



**PPP-RTK & Open Standards
Symposium, March 12-13, 2012
Workshop, March 14, 2012**

Literaturhaus Frankfurt
Schöne Aussicht 2
D-60311 Frankfurt am Main
Germany

Program, Day 1

Monday, 12th March 2012

08:30 **Registration**

09:00 **Opening and Introduction**

Global Geodetic Observing System and the Contribution of GNSS

*Hansjörg Kutterer, President of the Federal Agency for Cartography and Geodesy (BKG),
Chair of Global Geodetic Observing System (GGOS), Frankfurt, Germany*

From GPS to GNSS – Challenges and Prospects

*Urs Hugentobler, Chair International GNSS Service (IGS) Governing Board,
Institute for Astronomical and Physical Geodesy, Technical University Munich, Germany*

Kinematic GNSS towards Real-time

*Volker Schwieger, International Federation of Surveyors (FIG), Commission 5,
Institute of Engineering Geodesy, University of Stuttgart, Germany*

Enabling GNSS Standards that Support Emerging Positioning and Related Technologies

*Rudy Kalafus, Radio Technical Commission for Maritime Services (RTCM), Special Committee on
Differential Global Navigation Satellite Systems (SC-104), Arlington, VA, U.S.A.*

10:00 **Essentials**

Chair: *Georg Weber, Federal Agency for Cartography and Geodesy (BKG), Frankfurt, Germany*

RTCM State Space Representation (SSR), Overall Concept Towards PPP-RTK

*Gerhard Wübbena, RTCM SC104, Chair of State Space Representation Working Group, Geo++ GmbH, Garbsen,
Germany*

RTCM State Space Representation Messages, Status and Plans

Martin Schmitz, Geo++ GmbH, Garbsen, Germany

RTCA SBAS DO-229 Today and in the Future with GNSS Evolutions

*Michel Tossaint, European Space Agency, European Space Research and Technology Centre, Noordwijk, The
Netherlands*

11:00 Coffee Break



11:30 **Global Ionosphere**

Chair: *Tim Springer, European Space Agency, Space Operations Centre (ESA/ESOC), Darmstadt, Germany*

Generating Global and Regional Ionospheric Delay Model for Real-time Precise Point Positioning Service
Hongping Zhang, Research Center for Geoscience, Potsdam, Germany

Fast Precise Point Positioning Based on Real-time Ionospheric Modelling

Manuel Hernandez-Pajares, Res. Group of Astronomy and Geomatics, Universitat Politecnica de Catalunya, Barcelona, Spain

Global TEC Service for Ionospheric Delay Correction and Different Approaches for Higher Order Effects Mitigation

Mainul Hoque, German Aerospace Center (DLR), Institute of Communications and Navigation, Neustrelitz, Germany

12:30 Lunch

13:30 **Regional and Local Augmentations**

Chair: *Neil D. Weston, Spatial Reference Systems Division, National Geodetic Survey, National Oceanic and Atmospheric Administration, Silver Spring MD, U.S.A.*

Augmenting Global Real-time PPP Service with Regional Reference Network for Instantaneous cm-Level Positioning

Maorong Ge, Research Center for Geoscience, Potsdam, Germany

Strategy for an Internet Based Best Effort Regional PPP Product Delivery Free from Outages and Outliers – The EUREF Example

Wolfgang Söhne, Federal Agency for Cartography and Geodesy, Frankfurt, Germany

GNSS Precise Point Positioning in Regional Reference Frames Using Real-time Broadcast Corrections
Lennard Huisman, Kadaster, Apeldoorn, The Netherlands

15:00 Coffee Break

15:30 **Phase Biases and Ambiguity Resolution**

Chair: *Paul Collins, Geodetic Survey Division, Natural Resources Canada, Ottawa*

Phase Biases Estimation for Undifferenced Ambiguity Resolution

Denis Laurichesse, Centre National D'Etudes Spatiales, Toulouse, France

Processing GNSS Data in Real-time: Algorithms, Issues, and Challenges

Leos Mervart, GPS Solutions Inc., Boulder CO, U.S.A. and Geodetic Institute, Czech Technical University, Prague, Czech Republic

Results from Bernese IGS Workshop “GNSS Biases” on 18-19 Jan 2012

Stefan Schaer, Astronomical Institute, University of Bern, Switzerland

17:00 End of Day 1

19:00 Evening Event



Program, Day 2

Tuesday, 13th March 2012

09:00 Existing Services

Chair: *Matthias Becker, Institute of Physical Geodesy, Technical University Darmstadt, Germany*

Worldwide Centimeter Accurate GNSS Positioning Using Trimble RTX Technology
Herbert Landau, Trimble Terrasat GmbH, Höhenkirchen, Germany

Fugro's Precise (Point) Positioning Services
Kees de Jong, Fugro Intersite B.V., Leidschendam, The Netherlands

Title: TBD
Chaochao Wang, NavCom Technology, Torrance, Canada (enquired)

Providing Global GNSS Augmentation Data – A Commercial Service Provider's Perspective
Pieter Toor, VERIPOS, Norwich, Great Britain

10:30 Coffee Break

11:00 Emerging Services

Chair: *Robert Weber, Institute of Geodesy and Geophysics, University of Technology Vienna, Austria*

The IGS Real Time Infrastructure: From Pilot Project to Operational Service
Loukis Agrotis, European Space Agency, European Space Operations Center (ESA/ESOC), Darmstadt, Germany

Galileo Commercial Service – Status and Opportunities
Marco Dettratti, European GNSS Agency, Brussels, Belgium

Centimeter-Class Positioning Augmentation Utilizing Quasi-Zenith Satellite System
Yuki Sato, Mitsubishi Electric Corporation, Amagasaki Hyōgo, Japan

JAXA's PPP Experiment via QZSS
Motoyuki Miyoshi, Japan Aerospace Exploration Agency (JAXA), Tsukuba, Japan

12:30 Lunch

13:30 Prototype of Multi-Constellation Augmentation Service System in China
Yidong Lou, GNSS Research Center, Wuhan University, Wuhan, China

13:55 Product Dissemination

Chair: *Jürgen Rüffer, ALLSAT & AXIO-NET, Hannover, Germany*

Mass-Usage of Ntrip for GNSS Product Dissemination, Experiences and Perspectives
Dirk Stöcker, Alberding GmbH, Schönefeld, Germany

Broadcasting Via TV Satellite Links:
Subscription Based and Secure GNSS Data Transmission & Loss-less RTCM Data Compression
Rafal Mielniczuk, University of Applied Science Konstanz (HTWG), Germany

Broadband Spectrum Controversy, in GNSS/PPP Context, Pros & Cons
Gavin Schrock, Washington State Reference Network and Professional Surveyor Magazine, Seattle, U.S.A.

15:00 Coffee Break



15:30 **Tools and Applications**

Chair: *Peter Teunissen, Cooperative Research Centre for Spatial Information, Perth, Australia*

PPP Ambiguity Resolution Implementation in RTKLIB v 2.4.2

Tomoji Takasu, Tokyo University of Marine Science and Technology, Japan

Precision Farming, Sensor Applications for Guidance Systems

Marcus Reutemann, John Deere European Technology Innovation Center, Kaiserslautern, Germany

PPP-RTK from the Network RTK Service Providers' Point of View

Tamás Horváth, Institute of Geodesy Cartography and Remote Sensing, Budapest, Hungary

Development of Japanese Disaster Mitigation System Using Real-time PPP with Ambiguity Resolution for
Tsunami Buoys & Ground Networks

Masayuki Kanzaki, Hitachi Zosen Corporation, Tokyo, Japan

16:45 **Wrap-up**

Georg Weber, Federal Agency for Cartography and Geodesy, Frankfurt, Germany

17:00 End of Symposium

Workshop & Tutorial, Day 3

Wednesday, 14th March 2012

09:00 **Future SSR Messages and Related Open Source Software Tools**

Future RTCM Message Contents and Design for PPP-RTK/SSR

Gerhard Wübbena, RTCM SC104, Chair of State Space Representation Working Group, Geo++ GmbH, Garbsen, Germany

Introduction to Real Time Kinematic Library (RTKLIB) Usage

Tomoji Takasu, Tokyo University of Marine Science and Technology, Japan

Introduction to BKG Ntrip Client (BNC) Usage

Leos Mervart, GPS Solutions Inc., Boulder CO, U.S.A. and Geodetic Institute, Czech Technical University, Prague, Czech Republic

Ntrip Modernization and Professional Ntrip Caster

Dirk Stöcker, Alberding GmbH, Schönefeld, Germany

13:00 Lunch

14:00 Further discussions with BKG colleagues if wanted