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GNSS

providing solutions for life on earth

Munich, March 16–17, 2021

ONLINE CONFERENCE

MUNICH SATELLITE NAVIGATION SUMMIT 2021

Silver Sponsor: GALILEO

3rd ANNOUNCEMENT

After the cancellation of the **Munich Satellite Navigation Summit** due to the COVID-19 pandemic we are very much looking forward to an up-to-date version of the conference, which will take place from **March 16** (starting at **1 pm CET**) to **March 17, 2021**!

Being held virtually, the Munich Satellite Navigation Summit 2021 will provide you as always with highlevel speakers, inspiring discussions and first hand information about the current developments in the field of GNSS.
Make sure to check our website for the latest information: **www.munich-satellite-navigation-summit.org**

The conference program will run under the theme **"GNSS – providing solutions for life on earth"** and will cover the following:

TRENDING TOPICS of the 2021 edition

- First and Second Generation of the European Satellite Navigation System Galileo
- Modernization of the US Global Positioning System
- Status and modernization of the Russian Global Satellite Navigation System GLONASS and the Chinese Beidou System (BDS)
- Developments of regional systems like the Japanese QZSS and the Indian IRNSS
- Modern Agriculture under the use of GNSS
- Sensing the Earth's atmosphere and surface with GNSS
- Autonomous systems, related legal issues and related PPP technology
- Galileo and the civil use of the Public Regulated Service (PRS)
- Megaconstellations, Kepler, SSV, future trends and technologies for PNT
- Impact of COVID-19 on GNSS

…and many more up-to-date topics on GNSS!

ABOUT THE MUNICH SATELLITE NAVIGATION SUMMIT:

The Munich Satellite Navigation Summit is a conference with global impact dealing with satellite navigation now and in the future. The one-of-a-kind convention of high-ranking worldwide speakers from industry, science and governments provides the participants with a broad overview and different perspectives on the latest developments in the field of GNSS.

The Summit is part of the efforts of the Bavarian government and the cluster on aerospace and satellite navigation to stimulate applications and services in this high-tech field.

Registration is possible via **http://www.munich-satellite-navigation-summit.org**
If there are any questions, please contact:
+49-89-6004-3425 or email to **info@munich-satellite-navigation-summit.org**

DAY 1. Tuesday, March 16, 2021

10.30–12.30 hrs **Networking.** GNSS.asia Global Meetups

12.45–14.45 hrs **Afternoon.** OPENING PLENARY

The Bavarian State Minister of Economic Affairs, Regional Development, and Energy, representatives of the European Commission, the European Space Agency, National Space Agencies as well as representatives from USA, Russia and China are opening the Munich Satellite Navigation Summit 2021.

Welcome:
Prof. Dr. Thomas Pany, ISTA, Universität der Bundeswehr München, Neubiberg, Germany
Prof. Dr. Merith Niehuss, President, Universität der Bundeswehr München, Neubiberg, Germany
Hubert Aiwanger, Bavarian State Minister of Economic Affairs, Regional Development, and Energy and Deputy Bavarian Prime Minister, Munich, Germany
Andreas Scheuer, Federal Minister of Transport and Digital Infrastructure, Member of the German Bundestag, Berlin, Germany

Moderator:
Claus Kruesken, Presenter, Bayerischer Rundfunk (Bavarian Broadcasting), Munich, Germany

Panel Members:
Matthias Petschke, Director, EU GNSS Programmes, DG GROW, European Commission, Brussels, Belgium
Dr. Josef Aschbacher, Director General, European Space Agency (ESA), Paris, France
Rodrigo da Costa, Executive Director, European GNSS Agency (GSA), Prague, Czech Republic
Prof. Dr. Anke Kaysser-Pyzalla, Chair of the Executive Board, German Aerospace Center (DLR), Cologne, Germany
Harold „Stormy" Martin, Director, National Coordination Office for Space-Based Positioning, Navigation, and Timing, Washington, DC, USA
Oleg Kem, Director of the Department of Navigation Space Systems (GLONASS), ROSCOSMOS State Space Corporation, Moscow, Russia
Dr. Guifei Jing, Beihang University, Beijing, China
Dr. Graham Turnock, Chief Executive, UK Space Agency, Swindon, UK
Jean-Yves Le Gall, President, Centre National d'Etudes Spatiales (CNES), Paris, France

14.45–15.00 hrs **Have a break**
or attend the Round Table Discussion hosted by **Spaceopal**
Moderator: **Marco Folino,** Managing Director, Spaceopal GmbH, Munich, Germany

15.00–16.30 hrs Session 1. **GNSS PROGRAM UPDATES – GLOBAL, REGIONAL AND AUGMENTATION SYSTEMS**

Presentations are informing about news from the worldwide global, regional and augmentation satellite navigation systems in operation and under development.

Chairman:
Mike Swiek, Mike International, LLC, Washington, DC, USA

Panel Members:
Xavier Maufroid, Head of Galileo Implementation Team, European Commission, Brussels, Belgium
Javier Benedicto, Galileo Programme Manager, ESA, Paris, France
Guerric Pont, Acting Head of Galileo Services Department, GSA, Prague, Czech Republic
„Status of Galileo"
Harold „Stormy" Martin, Director, National Coordination Office for Space-Based Positioning, Navigation, and Timing, Washington, DC, USA
„Status and Modernization of the US Global Positioning System and WAAS"
Ivan Revnivykh, Head of the GLONASS Application Division of the Satellite Navigation Systems (GLONASS) Directorate, ROSCOSMOS State Space Corporation, Moscow, Russia
„Status of GLONASS"
Gucang Chen, Deputy Director, China Satellite Navigation Office, Beijing, China
„BeiDou Navigation Satellite System Development"
Vincent Brison, EGNOS Operations and Maintenance Manager, GSA, Prague, Czech Republic
„Status of EGNOS"
Dr. Satoshi Kogure, QZSS Executive Director, National Space Policy Secretariat, Cabinet Office, Tokyo, Japan
„Status of the Japanese QZSS Regional System"
Dr. N.K. Philip, Programme Director, Satellite Navigation Programme, ISRO/URSC, Bengaluru, India
„Status of IRNSS/NavIC and GAGAN "
Sharafat Gadimova, Program Officer, UN Office for Outer Space Affairs, Vienna, Austria
„ICG Developments"

16.30-16.45 hrs

Have a break
or attend the Round Table Discussion hosted by **Airbus on next challenges in Navigation**

16.45–17.40 hrs

THE IMPACT OF COVID-19 ON GNSS
Presentations on satellite-based antivirus-solutions in Asia and Europe and on the impact of COVID-19 on labour and business in the space sector.

Chairwoman:
Justyna Redelkiewicz, GSA, Market Development, Prague, Czech Republic

Panel Members:
Carla Filotico, Partner, SpaceTec Partners, London, UK
In-Seung Kay, Project Manager Korea, GNSS.asia, Seoul, Republic of Korea
Hanhua Wang, Beijing University of Posts and Telecommunications, Beijing, China
Pierluigi Fedele, Galileo Service Provision Manager, spaceopal GmbH, Munich, Germany

17.45–19.00 hrs

Session 2. MUNICH FLASHLIGHTS – NEWS FROM BAVARIA

Brief presentations from the Munich scene reporting on news and activities of the Bavarian satellite navigation network of excellence and of the high-tech cluster of satellite navigation.

Chairwoman:

Bärbel Deisting, Director Space and Space Applications, bavAIRia e. V., Gilching, Germany

Panel Members:

Lars Weimer, Chief Operating Officer, esc Aerospace GmbH, Taufkirchen, Germany
Dr. Patrick Henkel, Founder and Managing Director, Advanced Navigation Solutions - ANavS, Munich, Germany
Dr. Markus Irsigler, Product Manager, Rohde & Schwarz GmbH & Co. KG, Munich, Germany
Jürgen Seybold, Managing Director, TeleOrbit GmbH, Nuremberg, Germany
Matthias Overbeck, Group Manager Precise GNSS Receivers, Fraunhofer IIS, Nuremberg, Germany
Sowmyashree Lakshmaiah, Director Navigation Simulators, Work Microwave, Holzkirchen, Germany
Martin Grzebellus, Managing Director, NavCert GmbH, Munich, Germany
Daniela Dobreva-Nielsen, Director Business Development, Anwendungszentrum GmbH, Oberpfaffenhofen, Germany

19.00 hrs

End of first day

DAY 2. **Afternoon.** Wednesday, March 17, 2021

13.00–14.30 hrs

LIFE APPLICATIONS

Session 3.
THE (R)EVOLUTION OF FARMING WITH SATELLITE NAVIGATION

Over the past decade, the agricultural sector adapted quickly to new and digital technologies, increasing the use of satellite navigation for day-to-day farming. With modern equipment and big-data solutions, it is possible to use more efficiently fertilizer with the method of "Precision Farming". Farmers are nowadays able to collect a multitude of data and gather broad knowledge about their crops and livestock in order to increase in profitability as well as sustainability. Autonomous robots are already operational for mechanical weeding in vegetable crops and vineyards to avoid spreading herbicides. In this session, representatives of farm equipment manufacturers and experts in the field of modern agriculture will present and discuss current trends and solutions that take advantage of the benefits of satellite navigation for the future of farming.

IMPROVING TECHNIQUES

Session 4.
CRITICAL TRENDS FOR FUTURE NAVIGATION & TIMING SYSTEMS

In the last decades, Navigation & Timing Systems design has been MEO satellites constellation based and pivoted around 3 main drivers, the individual satellites ranging accuracy, the reduction of the dilution of precision/optimization of constellation geometry and the optimization of acquisition/tracking performance through different space and ground based techniques. Due to the vast adoption of PNT as one of the key engines for industrial growth across all sectors, the diversification of user communities and associated advanced needs is leading to a Navigation & Timing Systems Design revolution. This panel will address critical trends that may play a key role in future systems design (hybrid constellations including role of mega constellations, higher frequency bands usages including optical, usage of signals of opportunity for navigation, terrestrial vs satellite navigation systems complementarity,...). These topics will be addressed through a round table of public and private entities and international representatives that are currently leading the world vision into the future of navigation.

Chairman:
Thierry Chapuis,
Expert Space Applications, CNES, Toulouse, France

Panel Members:
Christophe Aubé,
Founder and President, AgreenCulture, Toulouse, France
Reinhard Blasi,
Market Development Officer/ Acting Head of Communications, GSA, Prague, Czech Republic
Robert Fraune,
Worldwide Director OEM Sales, Müller-Elektronik, Salzkotten, Germany
Dr. Thomas Engel,
Manager Technology Innovation Strategy, John Deere GmbH & Co. KG, Mannheim, Germany
Klaus-Herbert Rolf,
Network Manager, Claas Agrosystems GmbH & Co. KG, Gütersloh, Germany

Chairmen:
Eric Chatre,
Head of sector for Exploitation and Evolutions of the European satellite navigation programmes, European Commission, Brussels, Belgium
Miguel Manteiga Bautista,
Head of GNSS Evolution Programme and Strategy Division, ESA, Noordwijk, The Netherlands

Panel Members:
Roberto Prieto-Cerdeira,
GNSS R&D Principal Engineer, ESA/ESTEC Noordwijk, The Netherlands
Dr. Fredrik Gunnarsson,
Expert in RAN Automation and Positioning, Ericsson, Linkoping, Sweden
Alberto Madrazo,
Galileo Service Manager, GSA, Prague, Czech Republic
Dr. José Antonio del Peral-Rosado,
Future Programmes Navigation Engineer, Airbus Defence and Space, Taufkirchen, Germany
Michel Monnerat,
Navigation Domain Bid & Advanced Projects Director, Thales Alenia Space, Toulouse, France
Sandy Kennedy,
Vice President Innovation, Hexagon's Autonomy & Positioning Division, Calgary, Alberta, Canada

14.30–15.00 hrs

Have a break
or attend the Round Table Discussion hosted by **OHB on simplifying high precision services for sustainable agriculture**
Moderator: **Frank M. Salzgeber,** Head of Innovation and Ventures Office, ESTEC, ESA, Noordwijk, The Netherlands

15.00–16.30 hrs

LIFE APPLICATIONS

Session 5.
GNSS REMOTE SENSING: HIGHLIGHTS AND PROSPECTS

Ground and satellite based GNSS Remote Sensing (GNSS-RS) developed during the recent two decades into a powerful and versatile tool for Earth System Research. A highlight and established application is the operational use of spaceborne GNSS radio occultation data from several satellite missions to improve the day-by-day global weather predictions of the leading forecast centers. The status and future developments of this key GNSS-RS application are reviewed. GNSS signals, reflected from water, ice and land surfaces (GNSS-Reflectometry, GNSS-R), enable versatile geophysical applications such as sea surface altimetry, observation of wind speed and precipitation over oceans, and soil moisture or snow height observation on land. GNSS-R principles and applications are introduced and promising developments for a comprehensive Earth Observation with small satellite constellations are presented.

Chairman:
Prof. Dr. Jens Wickert,
German Research Centre for Geosciences, Technische Universität Berlin

IMPROVING TECHNIQUES

Session 6.
NEW FRONTIERS IN GNSS ACCURACY

"The technology is possible – and it's incredible!" Recent advances in GNSS correction services bring unprecedented accuracy in near-real time without base stations: centimeter level with global availability. Our experts explain the algorithms of precise point positioning (PPP), real-time kinematic (RTK) and the newly achieved RTK+PPP; define the positioning requirements for high-precision applications in terms of accuracy, availability, continuity and convergence time; demonstrate testing to verify the new benchmarks; show performance with real-time transmission, raw data, corrections processing, and data set transmission; and give examples for PPP service and applications in dynamic operations.

Chairman:
Alan Cameron,
Editor-in-Chief INSIDE GNSS Magazine, Red Bank NJ, USA

WHAT COMES NEXT?

Session 7.
INSIGHTS IN STATUS AND FUTURE OF GALILEO

Following the 2016 declaration of Initial Services, the performance of Galileo will gradually improve as additional satellites and services are added. The session will provide the status of the system deployment, including an overview on the most innovative added-value elements and services to be introduced in the next few years. Some highlights on the various activities being performed towards the Galileo 2nd Generation (G2G) will be presented, too. The session will also provide up-to-date information on the Public Regulated Service (PRS) and its user segment technology, including some innovative development.

Chairmen:
Matteo Paonni,
Project Manager, European Commission, Joint Research Centre (JRC), Ispra, Italy
Dr. Stefan Baumann, Programme Manager, IABG, Ottobrunn, Germany

Panel Members:
Dr. Estel Cardellach,
Distinguished Researcher, Institute of Space Sciences (ICE-CSIC/IEEC), Madrid, Spain
Dr. Dallas Masters,
Director, Earth Observations/GNSS, Spire Global Inc., Boulder CO, USA
Dr. Sean Healy,
Senior Scientist, European Centre for Medium-Range Weather Forecasts (ECMWF), Reading, UK

Panel Members:
Prof. Dr. Peter J.G. Teunissen,
Professor of Geodesy and Satellite Navigation, Curtin University, Perth, Australia, and Delft Technical University
Romain Zimmermann,
Business Development Manager, Spirent Communications, London, UK
Paul Alves,
Director Correction Services, Hexagon's Autonomy & Positioning Division, Calgary, Alberta, Canada
André Bauerhin,
Managing Director, spaceopal GmbH, Munich, Germany

Panel Members:
Jeremie Godet,
Deputy Head of Galileo and EGNOS Unit, DG Defence Industry and Space, European Commission, Brussels, Belgium
Damien Bellier,
Interministerial Delegate for GNSS, Ministry for the Ecological and Inclusive Transition, General Commission for Sustainable Development, Paris, France
Fiammetta Diani,
Head of Market Development Department, GSA, Prague, Czech Republic
Piotr Sitek,
PRS Technical Officer, Security Department, GSA, Prague, Czech Republic
Dr. Jan Wendel,
Expert Navigation Systems, Airbus Defense and Space Ottobrunn, Germany
Alexander Rügamer,
Program Manager PRS, Satellite Based Positioning Systems Department, Fraunhofer IIS, Nuremberg, Germany

16.30-17.00 hrs

Have a break
or attend the Round Table Discussion hosted by **Syntony on complex GNSS simulation**

17.00-18.30 hrs

LIFE APPLICATIONS	IMPROVING TECHNIQUES	WHAT COMES NEXT?
Session 8. **REGULATORY AND CYBERSECURITY ASPECTS OF AUTOMATED/ AUTONOMOUS SYSTEMS** This year´s Legal Session will focus on regulatory and cybersecurity aspects for automated and autonomous systems. Co-organized again by BHO Legal, the session will include high-level speakers from relevant international organizations, national ministries and industry providing insight on the current state in the development of suitable regulatory frameworks and on efforts in coping with ever-increasing cybersecurity threats. On the way from automated to increasingly autonomous systems, there are significant technical hurdles, including proper cybersecurity. The development also raises completely new aspects with regard to established legal principles such as causality, responsibility and – ultimately – liability. **Chairmen:** **Dr. Ingo Baumann,** Partner, BHO Legal, Cologne, Germany **Dr. Oliver Heinrich,** Partner, BHO Legal, Cologne, Germany	**Session 9.** **PPP FOR SAFETY OF LIFE APPLICATIONS, DREAM OR REALITY?** Over the last years Precise Point Positioning (PPP) techniques have demonstrated their capability to provide high accuracy positioning services at any location, reducing the support of any dense local or regional infrastructure. This paved the way for the provision of low cost high accuracy positioning services. Nowadays, many user communities, such as automotive, rail, maritime, agriculture, etc. are becoming enthusiastic about the potential of PPP techniques, and are now looking for, or implementing solutions able to deliver certain levels of integrity. Some years ago the provision of safe PPP solutions was a dream, but today it is becoming a reality. This will enable a wide range of low cost new autonomous and safety of life applications. **Chairman:** **Miguel Romay Merino,** GNSS Executive Officer, GMV, Madrid, Spain	**Session 10.** **THE FUTURE IN SPACECRAFT NAVIGATION & TECHNOLOGIES – NEW SYSTEMS, CONCEPTS AND APPLICATIONS** The session will cover innovations in terms of concepts, technologies and also applications related to the wide field of spacecraft navigation. This concerns both, the important topics of spacecraft navigation itselfs as well as trends and proposals for new system concepts and related technologies on board of future spacecraft. In this context, the activities of the UN – International Committee on GNSS (ICG) for establishing an interoperable GNSS Space Service Volume (SSV) – and associated standards will be addressed. The status of Kepler satellite navigation concept exploiting optical links and quantum technology is outlined and related to benefits in user applications. Further, mega-constellations in LEOs as a second shell beyond the conventional GNSS MEO constellation will be addressed and linked to the enormous benefits on user level for accurate and reliable carrier phase or Doppler based spacecraft navigation. **Chairman:** **Prof. Dr. Werner Enderle,** Head of Navigation Support Office, ESA/ESOC, Darmstadt, Germany

Panel Members:
Robert Gale,
Marine Technology Policy Manager – Ship Standards, Maritime & Coastguard Agency, Southampton, UK
Patrick O'Keeffe,
Managing Director, AMC Solutions, Kiel, Germany
Rita Sousa Uva,
Legal Adviser, European Union Aviation Safety Agency, Cologne, Germany

Panel Members:
Deane Bunce,
Senior Engineer, Zeta Associates, Fairfax, VA, USA
Dr. Ignacio Fernandez-Hernandez,
Administrator - Galileo Authentication and High Accuracy Service Manager, European Commission, Brussels, Belgium
Dr. Sam Pullen,
Senior Research Engineer, Aeronautics & Astronautics, Stanford University, Stanford, CA, USA
Rodrigo Leandro,
Vice President and Chief Technology Officer, Sapcorda Services GmbH, Scottsdale, AZ, USA
Juan Ramón Martin,
Business Development Manager Navigation, GMV, Madrid, Spain

Panel Members:
Prof. Dr. Michael Meurer,
Head of Navigation Department, Institute of Communications and Navigation, DLR, Oberpfaffenhofen/ Wessling, Germany
Marlon Sorge,
Principal Engineer, Space Innovation Directorate, The Aerospace Corporation, Albuquerque, NM, USA
Prof. Dr. Werner Enderle

18.30 hrs **Conclusion and Farewell by Prof. Thomas Pany and the Summit Team**

REGISTRATION

Online registration is possible via the website www.munich-satellite-navigation-summit.org

Registration fee:

Full Summit Rate	Speakers' Rate
€ 250,00	€ 150,00

The registration fee includes the following:

- access to all online sessions
- active participation in the discussions
- download of the proceedings

CANCELLATION/REFUND POLICY

Written cancellations until **March 2, 2021** are refundable less €95 cancellation fee. After March 2, 2021 there will be no refunds.
We regret that individual registration benefits are not transferable.

EXHIBITION & SPONSORING

Interested in supporting this unique event and to present your company in a new virtual format? Please contact us, so we can discuss about details.

CONTACT

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