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"RESILIENT PNT – BACKBONE OF AUTONOMY & CRITICAL INFRASTRUCTURE!" this will be the theme of the 2025 edition of the Munich Satellite Navigation Summit, taking place from March 26–28, 2025! The Summit will be held on site, as a hybrid conference.

Today PNT services from space are challenged from many directions. Jamming and spoofing events are at an all-time high, but also solar activity is at its maximum causing degraded navigation accuracy or malfunctioning systems in space and on earth. Whereas the everyday use of GNSS by smartphones is still perceived as perfectly normal, those challenges clearly impact operations of safety critical autonomous systems on land, at sea and in the air. The same is true for critical infrastructure depending on space-based PNT and required to operate it. But with the help of modernized GNSS including possible support via LEO-PNT, terrestrial navigation systems or other sensors, GNSS will continue to provide reliable services from the Earth to the Moon's surface. In addition to this conference theme, the program will encompass the following topics:

- O Current Status of Global Satellite Navigation Systems: Galileo (EU), GPS (USA), and BeiDou (China)
- O Regional Navigation Systems: India's IRNSS, Japan's QZSS, and Korea's KPS
- O Ensuring Resilient PNT for Critical Infrastructure and Autonomous Systems
- O Challenges to GNSS: Jamming, Spoofing, and Solar Activity
- O Legal Perspectives on Jamming, Spoofing, and Countermeasure Implementation
- O Advancing Performance and Resilience with Low Earth Orbit PNT (LEO-PNT)
- O Innovative Technologies in PNT: Optical Systems, Al and Galileo PRS Receiver Technology
- O Developing a Skilled Workforce for the European Space Sector
- O Navigating around the Earth and to the Moon
- O Driving Commercial Success through Cutting-Edge PNT Solutions

Make sure to check our website for the latest information: www.munich-satellite-navigation-summit.org

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. Meet at the reception in the Munich Residence, discuss upcoming projects on the sidelines of the conference and enjoy the closure of the Summit with a Bavarian networking event!

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.

DAY 1. Afternoon. OPENING Wednesday, March 26, 2025

14:30–16:00 hrs PRE-CONFERENCE: Registration, Exhibition and Networking

16:00–18:30 hrs OPENING PLENARY

Representatives of the European Commission, the EU Agency for the Space Programme, the European Space Agency, National Space Agencies as well as representatives from USA and China are opening the Munich Satellite Navigation Summit 2025.

Welcome:

Thomas Pany, Professor of Satellite Navigation, ISTA/FZ Space, University of the Bundeswehr Munich, Neubiberg, Germany Michael Meurer, Professor, Head of Navigation Department, German Aerospace Center (DLR), Oberpfaffenhofen, Germany Eva-Maria Kern, President, University of the Bundeswehr Munich, Neubiberg, Germany Anke Kaysser-Pyzalla, Chair of the DLR Executive Board, German Aerospace Center (DLR), Cologne, Germany

Keynotes and discussions:

Christoph Kautz, Director for Satellite Navigation and Earth Observation, DG DEFIS, European Commission (EC), Brussels, Belgium Rodrigo da Costa, Executive Director, EU Agency for the Space Programme (EUSPA), Prague, Czech Republic Francisco-Javier Benedicto Ruiz, Director of Navigation, European Space Agency (ESA), Noordwijk, The Netherlands U.S. Speaker *

Guo Shuren, Chief Engineer, China Satellite Navigation Project Center, Beijing, China
René Kleeßen, German Space Agency at DLR, German Aerospace Center (DLR), Bonn, Germany
Giancarlo Natale Varacalli, Head of Communications and Navigation Office, Agencia Spaziale Italiana (ASI), Rome, Italy

Moderator:

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

18:30–21:00 hrs EXHIBITION OPENING RECEPTION

at the foyer and mezzanine of the Alte Kongresshalle hostet by Thales Alenia Space.

We are looking very much forward to meeting you for drinks, food and great networking opportunities.

DAY 2.

Morning. Thursday, March 27, 2025

8:30-10:00 hrs

Session 1. GNSS PROGRAM UPDATES - GLOBAL, REGIONAL AND AUGMENTATION SYSTEMS

Speakers from the respective organizations and countries present news from the worldwide global, regional and augmentation satellite navigation systems in operation and under development.

Global: GALILEO (EU), GPS (USA), BeiDou (China)
Regional: QZSS (Japan), IRNSS/NAVIC (India), KPS (Korea)

Augmentation: EGNOS (EU), WAAS (USA), MSAS (Japan), Gagan (India)

Chairman:

Mike Swiek, Mike International, LLC, Washington, D.C., USA

Panel Members:

Ignacio Alcantarilla Medina, Head of Sector Galileo and EGNOS, European Commission (EC), Brussels, Belgium Col. Matthew Spencer, U.S. Space Force, Space Systems Command, Los Angeles, CA, USA Guo Shuren, Chief Engineer, China Satellite Navigation Project Center, Beijing, China Sharafat Gadimova, UN Office for Outer Space Affairs, Vienna, Austria Satoshi Hosoda, QZSS Strategy Office, Tokyo, Japan Sung-woo Kim, Korea AeroSpace Administration, Republic of Korea NN. EUSPA

10:00-10:30 hrs

COFFEE BREAK

10:30-11:30 hrs

Session 2. RESILIENT PNT - LEVERAGING RESILIENCE FOR AUTONOMOUS SYSTEMS AND CRITICAL INFRASTRUCTURE

Reliable Positioning, Navigation, and Timing (PNT) systems are critical for modern economies both for mobility as well as for synchronization of critical infrastructure. With the current trends towards increasing traffic volumes, autonomy and automation ensuring resilience in these systems is paramount, particularly in environments where signal disruption or spoofing could lead to catastrophic failures. The session will discuss the importance of robust PNT solutions and explore emerging technologies for enhancing resilience, such as e.g. artificial intelligence, quantum advancements or next-generation payloads. Al-driven algorithms can improve real-time decision-making and fault tolerance, while quantum technologies offer unprecedented security and accuracy. Join us and examine in this session how these innovations can safeguard and future-proof PNT for ensuring reliability and stability of critical systems in an increasingly complex world.

Chairwoman:

Carla Filotico, Partner & Managing Director, Novaspace, London, UK

Panel Members:

Karen Van Dyke, Director, Positioning, Navigation and Timing (PNT) and Spectrum Management, DOT, Washington DC, USA Dana Goward, President, Resilient Navigation and Timing Foundation, Virginia, USA Irma Rodríguez Pérez, Director of Navigation Products and Services, GMV, Madrid, Spain Kai Bongs, Director of the Institute for Quantum Technologies, German Aerospace Center (DLR), Ulm, Germany Mark Brammer, Positioning Programme Lead, National Positioning, Navigation and Timing Office, Department for Science, Innovation and Technology, London, UK

11:30-12:30 hrs

Session 3. JAMMING, SPOOFING, SOLAR ACTIVITY - EMERGING THREATS TO GNSS

Satellite navigation systems play a critical role in various applications, but face significant vulnerabilities due to external disruptions. In recent years, the impact of jamming and spoofing on GNSS has become apparent. In addition, we are currently approaching the peak of solar activity, which will further increase the need to increase the resilience of the systems affected. This session will explore the potential degradation of satellite navigation receivers, focusing on intentional disruptions such as jamming and spoofing, as well as natural phenomena such as solar storms. Experts will discuss the mechanisms of these disturbances, their impact on navigation accuracy and reliability, and strategies for detection, monitoring and mitigation. By addressing both technical and practical aspects, the session aims to foster a deeper understanding of how to improve the resilience of satellite navigation systems against these evolving threats.

Chairman:

Todd Humphreys, Professor, Aerospace Engineering, The University of Texas at Austin, TX, USA

Panel Members:

Todd Humphreys
Amir Tabatabaei, CTO & GNSS Engineer, IGASPIN, Graz, Austria
Ramsey Faragher, Director and CEO, Royal Institute of Navigation, London, UK
Michael Meurer, Professor, Head of Navigation Department, DLR, Oberpfaffenhofen, Germany
Bjorn Bergman, Data Analyst, Global Fishing Watch and SkyTruth, Houston, TX, USA

12:30–13:30 hrs LUNCH BREAK

Round Table Telespazio Theresiensaal

DAY 2. Afternoon.

13:30-14:30 hrs

Session 4. INNOVATIONS DRIVEN BY MULTI-LAYER PNT

Navigation has always been understood as an enabler for services to our society and economy. This session will feature PNT innovations that go beyond established services with the prospect of high market success: drone-based parcel delivery, robot taxis, and indoor location-based services with smartphones. The PNT enablers are LEO-PNT/signals of opportunity, sensor fusion with precise GNSS, and short-range communication signals (Wi-Fi, Bluetooth, UWB). Special emphasis will be given to 3GPP standardization (5G/6G/NTN) to reduce costs in the upstream/downstream sector of navigation by synergetic use of COM and NAV devices.

Chairman:

Li-Ta Hsu, Professor, Department of Aeronautical and Aviation Engineering, The Hong Kong Polytechnic University, Hong Kong

Panel Members:

Winfried Stock, SpaceCom Labs of the Space Systems Research Center, University of the Bundeswehr Munich, Neubiberg, Germany José A. del Peral Rosado, Senior R&D Navigation Engineer, Airbus Defence and Space, Taufkirchen/Munich, Germany Ilaria Martini, Principal Research Engineer, uBlox, Sgonico, Italy

Christopher Mutschler, Director of the Positioning and Networks division, Fraunhofer IIS, Nuremberg, Germany

Bruno Bougard, CTO, Septentrio, Leuven, Belgium

Oliver Wick, Space-Tech-Adviser, Environment Recognition, BMW, Munich, Germany

Patrick Robertson, Software Engineer, Google Germany GmbH, Germany *

14:30-15:30 hrs

Session 5. EU NAVIGATION SERVICES IN OPERATION

Galileo services, including the Open Service (OS), Public Regulated Service (PRS), High Accuracy Service (HAS), and Open Service Navigation Message Authentication (OSNMA), as well as new services such as the Early Warning Satellite Service (EWSS), the Maritime Service, and the European Rail Traffic Management System (ERTMS), offer a broad range of precise and secure navigation solutions for various sectors, from transportation to critical infrastructure. The session will give you latest insights into the fast developing new services.

Chairman:

Robert Greinacher, Head of the Project Management Office and Quality Department, EUSPA, Prague, Czech Republic

Panel Members:

F. Javier de Blas, Galileo Service Manager, EUSPA, Prague, Czech Republic Michel Hamwi, EGNOS Service Provision Manager, EUSPA, Toulouse, France Daniel Lopour, Senior Market Innovation Officer, EUSPA, Prague, Czech Republic

15:30–16:00 hrs COFFEE BREAK

16:00-17:00 hrs

Session 6. GALILEO PRS: RECEIVERS

This session will explore recent advancements in the development of Galileo PRS (Public Regulated Service) receivers and use cases, focusing on improving size, weight and power (SWaP) of the associated devices as well as the accuracy, security and resilience of the resulting services. Topics will include status and availability of receiver hardware, server-based processing, anti-jamming aspects, and multi-constellation GNSS integration

Chairman:

Stefan Baumann, IABG, Ottobrunn, Germany

Panel Members:

Alexander Rügamer, Head of Satellite Based Positioning Systems Department, Fraunhofer Institute for Integrated Circuits IIS, Nuremberg, Germany Alessandro Ambri, VP Galileo Programs, Electronic Division of LEONARDO, Campi Bisenzio, Italy Manuel Toledo, Business Unit Director of Navigation User Segment and PRS, GMV, Madrid, Spain

17:00-18:00 hrs

Session 7. LEGAL BOUNDARIES FOR JAMMING & SPOOFING AND RELATED COUNTERMEASURES

This year's Legal Session, as always organized and moderated by our partner BHO Legal, will focus on the legal boundaries for jamming & spoofing and related countermeasures, including within general international law, cyberlaw and aviation law. Key experts from the European Commission, the ITU and relevant international and European organisations in the aviation sector will discuss on the growing threats from jamming and spoofing, the applicable international law, policy and other measures taken by European and international stakeholders, and legal limitations of countermeasures.

Chairmen:

Ingo Baumann, BHO Legal, Cologne, Germany Oliver Heinrich, BHO Legal, Cologne, Germany

Panel Members:

Gerhard Berz, Head of Navigation and Spectrum, Eurocontrol, Brussels, Belgium Ignacio Alcantarilla Medina, Head of Sector Galileo and EGNOS, EC, Brussels, Belgium Jorge Ciccorossi, Head of Space Strategy and Sustainability Division, ITU, Geneva, Switzerland Stuart Fox, Director Flight & Technical Operations, IATA, Geneva, Switzerland

19:30 hrs

STATE RECEPTION in the Max-Joseph-Saal of the RESIDENZ Munich

hosted by the Bavarian Deputy Minister-President and Bavarian State Minister for Economics, Regional Development and Energy Hubert Aiwanger, MdL, and the Head of the Bavarian State Chancellery and State Minister for Federal Affairs and Media Dr. Florian Herrmann, MdL.

(Bus shuttle will be available - oneway only. No transport back to the Alte Kongresshalle. The Residenz is located in the city center. After the event public transport is available within walking distance. Please respect: formal wear, no sneakers, no T-Shirts, no Hoodies.)

DAY 3. Morning. Friday, March 28, 2025

8:30–9:15 hrs Session 8. BAVARIAN & MUNICH FLASHLIGHTS – NEWS FROM GNSS IN DOWNSTREAM APPLICATIONS

Experts from the Bavarian satellite navigation network of excellence, the Bavarian Cluster Aerospace as well as from companies and start-ups report on their developments and activities. This year a special emphasis will be put on solutions integrating GNSS for various application areas. You are invited to experience more from the highly innovative scene contributing to the future space applications scene.

Chairwoman:

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

Panel Members:

Thomas Fuhrmann, EGNOS V3 Algorithm and Performance Engineer, Airbus Defence and Space GmbH, Munich, Germany **Rolf Kozlowski**, Managing Director, DLR GfR, Wessling, Germany **Uwe Nowak**, Test Pilot, Ex-Lilium Aerospace GmbH, Gauting, Germany

9:15-10:00 hrs

Session 9. MEASURES TO FOSTER THE DEVELOPMENT OF SKILLED WORKFORCES IN THE EUROPEAN SPACE SECTOR

The European Union has introduced several initiatives, including the SPACE4GEO partnership and the Space Career Launchpad, to address the skills gap in the space sector. The EU Space Strategy for Security and Defence (EU SSSD) underscores the urgency of upskilling and reskilling to meet growing industry demands. This round-table will explore critical questions: What skills are most in demand? How effective are current EU mechanisms for skills development? What additional measures are needed to bridge the gap between job supply and demand? By engaging academia and the industry, we aim to shape actionable solutions for the sector.

Chairwomen:

Grazia M. Fiore, Permanent representative, SPACE Y, Vincennes, France **Bärbel Deisting**, Director Space and Space Applications, bavAlRia e.V., Gilching, Germany

Panel Members:

Maria Vittoria D'Inzeo, Policy Officer, DG DEFIS, EC, Brussels, Belgium
Milva Carbonaro, Space4Geo Coordinator, GISIG, Genova, Italy
Daniela Genta, Vice-President of Space Y and Head of European Union and Agencies Affairs at Airbus, Paris, France

10:00-11:30 hrs

Session 10. ENHANCING RESILIENCE WITH LEO-PNT

Modern systems are evolving towards more autonomous, non-centralized solutions, adopting a multi-layer System of Systems approach to enhance resilience and counteract the limitations and vulnerabilities of individual solutions. As the demand for robust and reliable Positioning, Navigation, and Timing (PNT) services continues to grow, the integration of LEO satellites presents a transformative opportunity. An architecture, where GNSS backbone is complemented by Low Earth Orbit (LEO) systems, terrestrial systems, and user-level integrated sensors, is essential to meet future demands for PNT performance and resilience. This panel will explore how LEO-PNT can enhance the resilience of autonomous applications and critical infrastructure. We will discuss different solutions, including robust signals, alternative bands, frequency diversity, and synergies with Satellite Communications (SatCom) and FusedPNT technologies. Our discussion will focus on how LEO-PNT can serve as a backup and alternative PNT solution, ensuring seamless and resilient services across various applications. By examining current initiatives and future prospects, we aim to provide a comprehensive overview of how LEO-PNT can bolster resilience within the broader PNT ecosystem.

Chairmen:

Roberto Prieto Cerdeira, Head of the LEO-PNT Project, ESA, Noordwijk, The Netherlands **Juan Pablo Boyero**, Policy Officer, Galileo Mission definition responsible, EC, Brussels, Belgium

Panel Members:

Andrés Juez Muñoz, Head of European GNSS Section, GMV, Madrid, Spain
Brian Manning, Co-Founder & CEO, XONA Space Systems, San Mateo/CA, USA
Daehee Won, Senior Researcher LEO-PNT, Korea Aerospace Research Institute, Korea
Michel Monnerat, Director of Bids & Advanced Projects in Navigation, DFN, Thales Alenia Space, Toulouse, France
Masaya Murata, Lunar PNT Lead, Japan Aerospace Exploration Agency (JAXA), Tsukuba, Ibaraki, Japan
Thomas Pany, Professor of Satellite Navigation, ISTA/FZ Space, University of the Bundeswehr Munich, Neubiberg, Germany
Todd Humphreys, Professor, Aerospace Engineering, The University of Texas at Austin, TX, USA

11:30-12:00 hrs

COFFEE BREAK

DAY 3.

Afternoon.

12:00-13:15 hrs

Session 11. TOWARDS FUTURE GNSS ARCHITECTURES ENABLED BY OPTICAL TECHNOLOGIES FOR TIME SYNCHRONIZATION AND RANGING

As global communication and navigation networks evolve, the need for precise time synchronization and ranging is paramount. This panel will explore the role of optical technologies in addressing these challenges for improvements of future navigation systems, with a focus on new architectures, performance assessments, as well as on corresponding in-orbit demonstrators and supporting R&D initiatives. Industry leaders and optical terminal manufacturers will discuss the path toward standardizing optical time synchronization and ranging to enable ultimate performance improvements. By fostering collaboration, this panel aims to address the importance of standardized optical solutions, to ensure a robust and interoperable ecosystem for future GNSS systems.

Chairman:

Michael Meurer, Professor, Head of Navigation Department, German Aerospace Center (DLR), Oberpfaffenhofen, and RWTH Aachen University, Germany

Panel Members:

Marco Falcone, Head of the Future Navigation Department in the Directorate of Navigation at the European Space Agency, ESA, Noordwijk, The Netherlands

Gianaldo Mantovani, Member of Executive Board, OHB System AG, Bremen, Germany

Herwig Zech, Product Manager at TESAT Spacesystems, Backnang, Germany

Massimo Eleuteri, Head of End to End Navigation System Engineering Department at TAS-I, Rome, Italy

André Bauerhin, Managing Director and COO, spaceopal GmbH, Munich, Germany

Cyrielle Richard, Cortex LASERCOM Product Manager, Safran Data Systems, Courtaboeuf Cedex, France

13:15-14:15 hrs

Session 12. NAVIGATION FOR LUNAR AND SPACE APPLICATIONS

This session will explore the challenges and advancements in navigation systems for lunar and space missions. Focusing on the unique requirements of lunar missions, such as precise landing, surface mobility, and autonomous operations, we will discuss novel approaches in spacecraft navigation, including advanced sensor technologies and autonomous guidance systems. Additionally, we will address the integration of Earth-based and in-situ navigation methods, the potential role of new technologies such as artificial intelligence, and the potential for collaboration between lunar and deep space navigation strategies. The session aims to give an insight in ongoing activities in relevant programs such as Moonlight or Novamoon as well as to highlight innovations that will enable safer, more efficient missions to the Moon and beyond.

Chairmen:

Masaya Murata, Lunar PNT Lead, Japan Aerospace Exploration Agency (JAXA), Tsukuba, Ibaraki, Japan Cosimo Stallo, Moonlight Navigation Principal System Engineer, ESA, Harwell, UK

Panel Members:

Masaya Murata

Cosimo Stallo

Grace Gao, Professor in the Department of Aeronautics and Astronautics, Stanford University, Stanford, USA

Quirino Morante, Moonlight Navigation Program Manager, Thales Alenia Space, Rome, Italy

Oscar Pozzobon, President and CEO in SRL, QASCOM, Bassano del Grappa, Italy

Ricardo Verdeguer Moreno, Product Line Manager, SPIRENT, Munich, Germany

Ben Ashman, Assistant Program Manager for Mission and Stakeholder Engagement, Space Communications and Navigation (SCaN), NASA Headquarters, Washington, DC, USA

14:15-14:20 hrs

Closing of the Summit and Invitation to the Bayarian Networking

14:20-16:00 hrs

hosted by Spirent.

This late lunch will be served in the Foyer and the Mezzanine of the Alte Kongresshalle.

Bayarian Bayarian Bayarian Bayarian

hosted by **Spirent**

This year the Summit will close with a special Bavarian Networking Event in the exhibition area, offering a glimpse into Bavarian kitchen and beer culture.



At this reception you will have the possibility to let the conference end in a relaxed way. There is room to get into conversation with people from companies in and outside Munich, with stakeholders and potentially interesting partners.



REGISTRATION

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

Virtual participation fee:

Virtual participation € 350,00

valid at all times

The registration for the virtual participation includes access to all online streams.

On site participation fees:

 Regular rate
 Speaker rate
 Sponsor/Exhibition staff

 € 950,00
 € 250,00
 € 600,00

 valid from
 valid at all times
 valid at all times

 February 16, 2025
 (individual code neccessary)
 (if not included in package) (individual code neccessary)

The registration fee includes access to all sessions (onsite and via online stream), to various networking opportunities like the reception on the first evening and the statereception at the Residence Munich as well as visiting the technical exhibition, admission to the lunches, coffee/tea, snacks and refreshments during the conference and the retrieving of the conference proceedings.

CANCELLATION/REFUND POLICY

Written cancellations until February 15, 2025 are refundable less € 150,00 cancellation fee. After February 16, 2025 there will be no refunds. We regret that individual registration benefits are not transferable.

VENUE

Alte Kongresshalle, Am Bavariapark 14, 80339 Munich

Which Registration Suits You Best?	In-Person	Virtual
Access to the Latest GNSS Developments and Program Update	es X	X
 Access to all Sessions 	Х	
 Attendance to Premium Talks 	X	
 Access to Online Session Streaming 	Х	Х
 Real-Time Q&A and Discussions with Presenters 	X	X
 Receive Electronic Conference Proceedings 	Х	Х
Participation in Various Networking Events	X	
 Welcome Reception 	Х	
State Reception	X	
 Various Round Tables 	Х	
 Access to Lunches, Coffee/Tea Breaks with Snacks and Refreshments 	X	
Connect and Network with Peers, Employers, GNSS Experts in Person	X	
Attend the Exhibition Trade Show in Person	X	
Identify Market, Programmatic and Research Trends	Х	
Experience New Cultural Location	X	
No Travel Required		X

NEW THIS YEAR

We will provide a QR-Code shown on your registration confirmation and invoice. This code will be only valid after the registration fee has been received in full. For further questions don't hesitate to get back to us!

CONTACT

Munich Satellite Navigation Summit, Phone +49 89 6004 3425 info@munich-satellite-navigation-summit.org www.munich-satellite-navigation-summit.org

DAY	TIME	LOCATION	EVENT
DAY 1	14:30 hrs – 16:00 hrs 16:00 hrs – 18:30 hrs 18:30 hrs – 21:00 hrs	7 o o g. o	Registration, Exhibition and Networking Opening Plenary Exhibition Opening Reception
DAY 2	8:30 hrs – 18:00 hrs 19:30 hrs	Alte Kongresshalle Residenz Munich	Conference and Exhibition State Reception
DAY 3	14:20 hrs	Alte Kongresshalle Alte Kongresshalle – Foyer/Mezzanine	Conference and Exhibition Bavarian Networking

The Munich Satellite Navigation Summit 2025 is organized by











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