



**5th International Colloquium  
Scientific and Fundamental Aspects of the Galileo Programme  
27-29 October 2015, Braunschweig, Germany  
Preliminary Programme**

**Tuesday 27 October 2015**

- 08:00 Registration**
- 09:00 Opening Session**  
*Chairs: Dr. Javier Ventura-Traveset, Dr. Andreas Bauch*
- Welcome from PTB, Prof. Joachim Ullrich, President of PTB  
Welcome from ESA, Dr. Didier Faivre, Director Navigation Department
- 09:40 Keynote 1:  
"ICARUS- New Global Science with Small Animals"  
*Dr. Walter Naumann*  
*Max-Planck-Institut für Ornithologie (Germany)*
- 10:20 Coffee Break**
- 11:00 Keynote 2:  
"The New SI: The Expected Redefinition of the SI Units"  
*Dr. Joern Stenger*  
*PTB (Germany)*
- 11:40 Keynote 3:  
"To Navigate Autonomously: on Land, in the Atmosphere and Under Water"  
*Dr. Annet Ward*  
*DLR – German Aerospace Center (Germany)*
- 12:20 Lunch Break**
- 14:00 Session 1A: N1 Multi\_GNSS  
Room 1**  
*Chair: Dr. Pascale Defraigne*
- The afternoon programme on this day runs in parallel sessions in Rooms 1 and 2***
- 14:00 Precise Point Positioning with Galileo Observables **19**  
*R. White, R. B. Langley*  
*University of New Brunswick Geodesy and Geomatics Engineering (Canada)*
- 14:20 MagicPPP in your Pocket: a Smart, Portable and Efficient Multi-GNSS High-accuracy Solution **20**  
*D. Calle, G. Tobias González, I. Rodriguez Perez, R. Rosa Ferrero, P. F. Navarro Madrid*  
*GMV (Spain)*
- 14:40 Phases Ambiguities Resolution Combining Precise Point Positioning (PPP) and SBAS Augmentation Methods **21**  
*N. Kheloufi*  
*Centre des Techniques Spatiales CTS (Algeria)*
- 15:00 Coffee Break**

15:30	Analysis of Multi-GNSS Observations and the Challenges of their Combination <i>F. Reichel<sup>1</sup>, E. Schönemann<sup>2</sup>, T. Springer<sup>2</sup>, M. Becker<sup>1</sup>, W. Enderle<sup>2</sup></i> <i><sup>1</sup>Technische Universität Darmstadt (Germany), <sup>2</sup>ESA/ESOC (Germany)</i>	21
15:50	GFZ Analysis Centre: Multi-GNSS Processing and Products <i>M. Fritsche, Z. Deng, M. Uhlemann, T. Nischan, M. Bradke, M. Ramatschi, A. Brandt, G. Beeskow</i> <i>Deutsches GeoForschungsZentrum GFZ (Germany)</i>	22
16:10	Utilization of a Novel Channel Quality Index for Improved Multi-GNSS Positioning in GNSS-Denied Environments <i>M.Z.H. Bhuiyan, S. Söderholm, H. Kuusniemi, S. Thombre, L. Ruotsalainen</i> <i>Finnish Geospatial Research Institute (Finland)</i>	22
<b>14:00</b>	<b>Session 1B: E2 Ionosphere Observation</b> <b>Room 2</b> <i>Chair: Prof. Dr. Gérard Lachapelle</i>	
	<i>The afternoon programme on this day runs in parallel sessions in Rooms 1 and 2</i>	
14:00	Evaluation of Parameters Pertaining to Observed Ionosphere Anomalies in Europe with Multi-GNSS and Validation with Space Weather Products <i>G. Lalgudi Gopalakrishnan, J. Feltens</i> <i>Telespazio VEGA Deutschland GmbH (Germany)</i>	23
14:20	Extrapolated Ionospheric GNSS Tomography to Support SBAS: Design and Proof of Concept over Eastern Asia <i>M. Hernandez-Pajares<sup>1</sup>, G. Olivares-Pulido<sup>1</sup>, H. So<sup>2</sup>, A. Garcia-Rigo<sup>1</sup></i> <i><sup>1</sup>UPC-IonSAT (Spain), <sup>2</sup>ADD (South Korea),</i>	24
14:40	Ionosphere Scintillation at Low and High Latitudes (Modelling vs Measurement) <i>Y. Beniguel</i> <i>IEEA (France)</i>	25
<b>15:00</b>	<b>Coffee Break</b>	
15:30	High Accuracy Measurements of Ionospheric Parameters by Combining Radio-Astronomical and GNSS Observations. <i>H. Zelle<sup>1</sup>, E. A. Kuijpers<sup>1</sup>, A. J. P. Van Kleef<sup>1</sup>, F. Wokke<sup>1</sup>, J. E. Noordam<sup>2</sup>, B. Van der Tol<sup>2</sup>, M. Mevius<sup>2</sup>, R. Prieto-Cerdeira<sup>3</sup></i> <i><sup>1</sup>NLR (The Netherlands), <sup>2</sup>ASTRON (The Netherlands), <sup>3</sup>ESA/ESTEC (The Netherlands)</i>	25
15:50	Inversion of Tsunami Height Using Ionospheric Observations. The Case of the 2012 Haida Gwaii Tsunami <i>R. Virgile<sup>1</sup>, P. Lognonné<sup>1</sup>, L. Rolland<sup>2</sup></i> <i><sup>1</sup>IPGP (France), <sup>2</sup>Géoazur (France)</i>	26
16:10	NeQuick G Performance and Residual Error Overbounding: 2 Year Global Study <i>R. Orus, Perez, J. Parro, R. Prieto-Cerdeira</i> <i>ESA/ESTEC (The Netherlands)</i>	26
<b>16:30</b>	<b>Poster Session</b>	
<b>18:00</b>	<b>Posters + Icebreaker</b>	

## Wednesday 28 October 2015

09:00	<b>Session 2A: N2 Challenges in GNSS Applications</b> <b>Room 1</b> <i>Chair: Prof. Dr. Stanislaw Oszczak</i>	
	<b>The programme on this day runs in parallel sessions in Rooms 1 and 2</b>	
09:00	On the Benefits of Atomic Clocks in Autonomous GNSS Navigation <i>T. Krawinkel, S. Schoen</i> <i>Leibniz Universität Hannover, Institut für Erdmessung (Germany)</i>	27
09:20	Numerical Weather Modelling Based Troposphere Correction for Real Time Precise Point Positioning <i>L. Yang<sup>1</sup>, C. Hill<sup>1</sup>, J. Jones<sup>2</sup>, R. Prieto-Cerdeira<sup>3</sup></i> <i><sup>1</sup>University of Nottingham (United Kingdom), <sup>2</sup>UK Met Office (United Kingdom), <sup>3</sup>ESA/ESTEC (The Netherlands)</i>	28
09:40	Kinematic GNSS Experiment Supported by External Tropospheric Corrections <i>P. Vaclavovic, J. Dousa, M. Elias</i> <i>Geodetic Observatory Pecny, RIGTC, p.r.i. (Czech Republic)</i>	29
10:00	Refined and Site-augmented Tropospheric Delay Models for GNSS <i>D. Landskron, G. Möller, A. Hofmeister, J. Böhm, R. Weber</i> <i>TU Wien (Austria)</i>	30
10:20	<b>Coffee Break</b>	
10:50	A Contribution to ETRS89 in Central Europe: Results from the CEGRN Activity <i>A. Caporali<sup>1</sup>, M. Barlik<sup>2</sup>, M. Becker<sup>3</sup>, G. Grenerczy<sup>4</sup>, J. Hefty<sup>5</sup>, D. Medak<sup>6</sup>, G. Milev<sup>7</sup>, M. Mojzes<sup>5</sup>, M. Mulic<sup>8</sup>, T. Rus<sup>9</sup>, J. Simek<sup>10</sup>, G. Stangl<sup>11</sup>, G. Virag<sup>4</sup>, J. Zurutuza<sup>12</sup></i> <i><sup>1</sup>University of Padova (Italy), <sup>2</sup>Warsaw University of Technology (Poland), <sup>3</sup>TU Darmstadt (Germany), <sup>4</sup>Satellite Geodetic Observatory, Penc (Hungary), <sup>5</sup>TU Bratislava (Slovakia), <sup>6</sup>University of Zagreb (Croatia), <sup>7</sup>Bulgarian Academy of Sciences (Bulgaria), <sup>8</sup>University of Sarajevo (Bosnia and Herzegovina), <sup>9</sup>Technical University of Civil Engineering, Bucharest (Romania), <sup>10</sup>Czech Academy of Sciences (Czech Republic), <sup>11</sup>Austrian Academy of Sciences (Austria), <sup>12</sup>University of Padova (Italy)</i>	30
11:10	Characterization of Velocity Field in Iberian Peninsula with Continuous GNSS (1998-2014) <i>I. Quintanilla<sup>1</sup>, M. Valdes<sup>2</sup>, J. A. Sánchez<sup>2</sup>, J. Velasco<sup>3</sup></i> <i><sup>1</sup>Technical University of Valencia (Spain), <sup>2</sup>Instituto Geográfico Nacional (IGN) (Spain), <sup>3</sup>Technical University of Madrid (Spain)</i>	31
11:30	Submillimetric GNSS Distance Determination for Metrological Purposes <i>S. Baselga, L. García-Asenjo, P. Garrigues</i> <i>Universidad Politécnica de Valencia (UPV) (Spain)</i>	31
11:50	Combined Architecture for Multi-dimensional Signal Quality Enhancements in GNSS Receivers <i>N. G. Ferrara<sup>1</sup>, M. J. Paśnikowski<sup>2</sup>, S. Sánchez-Naranjo<sup>3</sup>, F. A. González<sup>4</sup>, R. Ramos-Pollán<sup>5</sup>, G. Seco-Granados<sup>6</sup>, M. Solé<sup>3</sup>, M. Toledo<sup>2</sup>, E. S. Lohan<sup>1</sup></i> <i><sup>1</sup>Tampere University of Technology (Finland), <sup>2</sup>GMV (Spain), <sup>3</sup>Pildo Labs (Spain), <sup>4</sup>Universidad Nacional de Colombia (Colombia), <sup>5</sup>Universidad Industrial de Santander (Colombia), <sup>6</sup>Universitat Autònoma de Barcelona (Spain)</i>	32

<b>09:00</b>	<b>Session 2B: M2 Galileo/GNSS Orbit Determination</b> <b>Room 2</b> <i>Chair: Chair: Prof. Dr. Heidi Kuusniemi</i>	
	<b><i>The programme on this day runs in parallel sessions in Rooms 1 and 2</i></b>	
09:00	The Galileo Terrestrial Reference Frame and the Galileo Orbit Validation Facility <i>R. Zandbergen<sup>1</sup>, E. Schoenemann<sup>1</sup>, T. Springer<sup>2</sup>, J. Martin<sup>3</sup>, W. Enderle<sup>1</sup>, M. Uhlemann<sup>4</sup>, M. Fritsche<sup>4</sup>, R. Dach<sup>5</sup>, L. Prange<sup>5</sup>, E. Orliac<sup>5</sup>, Z. Altamimi<sup>6</sup>, J. Chenal<sup>6</sup>, W. Soehne<sup>7</sup>, J. Dostal<sup>7</sup>, A. Rülke<sup>7</sup>, F. Gonzalez<sup>8</sup>, R. Swinden<sup>8</sup>, S. Binda<sup>8</sup></i> <i><sup>1</sup>ESA/ESOC (Germany), <sup>2</sup>Positim UG (Germany), <sup>3</sup>Telespazio Vega (Germany), <sup>4</sup>Helmholtz Zentrum Potsdam (GFZ) (Germany), <sup>5</sup>University of Bern (Switzerland), <sup>6</sup>IGN (France), <sup>7</sup>BKG (Germany), <sup>8</sup>ESA/ESTEC (The Netherlands)</i>	<b>34</b>
09:20	Precise Orbit and Clock Determination of the Galileo FOC Satellites <i>P. Steigenberger, O. Montenbruck</i> <i>DLR/GSOC (Germany)</i>	<b>33</b>
09:40	Results from CODE's Multi-GNSS Orbit Solution <i>L. Prange<sup>1</sup>, E. Orliac<sup>1</sup>, R. Dach<sup>1</sup>, D. Arnold<sup>1</sup>, G. Beutler<sup>1</sup>, S. Schaer<sup>2</sup>, A. Jäggi<sup>1</sup></i> <i><sup>1</sup>AIUB (Switzerland), <sup>2</sup>Swisstopo(Switzerland)</i>	<b>34</b>
10:00	Precise Orbit Determination for GNSS Satellites <i>E. Schoenemann<sup>1</sup>, T. Springer<sup>1</sup>, F. Dilssner<sup>1</sup>, C. Garcia Serrano<sup>1</sup>, C. Flohrer<sup>1</sup>, F. Reichel<sup>2</sup>, W. Enderle<sup>1</sup>, R. Zandbergen<sup>1</sup></i> <i><sup>1</sup>ESA/ESOC (Germany), <sup>2</sup>Technische Universität Darmstadt (Germany)</i>	<b>35</b>
<b>10:20</b>	<b>Coffee Break</b>	
10:50	Accelerometers for GNSS Orbit Determination <i>U. Hugentobler, A. Schlicht</i> <i>Technische Universität München (Germany)</i>	<b>36</b>
11:10	Towards MEO Microaccelerometer for GNSS <i>R. Peresty, M. Peca, J. Kraus</i> <i>SERENUM, a. s. (Czech Republic)</i>	<b>36</b>
11:30	Positioning Accuracy Using a Combination of GNSS and Inter-Satellite Observations <i>M. Stetter, U. Hugentobler</i> <i>Technische Universität München (Germany)</i>	<b>37</b>
11:50	Laser Ranging to Galileo (LR2G) <i>S. Dell'Agnello</i> <i>INFN-LNF (Italy)</i>	<b>38</b>
<b>12:10</b>	<b>Lunch Break</b>	
<b>14:00</b>	<b>Session 3A: E3 Atmospheric Research</b> <b>Room 1</b> <i>Chair: Dr. Francesco Vespe</i>	
	<b><i>The programme on this day runs in parallel sessions in Rooms 1 and 2</i></b>	
14:00	A 17 Year Time Series of Ground-based GNSS for Sensing of Atmospheric Water Vapour <i>G. Elgered, T. Ning</i> <i>Chalmers University of Technology (Sweden)</i>	<b>39</b>

14:20	A New Mapping Function Recovered from Atmospheric Profiles Retrieved by GNSS Radio Occultation Data <i>D.R. Vespe<sup>1</sup>, C. B. Benedetto<sup>1</sup>, E. Rosciano<sup>1</sup>, G. Vizziello<sup>2</sup></i> <i><sup>1</sup>ASI – Agenzia Spaziale Italiana (Italy), <sup>2</sup>Consorzio INNOVA (Italy)</i>	39
14:40	COST Action ES1206 : Advanced Global Navigation Satellite Systems Tropospheric Products for Monitoring Severe Weather Events and Climate (GNSS4SWEC) <i>J. Jones<sup>1</sup>, G. Guerova<sup>2</sup>, J. Dousa<sup>3</sup>, S. de Haan<sup>4</sup>, E. Pottiaux<sup>5</sup>, O. Bock<sup>6</sup>, R. Pacione<sup>7</sup>, G. Dick<sup>8</sup></i> <i><sup>1</sup>Met Office (United Kingdom), <sup>2</sup>Sofia University (Bulgaria), <sup>3</sup>Geodetic Observatory of Pecny (Czech Republic), <sup>4</sup>Royal Netherlands Meteorological Institute (The Netherlands), <sup>5</sup>Royal Observatory of Belgium(Belgium), <sup>6</sup>Institute Geographique National (France), <sup>7</sup>e-geos S.p.A. ASI/Centro di Geodesia Spaziale (Italy), <sup>8</sup>GFZ German Research Centre for Geosciences (Germany)</i>	40
<b>15:00</b>	<b>Coffee Break</b>	
15:30	GNSS Meteorology to Compute Weighted Mean Temperature and its Parameters for Turkey <i>C. Mekik, I. Deniz, G. Gurbuz</i> <i>Bulent Ecevit University (Turkey)</i>	40
15:50	Towards Real-time GNSS Troposphere Delay Monitoring Service for Poland <i>T.H. Hadas, J. Kaplon, J. Bosy</i> <i>Wroclaw University of Environmental and Life Sciences (Poland)</i>	41
16:10	The Potential of Galileo Inter-Satellite Ranging for Atmospheric Research <i>G. Möller, F. Hinterberger, A. Hofmeister, R. Weber</i> <i>TU Wien (Austria)</i>	41
<b>14:00</b>	<b>Session 3B: M3 Timing</b> <b><u>Room 2</u></b> <i>Chair: Dr. Pacôme Delva</i>	
	<b><i>The programme on this day runs in parallel sessions in Rooms 1 and 2</i></b>	
14:00	Galileo Signals for Time and Frequency Users <i>P. Defraigne<sup>1</sup>, W. Huang<sup>1</sup>, N. Bergeot<sup>1</sup>, J. M. Chevalier<sup>1</sup>, G. Cerretto<sup>2</sup>, E. Canton<sup>2</sup>, A. Perucca<sup>3</sup>, A. Mudrak<sup>4</sup></i> <i><sup>1</sup>Royal Observatory of Belgium (Belgium), <sup>2</sup>Istituto Nazionale di Ricerca Metrologica (Italy), <sup>3</sup>aizoOn (Italy), <sup>4</sup>ESA/ESTEC (The Netherlands)</i>	42
14:20	Interoperability of the GNSS's for Positioning and Timing Applications <i>A. Caporali<sup>1</sup>, L. Nicolini<sup>2</sup>, M. Bertocco<sup>2</sup></i> <i><sup>1</sup>University of Padova (Italy), <sup>2</sup>University of Padova – CISAS (Italy)</i>	43
14:40	Calibration and Distribution of UTC from Galileo <i>R. Píriz<sup>1</sup>, P. Roldán<sup>1</sup>, A. Cruz<sup>1</sup>, A. Bauch<sup>2</sup>, J. Leute<sup>2</sup>, J. Díaz<sup>3</sup>, E. Marín<sup>3</sup></i> <i><sup>1</sup>GMV (Spain), <sup>2</sup>PTB (Germany), <sup>3</sup>Seven Solutions (Spain)</i>	43
<b>15:00</b>	<b>Coffee Break</b>	
15:30	High-rate Clock Variations of the Galileo IOV-1/2 Satellites and their Impact on Carrier Tracking of Geodetic Receivers <i>O. Montenbruck<sup>1</sup>, A. Hauschild<sup>1</sup>, A. Häberling<sup>2</sup>, G. Katsigianni<sup>3</sup>, U. Hugentobler<sup>3</sup></i> <i><sup>1</sup>DLR / GSOC (Germany), <sup>2</sup>ETH (Switzerland), <sup>3</sup>TUM/IAPG (Germany)</i>	44
15:50	GNSS Time Transfer in the Context of BIPM Activities	46

*G. Petit<sup>1</sup>, J. Leute<sup>2</sup>, D. Piester<sup>2</sup>, A. Bauch<sup>2</sup>*  
*<sup>1</sup>BIPM (France), <sup>2</sup>PTB (Germany)*

**16:30**      **Poster Session**

**18:00**      **Departure to Downtown**

**19:00**      **Conference Dinner**

## Thursday 29 October 2015

<b>09:00</b>	<b>Session 4A: E1 Status and Trends in Earth Observation</b> <b>Room 1</b> <i>Chair: Prof. Dr. Gunnar Elgered</i>	
	<b>The programme on this day runs in parallel sessions in Rooms 1 and 2</b>	
09:00	GEROS-ISS: Innovative Ocean Remote Sensing Using GNSS Reflectometry Onboard the International Space Station <i>J. Wickert<sup>1</sup>, O. Andersen<sup>2</sup>, B. Chapron<sup>3</sup>, E. Cardellach<sup>4</sup>, J. Hatton<sup>5</sup>, P. Hoeg<sup>2</sup>, A. Jäggi<sup>6</sup>, N. Jakowski<sup>7</sup>, M. Kern<sup>5</sup>, T. Lee<sup>8</sup>, M. Martin-Neira<sup>5</sup>, N. Pierdicca<sup>9</sup>, C. K. Shum<sup>10</sup>, M. Semmling<sup>1</sup>, C. Zuffada<sup>8</sup></i> <i><sup>1</sup>GFZ Potsdam (Germany), <sup>2</sup>Technical University of Denmark (Denmark), <sup>3</sup>IFremer (France), <sup>4</sup>IEEC/ICE-CSIC, Institute of Space Sciences (Spain), <sup>5</sup>ESA/ESTEC (The Netherlands), <sup>6</sup>University of Bern (Switzerland), <sup>7</sup>DLR (Germany), <sup>8</sup>Jet Propulsion Laboratory, Caltech (United States), <sup>9</sup>Sapienza University of Rome (Italy), <sup>10</sup>Ohio State University (United States)</i>	<b>46</b>
09:20	Current Research Activities at UPC on Earth Remote Sensing using GNSS-R <i>A. Camps, H. Park, H. Carreno-Luengo, A. Alonso-Arroyo, D. Pascual, R. Onrubia, J. Querol</i> <i>Universitat Politecnica de Catalunya-Barcelona Tech (Spain)</i>	<b>47</b>
09:40	Resolution Improvement of GNSS-based Bistatic Synthetic Aperture Radar Using Combined Galileo E5 Signals <i>M. Antoniou<sup>1</sup>, H. Ma<sup>2</sup>, J. Winkel<sup>3</sup>, M. Cherniakov<sup>1</sup>, C. Buck<sup>4</sup></i> <i><sup>1</sup>University of Birmingham (United Kingdom), <sup>2</sup>Beihang University (China), <sup>3</sup>IFEN GmbH (Germany), <sup>4</sup>ESA/ESTEC (The Netherlands)</i>	<b>48</b>
10:00	Determination of Temporal Changes in the Earth's Gravitational Field Using Optical Two-way Links between GALILEO and LEO Satellites <i>M. Hauk, M. Murböck, R. Pail, A. Schlicht</i> <i>TUM (IAPG) (Germany)</i>	<b>49</b>
10:20	Use of GNSS Tropospheric Products and Numerical Weather Prediction Model to Study Fog in Bulgaria <i>D. Guerova<sup>1</sup>, M. Stoycheva<sup>2</sup>, M. Manafov<sup>3</sup></i> <i><sup>1</sup>Sofia University (Bulgaria), <sup>2</sup>National Institute of Meteorology and Hydrology (Bulgaria), <sup>3</sup>Bulatsa (Bulgaria)</i>	<b>49</b>
<b>10:40</b>	<b>Coffee Break</b>	
<b>09:00</b>	<b>Session 4B: P1 Fundamental Physics</b> <b>Room 2</b> <i>Chair: Dr. Roberto Prieto-Cerdeira</i>	
	<b>The programme on this day runs in parallel sessions in Rooms 1 and 2</b>	
09:00	Test of the Gravitational Redshift Using Galileo Satellites 5 and 6 <i>P. Delva<sup>1</sup>, E. Richard<sup>1</sup>, P. Wolf<sup>1</sup>, A. Hees<sup>2</sup>, S. Bertone<sup>3</sup></i> <i><sup>1</sup>Syrte/Observatoire de Paris/UPMC (France), <sup>2</sup>Department of Mathematics, Rhodes University (South Africa), <sup>3</sup>Astronomical Institute, University of Bern (Switzerland)</i>	<b>49</b>

09:20	Clocks in Space <i>C. Lämmerzahl<sup>1</sup>, E. Hackmann<sup>1</sup>, M. List<sup>1</sup>, S. Herrmann<sup>1</sup>, V. Perlick<sup>1</sup>, D. Puetzfeld<sup>1</sup>, F. Merkle<sup>2</sup>, B. Rievers<sup>1</sup></i> <i><sup>1</sup>ZARM, University of Bremen (Germany), <sup>2</sup>OHB Systems (Germany)</i>	50
09:40	The Time Transfer and Sygne World Functions in Relativistic Positioning Systems <i>A. Heffernan<sup>1</sup>, C. Gerekos<sup>2</sup></i> <i><sup>1</sup>ESA/ESTEC (The Netherlands), <sup>2</sup>Université Libre de Bruxelles (Belgium)</i>	50
10:00	General Relativistic Experiments Using Accelerometry and Eccentric Orbits of GALILEO Satellites <i>D. Vespe</i> <i>ASI – Agenzia Spaziale Italiana (Italy)</i>	51
10:40	<b>Coffee Break</b>	
11:10	<b>Session 5A: N3 GNSS Signal Processing</b> <b>Room 1</b> <i>Chair: Prof. Dr. Günter Hein</i>	
	<b><i>The programme on this day runs in parallel sessions in Rooms 1 and 2</i></b>	
11:10	A Review of Pre-Despreading GNSS Interference Detection Techniques <i>A. Jafarnia Jahromi, S. Daneshmand, A. Broumandan, G. Lachapelle</i> <i>University of Calgary (Canada)</i>	51
11:30	Simulink-based Open-source Simulator for the Narrowband Interference Mitigation in E5a Galileo Band <i>D. Alonso de Diego , N. G. Ferrara, J. Nurmi, E. S. Lohan</i> <i>TUT (Finland)</i>	52
11:50	Effectiveness of GPS-GALILEO Inter-frequency Biases due to Mixed Signal Types on Ambiguity Resolution and Integrity Applications <i>G. Lalgudi Gopalakrishnan, H. Boomkamp, J. Feltens</i> <i>Telespazio VEGA Deutschland GmbH (Germany)</i>	54
12:10	A Context-Aware GNSS Multipath Compensation Algorithm based on Pattern Recognition Approaches <i>N. Sokhandan Asl, A. Broumandan, G. Lachapelle</i> <i>University of Calgary (Canada)</i>	55
11:10	<b>Session 5B: M1 : Clock Development and Use</b> <b>Room 2</b> <i>Chair: Dr. Andreas Bauch</i>	
	<b><i>The programme on this day runs in parallel sessions in Rooms 1 and 2</i></b>	
11:10	High Stability Double-modulation CPT Cesium Compact Clock <i>P. Jun, S. Mejri, F. Tricot, E. de Clercq, S. Guerandel</i> <i>Observatoire de Paris (France)</i>	56
11:30	MuClock: a Commercial Cold Atom Clock for Ground Applications <i>J. F. Schaff<sup>1</sup>, R. Szmuk<sup>2</sup>, M. Langlois<sup>2</sup>, L. de Sarlo<sup>2</sup>, D. Holleville<sup>2</sup>, N. Dimarcq<sup>2</sup>, B. Desruelle<sup>1</sup></i> <i><sup>1</sup>Muquans (France), <sup>2</sup>SYRTE, Observatoire de Paris, PSL Research University, CNRS, Sorbonne Universités, UPMC Univ. Paris 06, LNE (France)</i>	57



11:50	Towards a Highly Compact Rb Atomic Clock with Improved Stability for Space Applications <i>C. Affolderbach, M. Gharavipour, S. Kang, F. Gruet, G. Mileti</i> <i>University of Neuchatel (Switzerland)</i>	57
12:10	Stable Clocks for Precise Orbit Determination and Navigation <i>T. Romanyuk, U. Hugentobler</i> <i>TUM (Germany)</i>	58
12:30	<b>ESA / Local</b>	
12:45	<b>CLOSE COLLOQUIUM</b>	
12:45	<b>Lunch in PTB casino (self-organized)</b>	
14:00	<b>Guided tours to PTB laboratories</b>	

## Poster Sessions

- P01** Evaluation of Possibilities of Using Precise Point Positioning Method to Determine Orthometric Heights  
*G. Krzan, K. Dawidowicz, K. Świątek*  
*University of Warmia and Mazury in Olsztyn (Poland)*
- P02** Reliable Receiver Quality Assessment by Means of a Record and Playback System  
*D. Spiegel, U. Becker*  
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