



IN GNSS – INTELLIGENCE brought to NAVIGATION

Munich,
March 7–8, 2022

ONLINE CONFERENCE

3rd ANNOUNCEMENT



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„AI in GNSS – Intelligence brought to Navigation“, this will be the theme of the 2022 edition of the Munich Satellite Navigation Summit, taking place from March 7–8, 2022! In the light of the ongoing pandemic the Summit will be held virtually.

We are very proud to announce the cooperation of the Institute of Space Technology and Space Applications of the University of the Bundeswehr Munich and the Institute of Communications and Navigation of the German Aerospace Center (DLR). Both institutes pool expertise in organizing the Munich Satellite Navigation Summit.

The conference program will run under the theme „AI in GNSS – Intelligence brought to Navigation“ and will cover the following:

TRENDING TOPICS of the 2022 edition

- First and Second Generation of the European Satellite Navigation System Galileo
- Modernization of the US Global Positioning System
- Status and modernization of the Chinese Beidou System (BDS)
- Developments of regional systems like the Japanese QZSS and the Indian IRNSS and the Korean Positioning System (KPS)
- Use of AI within the navigation world and its implications
- Jamming, spoofing, interference, and countermeasures; understanding secure Galileo services (OSNMA, PRS)
- GNSS and the new race to the Moon; upcoming space mission related to PNT
- Advanced technologies for PNT (quantum, optical) even beyond Galileo 2nd Generation

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

The Galileo High Accuracy Service will be addressed in selected sessions.

ABOUT THE MUNICH SATELLITE NAVIGATION SUMMIT:

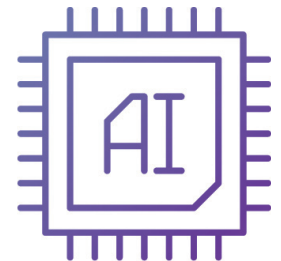
The Munich Satellite Navigation Summit is a conference with global impact dealing with satellite navigation now and in the future. The one-of-a-kind convention of high-ranking worldwide speakers from industry, science and governments provides the participants with a broad overview and different perspectives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

For any questions, please contact:

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



Time zone: CET

DAY 1.

Lunchtime. Monday, March 7, 2022

10.45 hrs

PRE-OPENING – let's start with some general information about our virtual conference

11.00–12.30 hrs

JOB MARKET

We especially invite graduates, doctoral candidates and young researchers to our job market.

A high-level panel will discuss from different perspectives:

Working in Space – European Competitiveness in GNSS

The competitiveness of the European Space Sector is highly dependent on the availability of well-educated and skilled professionals. It requires an educational landscape which is able to provide basic as well as further education and a highly ambitious research and innovation community driving developments in space to the extent of commercialisation. Is there a match between needs and offers across the EU? What are the needs of industry? What does the job market look like? What effort is needed from the side of universities, politics and industry? Is there enough co-operation between relevant stakeholders across the EU and what is needed from students' point of view? The panel is discussing chances and challenges of working in the space sector.

Chairwoman:

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

Panel Members:

Fiammetta Diani, Head of Market Development Department, EUSPA, Prague, Czech Republic

Philippe Tanguy, Director of Engineering, Navigation Domain France, Thales Alenia Space, France

Daniel Seybold, TeleOrbit & SGAC, Nuremberg, Germany

Dr. Alex Minetto, Assistant professor, Politecnico di Torino, Turin, Italy

Monica Pesce, Managing Director, VVA, Brussels, Belgium

Gabriella Povero, Team Leader „International Cooperation“ - Space & Navigation Technologies, LINKS Foundation, Turin, Italy

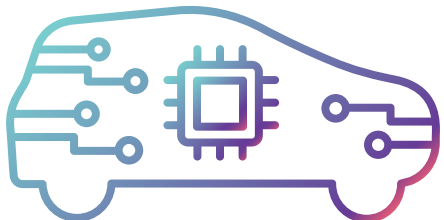
Dr. Adrià Rovira Garcia, Serra Hunter Lecturer, Universitat Politècnica de Catalunya (UPC), Barcelona, Spain

Followed by our **Companies' Pitch**:

Different companies (s. our website) active in the space sector will present themselves briefly.

Afterwards you have the possibility to get into contact with their representatives on a networking platform.

**FREE
ADMISSION!**



DAY 1.

Afternoon.

12.45–14.30 hrs

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 2022.

Welcome:

Prof. Dr. Thomas Pany, ISTA, Universität der Bundeswehr München, Neubiberg, Germany

Prof. Dr. Michael Meurer, German Aerospace Center (DLR), Oberpfaffenhofen & RWTH Aachen University, Aachen, Germany

Prof. Dr. Merith Niehuss, President, Universität der Bundeswehr München, Neubiberg, Germany

Prof. Dr. Anke Kaysser-Pyzalla, Chair of the Executive Board, German Aerospace Center (DLR), Cologne, Germany

Hubert Aiwanger, Bavarian State Minister of Economic Affairs, Regional Development and Energy and Deputy Bavarian Prime Minister, Munich, Germany

Dr. Anna Christmann, Member of the Bundestag, Federal Government Coordinator of German Aerospace Policy, Federal Ministry for Economic Affairs and Climate Action, Berlin, Germany

Moderator:

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

Panel Members:

Timo Pesonen, Director-General, DG Defence Industry and Space (DEFIS), European Commission, Brussels, Belgium

Dr. Josef Aschbacher, Director General, European Space Agency (ESA), Paris, France

Rodrigo da Costa, Executive Director, EU Agency for the Space Programme (EUSPA), Prague, Czech Republic

Harold „Stormy“ Martin, Director, National Coordination Office for Space-Based Positioning, Navigation, and Timing, Washington, DC, USA

Gu’Cang Chen, Deputy Director, China Satellite Navigation (BeiDou) Office, Beijing, China

Dr. Philippe Baptiste, Chairman and CEO, Centre National d’Etudes Spatiales (CNES), Paris, France

Dr. Anke Pagels-Kerp, Divisional Board Member for Space, German Aerospace Center (DLR), Cologne, Germany

14.30–14.45 hrs

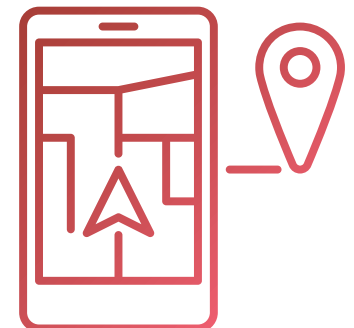
BREAK

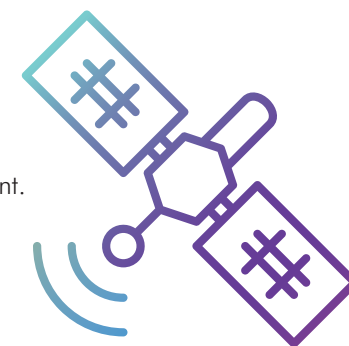
We invite you to attend the Round Table Discussion hosted by **Thales Alenia Space**, our **Diamond-Sponsor**.

Invited guests will discuss on an up-to-date topic.

“GNSS new trends and innovations”

Moderator: Claus Kruesken





14.45-16.30 hrs

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

We present 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:

Jérémie Godet, Deputy Head of Galileo and EGNOS Unit, DG DEFIS, European Commission, Brussels, Belgium
and

Guerric Pont, Acting Head of Galileo Services Department, EUSPA, 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"

Dr. Xiao'Chun Lu, Deputy director of National Time Service Center, Chinese Academy of Sciences, Beijing, China

"BeiDou Navigation Satellite System Development"

Jean-Marc Piéplu, Head of EGNOS Services Department, EUSPA, Prague, Czech Republic

"Status of EGNOS"

Dr. Satoshi Kogure, Japan Aerospace Exploration Agency (JAXA), Japan

"Status of the Japanese QZSS Regional System"

P. S. Sura, Indian Space Research Organisation (ISRO), 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

BREAK

16.45–17.45 hrs

Session 2. AI AND ADVANCED TECHNOLOGIES FOR NEXT GENERATION GNSS

Artificial intelligence opens new doors in navigation. It will create a path to greater autonomy and automation of systems and automated decision making. Additional advanced technologies will complement this potential to lift GNSS performance to a new level in terms of accuracy, integrity, robustness. The session will address these potentials and show how applications, user-side and system-side techniques and processes will benefit.

Chairman:

Prof. Dr. Zak M. Kassas, University of California, Irvine & The Ohio State University, USA

Panel Members:

Dr. Erik Blasch, Principal Scientist, US Air Force Research Lab (AFRL), Rome, NY, USA

Prof. Dr. Fabio Dovis, Interdepartmental Centre for Service Robotics, Politecnico di Torino, Torino, Italia

Stefano Maggiolo, Software Engineer, Google, London, UK

"Enhancing smartphone GNSS with ML and 3DMA"

17.50–19.10 hrs

Session 3. SECURE PNT SERVICES

The increasing dependency of many commercial and safety & security related applications on GNSS has led to multiple approaches to enhance the confidence we have in PNT-information derived from GNSS for many years. Some approaches are based on the usage of multi-constellation GNSS, the usage of complementary radionavigation systems or sensor-fusion. Further, also improvements and additional services of the GNSS itself are under discussion or even under implementation for different GNSS. Galileo, for example, will introduce the Open Service Navigation Message Authentication (OSNMA) and the Commercial Authentication Service (CAS) being available to the wide GNSS community. For user communities under governmental control the Galileo PRS will provide an even higher level of security. This session will provide an overview on the Galileo OSNMA, CAS and PRS and highlight their different and corresponding use cases.

Chairmen:

Dr. Stefan Baumann, Programme Manager, IABG, Ottobrunn, Germany

Jérémie Godet, Deputy Head of Galileo and EGNOS Unit, DG DEFIS, EC, Brussels, Belgium

Panel Members:

An industry perspective on Galileo OSNMA/CAS receiver developments

Bruno Bougard, R&D Director, Septentrio, Leuven, Belgium

Clemens Buerji, Director System Architecture, u-blox, Thalwil, Switzerland

Differences and synergies of OSNMA/CAS and PRS receiver developments

Manuel Toledo López, Head of the GNSS Advanced User Segment Solutions (GUS) Division, GMV, Madrid, Spain

PRS implementation status and national activities

Kai Herrmann, Director Competent PRS Authority (CPA), Federal Ministry of Transport and Digital Infrastructure, Berlin, Germany

Christophe Mérieult, Navy Captain, Security Officer for European space program, Competent PRS authority,

General Secretariat for National Defence and Security, Paris, France

and

Benoît Malevergne, Commander, Position Navigation and Timing expert, French Air and Space Force, Paris, France

José Manuel Gorostiaga Ugalde, Head of Spanish Competent PRS Authority (ES CPA), National Institute for Aerospace Technology, Torrejón de Ardoz, Spain

19.15 hrs

End of Day 1



Time zone: CET

DAY 2.

9.00–9.50 hrs

Morning. Tuesday March 8, 2022

Session 4. A NEW REGIONAL SYSTEM IS BORN: THE KOREAN POSITIONING SYSTEM (KPS)

This session will present a general overview of KPS, the signal design concept, the satellite configuration and the KPS deployment plans.

Chairman:

Prof. Dr. Dr. Guenter Hein, Chairman of the Executive Board, Munich Aerospace, Taufkirchen, Germany

Panel Members:

Taegyu Kim, Head of KPS Program Team, Ministry of Science and ICT, Sejong, Republic of Korea

"General Overview of KPS"

Prof. Dr. Jae min Ahn, Chungnam National University, Daejeon, Republic of Korea,
and

Prof. Dr. Sang Jeong Lee, Chungnam National University, Daejeon, Republic of Korea

"KPS Signal Design Concept"

Dr. Young Baek Kim, Senior Executive Vice President, Microinfinity, Suwon, Republic of Korea

"Expected Application Fields of KPS - Industrial View"

9.55–10.45 hrs

Session 5. DEMONSTRATION OF GNSS+AI APPLICATIONS IN CHINA

Satellite navigation and location services are rapidly merging into various applications in the digital society in China. The recording of a large amount of spatio-temporal data provides a wealth of application scenarios for the use of artificial intelligence technology to improve the convenience and safety of applications, and new applications continue to emerge. AI technology is exploring innovative ways of sustainable urban development, covering many fields such as traffic management, green travel, spatial planning, and human ecology, which are widely used in satellite navigation and location services.

Chairman:

Prof. Dr. Gui'Fei Jing, Head of BeiDou Silk-Road School, Beihang University, Beijing, China

Panel Members:

Qi'An Wang, Director General, National Remote Sensing Center, Wuhan, China

Prof. Dr. Gui'Fei Jing, Head of BeiDou Silk-Road School, Beihang University, Beijing, China

"GNSS+AI promotes shared travel into the era of smart safety management"

Shao'Biao Zhang, Executive Director of Shenzhen Urban Public Safety and Technology Institute, Shenzhen, China

"Risk Monitor and Disaster Management by Earth Observation and GNSS - an Urban Safety Perspective"

Prof. Chuang Shi, Beihang University, and Director of the Laboratory of Navigation and Communication Fusion Technology, Ministry of Industry and Information Technology, Beijing, China

"Precise Point Timing technology (PPT)"

**FREE
ADMISSION!**



**FREE
ADMISSION!**

10.45–11.00 hrs

BREAK

You are invited to attend the Round Table Discussion hosted by our **Platinum-Sponsor**

11.00–12.00 hrs

Session 6. NEW LEGAL ASPECTS FOR NEW SPACE CHALLENGES

The Legal Session, organised by BHO Legal as in past years, will this time focus on future Navigation and Communication Systems for the Moon. Around the globe, space agencies and companies prepare for numerous moon missions and the development of a lunar economy. All future lunar activities will have to rely on reliable navigation and communications systems. The session will discuss policy, legal, regulatory and standardisation aspects with experts from the European Space Agency, the ITU, and industry.

Chairmen:

Dr. Ingo Baumann, BHO Legal, Cologne, Germany

Dr. Oliver Heinrich, BHO Legal, Cologne, Germany

Panel Members:

Carlos M. Entrena Utrilla, CEO, Plus Ultra Space Outposts, Madrid, Spain

"The race for commercial communications & navigation services on the Moon"

Dr. Marco Ferrazzani, Head of the Legal Services Department, European Space Agency (ESA), Paris, France

"US-Europe cooperation for lunar economy - Space Policy and Space Law aspects"

Mitsuhiro Sakamoto, Head, Space Systems Coordination Division, Radiocommunications Bureau, International Telecommunication Union (ITU), Geneva, Switzerland

"Radio Frequency for operation on the Moon"

12.05–13.00 hrs

Session 7. MUNICH FLASHLIGHTS – NEWS FROM BAVARIA

A ROUND TABLE DISCUSSION ON SATELLITE NAVIGATION TRENDS & DEVELOPMENTS IN BAVARIA

Chairman:

Harald Hofmann, Acting Director of Administration and Infrastructure, Galileo Competence Center at the German Aerospace Center, Oberpfaffenhofen, Germany

Panel Members:

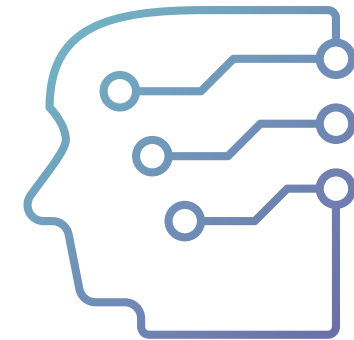
Dr. Roland Braun, EGNOS V3 System Performance Manager, Airbus Defence and Space GmbH, Ottobrunn, Germany

Dr. Ronald Holzwarth, Managing Director & CTO, Menlo Systems GmbH, Planegg, Germany

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

Dr. Wolfgang Felber, Head of Department for Satellite Based Positioning, Fraunhofer Institute for Integrated Circuits IIS, Erlangen, Germany

Rainer Horn, Managing Partner, SpaceTec Partners, Munich, Germany



**FREE
ADMISSION!**

DAY 2.

Afternoon.

13.00–14.00 hrs

BREAK

You are invited to attend the Round Table Discussion (10 minutes) hosted by our **Sponsor**

14.00–15.00 hrs

Session 8. JAMMING AND SPOOFING IN GNSS

Intentional radio interference, namely jamming and spoofing, is considered a critical threat to GNSS. Especially with the increased level of autonomy and automation in safety-critical applications, these threats need to be assessed and mitigated. The same applies to security-critical applications and applications of GNSS in critical infrastructures. The session will address both: the analysis of the risk related to jamming and spoofing as well as ways to limit and mitigate the risk by technical solutions.

Chairman:

Prof. Dr. Todd E. Humphreys, University of Texas, Austin, TX, USA

Panel Members:

Bjorn Bergman, Data Analyst, Global Fishing Watch & Project Manager, SkyTruth, Shepherdstown, WV, USA

"Manipulation and GNSS Interference in Global AIS Ship Tracking Data"

Dr. Fabian Rothmaier, Navigation Research and Development Engineer, Airbus Defence and Space, Munich, Germany & Stanford University, CA, USA

"Receiver-based RFI detection"

Prof. Dr. Michael Meurer, German Aerospace Center (DLR), Oberpfaffenhofen & RWTH Aachen University, Aachen, Germany

"Jamming and Spoofing in Satellite Navigation – Risks and Countermeasures for Safety-Critical and Autonomous Applications"

15.05–16.30 hrs

Session 9. SPACE PNT IN EUROPE, INNOVATION AND FUTURE TRENDS IN EUROPEAN SATELLITE NAVIGATION

This session will cover the future of Space PNT beyond the current Galileo / EGNOS systems and their future evolutions.

The session will take off with one of the latest Services introduced by Galileo (The High Accuracy Service) to later introduce a selection of projects from H2020, Horizon Europe, NAVISP, Moonlight, Science satellites and other national programs. The panelists will provide an overview of Europe's PNT ambitions to not only secure Europe's leadership in Satellite Navigation today, but to also further expand its relevance over future decades. Orthodox and out of the box ideas on future PNT will find their home in this session.

Chairmen:

Javier Benedicto, Director of Navigation, ESA, Paris, France

Miguel Manteiga Bautista, Head of Unit, ESA, Noordwijk, The Netherlands



**FREE
ADMISSION!**

Panel Members:

Institutional Part:

F. Javier de Blas, Commercial and High Accuracy Service Manager, EUSPA, Prague, Czech Republic,
and

Ignacio Fernández Hernández, Galileo Authentication and High Accuracy Service Manager, European Commission, Brussels, Belgium
"Galileo New Services and evolution trends"

Lionel Ries, Head of the Radio Navigation Systems and Techniques Section, ESTEC, ESA, Noordwijk, The Netherlands
"Future trends for European space-based PNT concepts and technologies"

Prof. Dr. Christoph Günther, Director of the Institute of Communications and Navigation, German Aerospace Center (DLR), Oberpfaffenhofen & Professor of Navigation, Technical University of Munich, Munich, Germany
"Kepler Architecture – Recent Developments"

Non-institutional Part:

Irma Rodríguez Pérez, Head of GNSS Algorithms, Products and Services, GMV, Madrid, Spain
"Future challenges in the provision of High-Accuracy Solutions for different user applications"

Michel Monnerat, Director Bid & Advanced Projects - Navigation Domain, Thales Alenia Space France, Toulouse, France
and

Mauro Marinelli, Product Line Manager of GNSS, Lunar Navigation and Aerocom Systems, Payloads & Satellites, Thales Alenia Space Italia, Rome, Italy
"TAS view on the Satellite Navigation beyond MEO-GNSS and augmentation systems"

Michael Kirchner, Head of GNSS Performance Department, Airbus Defence and Space, Munich, Germany
"Space PNT, what's next?"

16.30–16.45 hrs

BREAK

You are invited to attend the keynote by **Airbus**, our **Space-Night Sponsor**
"Airbus flies satellite navigation to new heights"

Andreas Lindenthal, Head of Space Systems Business Operations and Products & Head of Space Systems Germany

16.45–17.45 hrs

Session 10. SPACE MISSIONS AND TECHNOLOGY VALIDATION

New technologies are the key-enablers for next generations of satellite navigation systems. Developing such technologies and lifting them to the necessary level of maturity requires testing, validating and demonstrating such technologies in space. New-space approaches offer further potentials along these lines. The session will address ongoing activities in various locations to plan and execute space missions to achieve this goal and will give an insight on what's coming next...

Chairman:

Prof. Dr. Christoph Günther, German Aerospace Center (DLR), Oberpfaffenhofen & Technical University of Munich, Munich, Germany



**FREE
ADMISSION!**

Panel Members:

Dr. Stefan Schlüter, Galileo Competence Centre, Oberpfaffenhofen, Germany

"COMPASSO - In-orbit Demonstration of Optical Technologies"

Prof. Dr. Zak M. Kassas, University of California, Irvine & The Ohio State University, USA

"Ad Astra: Navigation with Starlink Megaconstellation LEO Satellites"

Prof. Dr. Andreas Knopp, Chair of Signal Processing, Universität der Bundeswehr München, Neubiberg, Germany

"SeRANIS: A Low-Earth-Orbit High-Bandwidth Software Defined Satellite Radio for GNSS, IoT and 6G Experiments"

Dr. Joanna Hinks, Principal Investigator, Air Force Research Laboratory (AFRL), Albuquerque, NM, USA

"Navigation Technology Satellite – 3: A Vanguard of Resiliency & Flexibility"

17.45–19.10 hrs

Session 11. NEW GNSS SYSTEMS FOR EARTH AND MOON

The GNSS landscape is changing fast. New developments in the area of GNSS for earth and moon have their synergies but also individual challenges. Several ambitious undertakings are planned around the globe in low earth orbit, augmenting existing MEO and GEO based solutions and providing services on their own. In the context of the evolution driven by key applications like 5G, autonomous cars, as well as in the frame of the new race to the Moon and beyond, more and more missions will rely on additional navigation services guiding the way also in this new environment. The sheer number of projects and the satellites needed to realise them will change productions, time to market, operations and the services that can be provided. This session will provide an outlook into what will be coming.

Chairman:

Michel Monnerat, Director Bid & Advanced Projects - Domain Navigation France , Thales Alenia Space, Toulouse, France

Mauro Marinelli, Product Line Manager GNSS, Lunar Navigation and Aerocom Systems, Payloads & Satellites, Thales Alenia Space Italia, Rome, Italy

Panel Members:

Lionel Ries, Head of the Radio Navigation Systems and Techniques Section, ESTEC, ESA, Noordwijk, The Netherlands

"Considerations for future multi-layer PNT system-of-system concepts"

Brian Manning, Co-Founder & CEO, Xona Space Systems, San Jose, CA, USA

"Xona Pulsar: The First Generation of High-Performance LEO PNT"

Dr. Javier Ventura-Traveset, Head of Navigation Science Office & ESA Lunar PNT Coordinator, Toulouse, France

"ESA Lunar Navigation strategy: Moonlight and Lunar Pathfinder "

Dr. Carlo Albanese, Head of Navigation Applications & Services Design and Science Support, Telespazio, Rome, Italy

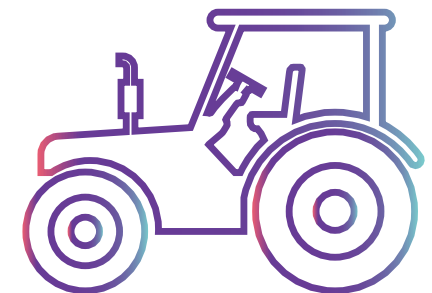
"The challenge to enable Communication and Navigation Services for future Moon Exploration"

Dr. Oscar Pozzobon, President and CTO, Qascom, Bassano d. Grappa, Italy

"Direction Moon: Challenges and Opportunities for Lunar Satellite Navigation"

19.15 hrs

End of Day 2 and Closing of the Summit



REGISTRATION

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

Registration fee:

Virtual participation
€ 250,00
valid at all times

Free admission:

Virtual participation
€ 0
valid for selected sessions

The **registration fee** online includes the following:

- access to all online sessions
- download of the proceedings
- download of session recordings

The **free admission** includes the following:

- Pre-Opening and Job Market
- access to online sessions 4-11
- download of session recordings

CANCELLATION/REFUND POLICY

Written cancellations until February 18, 2022 are refundable less € 95 cancellation fee. After February 18, 2022 there will be no refunds. We regret that individual registration benefits are not transferable.

EXHIBITION

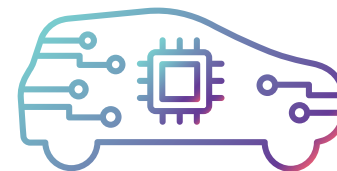
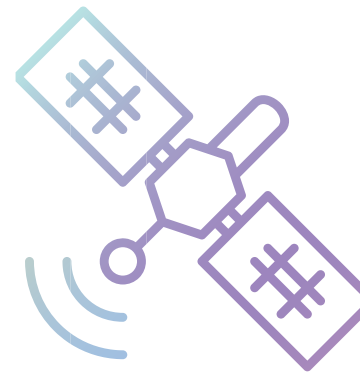
The Munich Satellite Navigation Summit will give your business a unique opportunity to position your latest products, services and technologies. Manufacturers, organisations and service providers are invited to exhibit at this event. Join our sophisticated online exhibition. Please contact us for further information.

SUPPORT

We offer different packages for companies and institutions that are interested to be an official partner of the conference. If you would like to contribute, please contact us for further details.

CONTACT

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



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