, kinematic and area evaluation of the EGNOS 1046 Maritime Service
Shehaj, *ETHZ*	Tropospheric delay models estimated by GNSS, InSAR and their combination
Sidorov, *Astronomical Institute Of*	Enhanced orbit modelling of eclipsing Galileo satellites
Sieradzki, *University Of Warmia*	GNSS-based detection of ionospheric polar patches in the northern hemisphere
Sumaya, *KIT*	Few centimeter positioning accuracy by using single-frequency PPP
Tan, *Ensta-bretagne*	Improvement of GNSS receiver positioning accuracy by using DGNSS
Vespe, *Agenzia Spaziale Italiana*	G4S project: updates and new objectives
Villiger, *University of Bern*	Satellite and receiver chamber calibrated antenna pattern for TRF scale determination

Poster Session 2

Bernet, *University of Bern*	Water vapour trends in Switzerland based on data from ground-based microwave radiometry and GNSS ground stations
Breva, *Leibniz Universität Hannover*	Estimation and validation of receiver antenna codephase variations for multi-GNSS
Bruno, *University Of Bath*	Multi-constellation GNSS tomography for accurate ionospheric imaging
Bury, *Wrocław University Of Environ*	Processing of the Satellite Laser Ranging data to the Galileo satellites at WUELS
Douša, *RIGTC*	GLASS, a tool for quality-controlled GNSS data and product dissemination
Elgered, *Chalmers University of Tech*	Comparison of atmospheric gradients estimated from ground-based GNSS observations and microwave radiometry
Jolivet, *CNES*	Galileo E6 signal capability of REGINA, a CNES/IGN worldwide GNSS receivers network for IGS and navigation.
Kazmierski, *Wrocław University of E*	A service for the validation of the real-time GNSS orbit and clock quality
Krzan, *University of Warmia and Ma*	Impact of individual antenna phase center models on GNSS tropospheric estimates
Laemmerzahl, *University of Bremen*	Clocks in Space
Liwosz, *Warsaw University Of Techn*	Usage of Galileo in EUREF Permanent Network Data and Products
Paziewski, *University of Warmia and*	Long-range multi-GNSS RTK under the influence of the ionospheric disturbances – benefits from innovative ionosphere mitigation algorithm
Prajapat, *Fixposition AG*	Sensor fusion algorithm for accurate heading and tilt estimation using imu and RTK based dual GNSS receiver
Ravanelli, *Sapienza University Of*	Total Variometric Approach for real-time GNSS seismology and ionospheric seismology: a case study
Ruiz, *GMV Innovating Solutions Limi*	POSITRINO: Positioning, Navigation, and Timing with Neutrino Particles
Su, *ETH Zurich*	Analysis of reprocessed GNSS time series of troposphere zenith wet delays for use in climatology
Tan, *Ensta-bretagne*	Robust Galileo/GPS data fusion to enhance the receiver position accuracy
Valencia, *NASA*	Autonomous Flight Termination System (AFTS)
Vespe, *Agenzia Spaziale Italiana*	Refinements of the algorithms needed to retrieve humidity profiles from GNSS Radio Occultation
Wang, *TU München*	Real-time ionospheric error correction for GNSS applications: NeQuickG and RT-GIM
Zajdel, *Institute Of Geodesy And Ge*	Handling of geocenter motion in the GNSS solutions
Zedek, *Géoazur*	Contribution of Galileo and multi-GNSS ionosphere monitoring to the localization of earthquake uplift zones and tsunami sources