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NÜRNBERG CONVENTION CENTER,
NUREMBERG, GERMANY
8TH - 13TH OCTOBER 2017



**EUROPEAN
MICROWAVE WEEK**
NÜRNBERG CONVENTION CENTER
NUREMBERG, GERMANY
8TH-13TH OCTOBER 2017
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***European Microwave Week Future Events
EuMW 2018 - Madrid
EuMW 2019 - Paris***

Details in this booklet were correct at the time of going to press. They are subject to change. For up-to-date information visit our website: www.eumweek.com

Welcome to the 20th European Microwave Week

Welcome to Nuremberg, the medieval city at the heart of Franconia in Northern Bavaria! It is my great pleasure to welcome you to the 20th European Microwave Week (EuMW) to be held at the Nürnberg Convention Center (NCC) from Sunday 8th to Friday 13th October 2017. After four years and the very successful editions in Rome (2014), Paris (2015), and London (2016) the EuMW returns to Nuremberg. This conference event, which was started by the European Microwave Association (EuMA) in 1998, is comprised of the 47th European Microwave Conference (EuMC) to be held from 8th to 12th October, the European Microwave Integrated Circuits Conference (EuMIC), which will take place from 8th to 10th October, and the European Radar Conference (EuRAD), which will run from 11th to 13th October. The three conferences are accompanied by the traditional three-day trade show on microwaves and RF, which attracts about 300 exhibitors and is the largest of its kind in Europe.

Based on the invaluable commitment of some 450 reviewers, the 100 members of the Technical Programme Committee constituted an excellent programme comprising more than 500 presentations. This includes the contributions to three Focused Sessions devoted to conformal antennas for defence, security, and space applications, to advanced materials, and to the latest developments in vacuum electronics. The programme also includes six Special Sessions, four of which highlight the research activities in Central Europe, in the Asia Pacific Region, and in Latin America. Another one presents the latest research on stochastic approaches in Electromagnetic Compatibility (EMC). In the sixth Special Session representatives from US, European, and German agencies promote international funding opportunities.

The regular programme, which is organised in 85 oral and six interactive sessions, is complemented by 38 Workshops and five Short Courses covering most relevant topics ranging from Millimetre-Wave Circuits to 5G, from Power Amplifiers to Automotive Radar, and from Phased Arrays to Satellite Communications.

This year's Defence, Security and Space Forum (DSS), a well-established and highly appreciated event at the EuMW, is devoted to 'The Internet of Space – Technologies and Applications'. Its organisers have succeeded in attracting high-level speakers to discuss the latest developments of what is sometimes also coined 'New Space' or 'Open Space', and to explore the impact on 'Old Space'.

Internationally renowned speakers will discuss latest trends and developments in their keynotes at the conferences' Plenary Sessions. At the Opening Session of the EuMW Bruno Jacobfeuerborn, CTO of the Deutsche Telekom, will outline the prospects of 5G and the Internet of Things while Reinhard Ploss, CEO of Infineon, will address the challenges associated with designing smart sensors. The EuMIC opens with presentations by Tom Lee from Stanford University, CA/USA, on RF CMOS-based MMICs and by Lars-Erik Wernersson from Lund University, Sweden, on III-V MOSFET devices. Josef Hausner from Intel Mobile Communications, Germany, has accepted the invitation to close the EuMIC with a review on the state of the art of wireless applications. The EuRAD Opening, which is held in conjunction with the DSS, is devoted to radar applications in space. Paul Rosen from the NASA Jet Propulsion Laboratory, CA/USA, will highlight the latest

achievements in radar remote sensing, while Gerald Braun from German Aerospace Center, Germany, will familiarise us with space surveillance and tracking. Ludger Verweyen from Infineon, Germany, will address the consumer and industrial applications of radar systems at the EuRAD Closing Session. The EuMW will close with a panel of eminent specialists who will debate 'Fully automated driving. Enabled by microwaves. What else?'

This year's EuMW introduces Session Keynotes as a new format to boost industrial participation and intensify the interaction between industry and academia. For this, internationally recognised experts from industry will open selected sessions with presentations on challenges and state-of-the-art achievements in their field.

The traditional Women in Microwave Engineering (WiM) event, co-sponsored by the IEEE MTT-Society, includes a visit to the 'Rundfunkmuseum Fürth', which demonstrates the historical role played by the Nuremberg metropolitan area in the RF industry. This year, the WiM attendees will have the opportunity to interact with high-school girls who are invited to participate in a MINT event (German acronym for STEM).

The EuMW 2017 will host several events especially for the younger generation. This includes the very stimulating and successful Student Challenge, which will have the same format as in previous years. The Student Design Competition comprises two tasks to be prepared in advance. As a novelty, it will also feature a design task to be carried out on-site. This will happen in the form of a hands-on design experience event. The latter is also part of the Student and the Doctoral School, which both start with a high-level 2-day lecture programme. The Career Platform, finally, will continue the successful format of previous years.

The 'Week' wouldn't be the 'Week' without its traditional social events. These include Monday's EuMIC Get-Together, Tuesday's Welcome Reception sponsored by Keysight Technologies, and the EuRAD lunch on Friday. In addition, the Free State of Bavaria is pleased to host a reception on Wednesday at the 'Kaiserburg', the imperial castle of Nuremberg.

Hopefully, the week's programme will let you enjoy Europe's PRIME EVENT in 2017 and will give you plenty of opportunities to satisfy your professional curiosity, thus making 2017 a truly PRIME YEAR in your calendar. Yet, don't forget to explore Nuremberg with its rich cultural past and also its more recent landmarks reminding us where last century's historical events that shook the world started.



Arne Jacob,
General Chairman

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Join the EuMA Community

Welcome from the President of the European Microwave Association

Welcome to Nuremberg on behalf of the European Microwave Association (EuMA)! EuMA is the organisation behind the European Microwave Week, our mission is to promote microwaves in Europe and to foster networking between microwave scientists and engineers in Europe. We are pursuing this in various ways but our key event is the European Microwave Week.

For those who are not familiar with EuMA: We are open to membership for all working in the field of microwaves, particularly from Europe, but also from around the world. The General Assembly, the highest governing body of the Association, gathers representatives from European countries, from North America, from the Asia-Pacific region, and from North Africa and Middle East. If you are not a EuMA member yet, I encourage you to join. Among other benefits, you will enjoy reduced fees for attending the Week and other EuMA-sponsored conferences and workshops as well as the IEEE International Microwave Symposium. Moreover, you will have access to the internal part of our website, which provides an archive of publications, the on-line version of the International Journal on Microwave and Wireless Technologies and further networking opportunities.

The European Microwave Week (EuMW) is the premier microwave conference and exhibition event in Europe. Its centrepiece is the European Microwave Conference (EuMC), the largest of the three conferences that form the Week. It is complemented by the European Microwave Integrated Circuits Conference (EuMIC) focusing on semiconductor device and circuit technologies, and the European Radar Conference (EuRAD), targeting the field of radar, from components to applications. The success of EuMW is also a result of the collaboration with the IEEE MTT Society (technical co-sponsor of the Week) and the GAAS Association (co-sponsor of EuMIC). But the Week is not only conferences, the Exhibition organised by our long-standing partner Horizon House forms an integral part of it.

As everybody knows, preparing and hosting the EuMW is a major effort, from paper submission and review to the on-site organisation at the venue, and this is accomplished by a team of volunteers year by year. Therefore, my special and sincere thanks go to Arne Jacob, 2017 General Chair, to Thomas Zwick, General TPC Chair, and to Rolf Jakoby, Treasurer, to Matthias Hein and Ilona Rolfes, EuMC Chair and TPC Chair, to Ingmar Kallfass and Georg Böck, EuMIC Chair and TPC Chair, and to Martin Vossiek and Nils Pohl, EuRAD Chair and TPC Chair - just to name a few on behalf of the entire team. They all have been working hard to set up an outstanding technical and scientific programme for you and to make your stay in Nuremberg exciting and enjoyable. Thank you!

After 2013, it is the second time now we are holding EuMW in Nuremberg, in the spacious and multi-functional conference centre of Messe Nürnberg, which is quite ideally suited for our purpose. Nuremberg has a long history dating back before the medieval times. Today it is a city where everything is well connected, and all conference delegates will enjoy free urban transport. From overseas, you can either use a connecting flight to Nuremberg airport or go to Frankfurt or Munich and take the high-speed train.

With this, I would like to cordially invite you to EuMW 2017. I hope you will not only learn about exciting ideas and gain new insights from presentations and posters, but also find enough time to meet with colleagues and friends. Join us and see you in Nuremberg!



Wolfgang Heinrich
President
European Microwave Association

Welcome to the 47th European Microwave Conference, EuMC 2017

In 2017, the European Microwave Conference celebrates its 47th anniversary. 47 marks an advanced age, looking back on a long and successful tradition, rich scientific experiences, and worldwide reputation. This golden age also symbolises the heyday of microwave technology. Nowhere in our daily life, neither in business nor travel nor leisure do we miss the manifold benefits of wireless technologies, with a breathtaking pace of further developments. We, the entire Team of the 2017 European Microwave Week, and especially the 2017 EuMC Team, have faced the enormous responsibility to compose a worthy conference programme reflecting these trends. Hundreds of high-quality conference contributions complemented by many topical workshops throughout the week, seven industrial session keynotes, two brilliant plenary keynote speakers, and eight highly reputed panelists, in addition to one of the biggest microwave exhibitions of its kind, have made it possible to provide you with unique opportunities to experience and contribute to the latest state of the art in European Microwaves!

It is our great honour to announce for the Week and EuMC opening on Tuesday 10th October, the keynotes of Dr. Bruno Jacobfeuerborn, Chief Technical Officer, Deutsche Telekom AG, and Chief Executive Officer, Deutsche Funkturm GmbH, on "5G: The true enabler of the internet-of-things", and of Dr. Reinhard

Ploss, Chief Executive Officer of Infineon Technologies AG, on the development "From RF signals to smart sensor solutions". We would also like to draw your attention to a special event on "Fully automated driving. Enabled by microwaves. What else?" in the Week and EuMC closing on Thursday 12th October. Eight experts share their complementary views on the role of radar, chip technology, optical sensors, navigation, mobile communications, cyber security, test and evaluation, and regulation for autonomous driving, arranged in a panel discussion directed by the TV editor and moderator Ulrich Bobinger.

In closing, special thanks are devoted to the EuMC Secretary Christian Bornkessel, who created the session schedule of the entire week with great enthusiasm. We hope you will find the session plan convenient and easy to access – the result of a challenging optimisation task. Furthermore, major credit for inspiring me with many fruitful ideas and for supporting me in bringing a team of expert microwave panelists together go to my friend Holger Meinel, thank you!

We are sure, as you take a closer look at this programme, you will find the motto of this year's week confirmed: A prime year for a prime event. Enjoy!



Matthias Hein
EuMC 2017 Chair



Ilona Rolfes
EuMC 2017 TPC Chair



Christian Bornkessel
EuMC 2017 Secretary

Welcome to the 12th European Microwave Integrated Circuits Conference, EuMIC 2017

The 12th European Microwave Integrated Circuits Conference welcomes you to an attractive setting combining the conference's long-standing and appreciated heritage with a range of innovative elements. The composition of the 13 technical sessions and six joint sessions with EUMC reflects our intention to stimulate the scientific discussion among experts from competing and complementary semiconductor technologies addressing the microwave to Terahertz frequency regimes, encompassing all aspects from device technologies, modelling and characterisation, to the application-oriented design of integrated circuits. The significance of Si-based microwave technologies alongside the III-V and other compound semiconductors is reflected by the strong presence of related papers in the technical programme, as well as in the topics of this year's distinguished plenary speakers. As a novel feature to all conferences

of the European Microwave Week, we are pleased to announce four "industrial session keynote" addresses from very prominent members of the microwave integrated circuits industries. Communication in the interactive sessions will be raised by electronic media supports. The scientific programme will be complemented by attractive topical workshops running alongside the conference. The traditional "Foundry Session", hosted by the GAAs Association, together with a new special session on "Funding for Research" are further marks of EuMIC's strong topical diversity. As the organizing team, we have strived to provide you with an attractive and comprehensive stage for the 2017 edition of EuMIC, and we are looking forward to meeting you in Nuremberg, to fill the stage with enriching scientific presentations, stimulating discussions and pleasant encounters among friends and colleagues.



Ingmar Kalfass
EuMIC 2017 Chair



Georg Böck
EuMIC 2017 TPC Chair



Friedel Gerfers
EuMIC 2017 Secretary

European Microwave Week 2017 National Sponsors

The organisers would like to thank the Free State of Bavaria, the German Research Foundation (DFG) and the VDE Association for Electrical, Electronic and Information Technologies (VDE-ITG) for their valuable support.



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Welcome to the 13th European Radar Conference, EuRAD 2017

The EuRAD 2017 team has great pleasure in welcoming you to the 14th European Radar conference (EuRAD), to be held at the Nürnberg Convention Center (NCC), from 11th - 13th October. This conference is the major European event covering the present status and future trends in the field of radar technology, system design, and applications, and covers a wide variety of topics, ranging from radar components and systems, radar propagation and target modelling, advanced signal processing techniques, up to the most innovative radar architectures and concepts and the latest applications.

In the opening session on Wednesday, two excellent keynote speakers will address important aspects of spaceborne radar and space surveillance. Dr. Paul Rosen, manager NASA Jet Propulsion Laboratory, will present 'The Renaissance in Radar Remote Sensing - Our New Vision for Earth and the Planets'. In the second keynote, Dr. Gerald Braun, manager DLR Space Administration, will give a talk on 'Space Surveillance and Tracking: Operational setup and needs'. The EuRAD Opening is held in conjunction with the Defence, Security and Space Forum (DSS). In contrast to the opening session, the closing session keynote is focused on consumer and industrial

applications. The closing session keynote is entitled 'Radar Systems: a New Emerging Market for Consumer and Industrial Applications' and presented by Dr. Ludger Verweyen, Senior director RF Mobile, Infineon Technologies AG.

This year, 151 papers were submitted to the conference, and after a rigorous selection process, the 93 accepted papers were organised into 24 oral sessions and two interactive sessions. EuRAD delegates can also attend several sessions shared with EuMC. Two 'industrial session keynotes' that will address recent innovation highlights of radar industry, and attractive topical workshops running alongside the conference round out the EURAD programme.

We would like to express our gratitude to all the reviewers and the TPC members for undertaking their task in a professional and timely manner, and for their contribution to the success of EuRAD 2017.

We look forward to meeting you at the EuRAD 2017 conference, and wish you a very pleasant stay in Nuremberg!



Martin Vossiek
EuRAD 2017 Chair



Nils Pohl
EuRAD 2017 TPC Chair



Peter Knott
EuRAD 2017 Secretary

WELCOME MESSAGES

Welcome from the General TPC Chair

I'm delighted that the European Microwave Week is back in Nuremberg, Germany, in 2017 for the second time. I look forward to seeing you during the week and hope you enjoy the excellent conference programme and perhaps find time to visit the lovely city of Nuremberg with its traditions and interesting historical sites.

As General Technical Programme Committee Chair, I would like to acknowledge the intensive work conducted by the reviewers and TPC members in just a few weeks between the paper submission deadline and the TPC meeting where the final programme was put together. The reviews were conducted by more than 450 reviewers and the 100-strong TPC which met in Nuremberg in March to rank the papers and organise accepted papers into a total of 90 sessions. The European Microwave Week maintains its high standard through the commitment of all these people, with individual papers typically receiving six independent reviewers' scores and having an acceptance rate of around 50%.

Serving as General TPC Chair of EuMW 2017 has been a great honour and valuable experience for me! One of the benefits of being General TPC Chair is the opportunity to look at every single paper and see new technology trends across a wide range of disciplines. The three conferences cover the whole chain from semiconductor components over active and passive components to complete radar and communication systems which makes the WEEK our major scientific and networking event of the year.

This year all of this has been managed through a new software system and I would like to especially thank Matthias Rudolph, Marc van Heijningen and the staff from CONVERIA, who have done tremendous work in setting up and managing the system and who efficiently contributed to the final programme preparation. Many thanks go to Christian Bornkessel for his excellent support in planning the overall session matrix of the EuMW. I also would like to thank the three TPC chairs of the individual conferences who supported me in an excellent and extremely efficient way.

Enjoy the conference, meet many people and take some extra time to visit the city or other places to take new ideas, make new friends or just re-load your body's batteries for whatever waits for you back home. See you all in Nuremberg in October.



Thomas Zwick
2017 General TPC Chair

SPECIAL ISSUE

International Journal of Microwave and Wireless Technologies: EuMW 2017 Special Issue

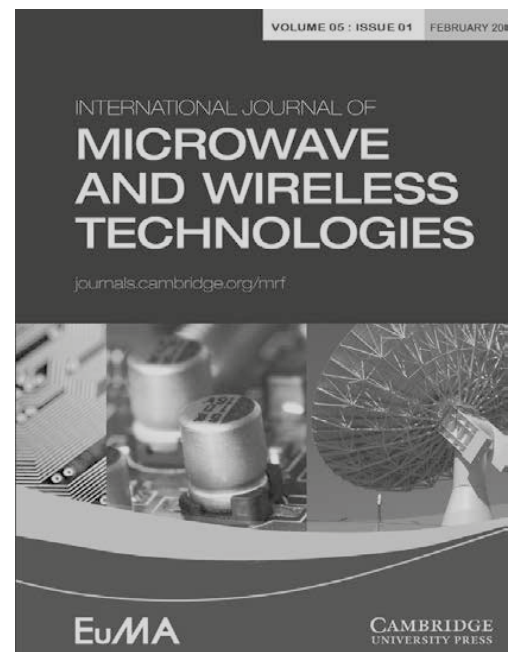
The International Journal of Microwave and Wireless Technologies was created in 2009 by the European Microwave Association (EuMA) and Cambridge University Press for the benefit of the microwave research community in Europe and overseas.

The journal is published eight times a year. It allows academic and industrial researchers to promote their work and stay connected with the most recent developments in microwave and RF technology. The journal is referenced in databases such as Scopus and Google Scholar and is indexed in the Thomson Reuters Web of Science. Following the success of previous microwave weeks, the journal will again publish a special issue dedicated to European Microwave Week 2017.

The authors of a number of highly ranked papers presented at the conferences will be invited to submit an extended version for publication in the journal. The special issue will be guest edited by Matthias Hein, chair of EuMC 2017, Ingmar Kallfass, chair of EuMIC 2017, and Martin Vossiek, chair of EuRAD 2017.

Accepted papers will be published online at <http://journals.cambridge.org/MRF> and can be referenced using their DOI (Digital Object Identifier). Once all submissions are received, the articles will be collated into the Special Issue and published in print, which is expected to appear in June 2018.

Ingmar Kallfass
EuMIC 2017 Chair



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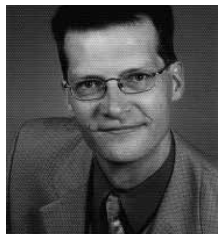
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2016 European Microwave Week in London Best Paper Prizes

EuMC Microwave Prize (sponsored by EuMA)

New Planar Microwave Devices and Antennas by Practical Surface-Wave Launching

S. K. Podilchak¹, S. F. Mahmoud², A. P. Freundorfer³, Y.M. Ma Antar³

¹Heriot-Watt University, UK

²Cairo University, Egypt

³The Royal Military College of Canada, Canada



EuMC Young Engineer Prizes

Efficient 2-D Leaky-Wave Antenna Configurations Based on Graphene Metasurfaces

W. Fuscaldo^{1,2}, P. Burghignoli¹, P. Baccarelli¹, A. Galli¹

¹Sapienza University of Rome, Italy

²Université de Rennes 1, France

Design and Experimental Characterization of a Surface with Low Radar Cross-Section at Millimetre-Wave Frequencies

C. Vasanelli , F. Boegelsack and C. Waldschmidt
Ulm University, Germany



EuRAD Best Paper Prize (sponsored by Thales Netherlands)

Detection of Jet Engines via Sparse Decomposition of ISAR Images for Target Classification Purposes

S. Wagner, F. Dommermuth, J. Ender

Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR, Germany



EuRAD Young Engineer Prize (sponsored by EuMA)



Waveform Diversity for SAR ECCM Based on random Phase and Code Rate Transition

K.W. Lee, J. Song, W. Lee

Korea Aerospace University, Korea

EuMIC Best Paper Prize



Integrated Circuit Field Canceller System Suitable for Highly Integrated Connectivity Transceivers

Z.E. Aboush¹, N. Dubash¹, A. Aktas¹, L. Brions¹, J. Koeller¹, R. Herberholz², A. Croxall²

¹Qualcomm Atheros Inc., USA

²Qualcomm Technologies International Ltd., UK

EuMIC Young Engineer Prize



A 280 GHz Stacked-FET Power Amplifier Cell using 50nm Metamorphic HEMT Technology

A.B. Amado Rey¹, Y. Campos Roca², C. Friesicke¹, A. Tessmann¹, R. Lozar¹, S. Wagner¹, A. Leuther¹, M. Schlechtweg¹, O. Ambacher¹

¹Fraunhofer Institute for Applied Solid State Physics IAF, Germany

²University of Extremadura, Spain

2017 EuMA Outstanding Career Award



Seán Scanlan

Seán Scanlan received a BE degree in Electrical Engineering from University College Dublin (UCD) in 1959. He then worked for a number of years in the U.K. at Mullard, Redhill, a leading industrial research laboratory, and received his PhD from the University of Leeds in 1966. He soon acquired a formidable reputation as a scholar of the highest standing and in 1968 was appointed to the Chair of Electronic Engineering at the

University of Leeds at the age of 31. He left Leeds to take up the newly created Chair of Electronic Engineering at UCD in 1973, and later became Head of the Department of Electronic and Electrical Engineering. He retired from this position in 2002 and became an Emeritus Professor at UCD.

Throughout his career Seán solved some of the most important circuit theoretic challenges of the time. Initially he contributed to the theory of high frequency transistor amplifiers and oscillators, and that of tunnel diode amplifiers. After making a number of fundamental contributions to the synthesis of lumped networks, he turned to the synthesis of distributed circuits, then exercising the minds of the leading circuit theorists, and working with David Rhodes produced what remain the most important results in distributed circuit synthesis. These methods continue to be central to the design of microwave filters for the most challenging applications.

He also made important contributions to the fields of digital filters and switched-capacitor filters, where he proved the existence of an exact synthesis for switched-capacitor state-variable filters with arbitrary attenuation characteristics, previously thought impossible.

Seán Scanlan founded the successful *International Journal of Circuit Theory and Applications* and served as Editor from 1973 until 2006, and was till 2017 an Honorary Editor. He was member of the European Microwave Conference Management Committee from 1974 through 1977 and from 1981 through 1985, chaired EuMC in 1986 in Dublin and chaired the EuMC Management Committee in 1987. He was also one of the founders of the biannual European Conferences on Circuit Theory and Design (ECCTD) and served as the Chairman of the first ECCTD in 1972. These conferences have provided an important vehicle for international scientific collaboration within the field; this was particularly significant at a time when collaboration within Europe was not as straightforward as it later became.

Seán was the President of the Royal Irish Academy (RIA) in 1993-1996, a Life Fellow of the Institute of Electrical and Electronics Engineers (IEEE), and is a recipient of the Golden Jubilee Medal of the IEEE Circuits and Systems Society, and of the RIA Gold Medal.

Very sadly, Prof. Seán Scanlan passed away in May 2017, shortly after receiving the letter informing him that he was the recipient of the EuMA Outstanding Career Award for 2017.

2017 EuMA Distinguished Service Award



Antti Räisänen

Antti Räisänen received a DSc degree in Electrical Engineering from the Helsinki University of Technology, HUT (now Aalto University) in 1981. In 1989, he was appointed Professor of Radio Engineering with HUT, after holding the same position pro tem in 1985 and 1987-1989. He has been Visiting Scientist and Professor with Five College Radio Astronomy Observatory and University of Massachusetts, Amherst (1978-1981); Chalmers University of Technology (1983); University of California, Berkeley (1984-1985); Jet Propulsion

Laboratory and California Institute of Technology (1992-1993); Observatoire de Paris and Université de Paris 6 (2001-2002); Universidad Carlos III de Madrid (2013-2014).

He teaches and supervises research in mm-wave components, antennas, receivers, measurements, etc., at the Aalto University and Millimetre Wave Laboratory of Finland - ESA External Laboratory (MilliLab). He has educated a large number of MSc and PhD students: under his supervision 54 students have received a PhD degree. He has authored or coauthored over 500 peer-reviewed scientific papers and seven books, e.g., *Radio Engineering for Wireless Communication and Sensor Applications* (Artech House 2003) and *Semiconductor Terahertz Technology: Devices and Systems at Room Temperature Operation* (Wiley 2015).

At HUT and Aalto University, Dr. Räisänen led the Radio Laboratory (1987-2007), the Department of Radio Science and Engineering (2008-2016) and the Centre of Smart Radios and Wireless Research, SMARAD (2002-2013). He was member of the Research Council for Natural Sciences and Engineering in the Academy of Finland (1995-1997). He was elected Vice-Rector of HUT for 1997-2000. He has chaired the Board of Directors of MilliLab since 1995.

Dr. Räisänen has served the European Microwave Conference (EuMC) and the European Microwave Association (EuMA) since 1981, when he started as Secretary General of the 12th EuMC held in Helsinki in 1982. Since that, he has served in the TPC of EuMC in most of the years. He was General Chairman of the 22nd EuMC held in Espoo in 1992. He served in the Management Committee of EuMC (1986-88, 1995-99) and chaired the Management Committee in 1993. He also served in the General Assembly of EuMA (2003-2006). He was a member of the Board of Directors of EuMA (2006-2011) and chaired its Awards Committee (2009-2011).

Dr. Räisänen was the founder of the IEEE MTT/AP Chapter in Finland and its first Chair (1987-1992). He has been Conference Chairman of several international mm-wave conferences, e.g., ESA Workshop on Millimetre Wave Techniques and Applications and Global Symposium on Millimetre Waves. He was Associate Editor of the IEEE Transactions on Microwave Theory and Techniques (2002-2005).

In 1994, Dr. Räisänen became Fellow of IEEE with citation "for contribution to and leadership in millimetre-wave receiver technology" and in 2008 Fellow of the Antenna Measurement Techniques Association, AMTA. In 1998, he received the Finnish Society of Electronics Engineers Award with citation "for raising education and research of radio engineering in Finland to the top international level". In 2001, he became First Class Knight of the White Rose of Finland. He was the recipient of the AMTA Distinguished Achievement Award in 2009. University Carlos III of Madrid awarded him the Chair of Excellence in 2013.

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Group 5 - Belgium, The Netherlands, Luxembourg
Group 6 - Iceland, Norway, Sweden
Group 7 - Denmark, Faroe Islands, Finland, Greenland
Group 8 - Bulgaria, Czech Republic, Hungary, Romania, Slovakia
Group 9 - Estonia, Latvia, Lithuania, Poland
Group 10 - Armenia, Azerbaijan, Georgia, Moldova, Ukraine
Group 11 - Albania, Bosnia and Herzegovina, Croatia, Cyprus, FYR Macedonia, Montenegro, Greece, Israel, Serbia, Slovenia, Turkey
Group 12 - Belarus, Russia
Group 13 - Austria, Liechtenstein, Switzerland
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Group 15 - North America
Group 16 - Asia-Pacific
Group 17 - Africa and Middle East countries

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Welcome to EuMW 2017

We are excited that in 2017 the EuMW returns to Nuremberg, a uniquely fascinating European city, full of medieval charm. Bringing industry and academia together, European Microwave Week 2017 is a SIX day event, including THREE cutting edge conferences and ONE exciting trade and technology exhibition featuring leading players from across the globe. EuMW 2017 provides access to the very latest products, research and initiatives in the microwave sector. It also offers you the opportunity for face-to-face interaction with those driving the future of microwave technology.

The 20th European Microwave Week combines

- three major conferences,
- associated workshops,
- tailored courses and seminars for industrialists, academics and researchers, and
- leading international trade show.

In addition, Exhibitor Workshops and Seminars will be provided by several top organisations with superior expertise in Microwave, RF, Wireless or Radar.

BADGES

Online registrants will automatically be e-mailed their badge barcode and an order confirmation receipt immediately after they pay. All those who have pre-registered should bring their badge barcode and confirmation with them to the conference where they can print out their badge by scanning their barcode at the Fast Track desk onsite. Once you have collected your badge, you can collect the conference proceedings which are on a USB stick and delegate bag for the conferences. Processing will be quick and easy but queues may form at busy times, so please arrange to collect your badge well in advance of your first conference session.

The registration area will be located at the entrance to the conference centre as sign posted.

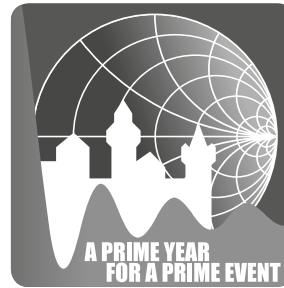
Those who have not pre-registered can do so on site. There will be onsite registration terminals located within the registration area, where delegates can enter their details and pay immediately by swiping their credit or debit cards through the card readers attached to the terminals. Alternatively, you can pay at the Cashier desk if you require a printed receipt.

If you have any questions regarding registration procedures and payment, please email: eumwreg@itnint.com.

CONFERENCES

Choose from three separate but complementary conferences. Spanning the length of the week, starting from Sunday 8th October, the conferences and workshops are scheduled as follows:

- European Microwave Integrated Circuits Conference (EuMIC) 9th - 10th October 2017
- European Microwave Conference (EuMC) 10th - 12th October 2017
- European Radar Conference (EuRAD) 11th - 13th October 2017



**EUROPEAN
MICROWAVE WEEK**
NÜRNBERG CONVENTION CENTER
NÜRNBERG, GERMANY
8TH-13TH OCTOBER 2017
www.eumweek.com

- Plus Workshops and Short Courses (From 8th - 13th October 2017)
- In addition, EuMW 2017 will include for the 8th year, the Defence, Security and Space Forum on 11th October 2017

The conferences encompass a wide range of subject areas including:

- Microwave, Millimetre-wave and Submillimetre-wave Systems
- Antennas and Propagation
- Wireless Technologies
- Telecommunication (RF, Microwave and Optical)
- ICs, Semiconductor Materials and Packaging
- Radar Architectures, Systems and Subsystems
- Sensors and Remote Systems
- Test and Measurement

Online registration opens on 1st June 2017 and remains open up to and during the event until 7th October 2017. During the event, you can also register on site from Saturday 7th October 2017 (16:00 -19:00) and from 07:30 each morning from Sunday 8th October 2017 to Friday 13th October 2017.

The conferences will be held in different rooms over the conference dates. Please refer to the Conference Matrix at the back of this booklet for a detailed overview. Delegates may register for one, two or all three of the conferences. Registration at one conference does not allow any access to sessions of other conferences. Those who wish to register for two or more conferences will receive a discount on these registrations.

Fees and discounts are all explained in the Conference Registration Information section of this booklet.

PROCEEDINGS ON USB

All papers published for presentation at your chosen conference will be on a USB stick given out with the delegate bags. There will be one USB stick combining all three conferences.

No hard copies of workshop slides will be provided, but electronic download will be available ahead of the conference. Additionally, all workshop proceedings will be available on a USB stick for all workshop participants.

INTERACTIVE SESSIONS

Authors of papers in the Interactive Sessions will have presentation screens to present their paper instead of the posters used in previous years. The presentation screens are located in the conference area on Monday and Friday and in the exhibition hall as sign-posted on Tuesday, Wednesday and Thursday.

SPEAKER PREPARATION SPACE

A speaker preparation lounge is located within the 'press centre' on level 1.

GENERAL INFORMATION

EXHIBITION HOURS

The exhibition area will be located in Hall 7A as shown on the Floor Plans at the back of this booklet. As a registered delegate you will have full access to the exhibition area.

The exhibition opening hours are:

- Tuesday 10th October 9:30-18:00
(followed by the Welcome Reception)
- Wednesday 11th October 9:30-17:30
- Thursday 12th October 9:30-16:30

See the back cover for a full listing of the exhibitors (correct at the time of going to press).

EuMA MEMBERSHIP

One can apply for EuMA membership by ticking the appropriate box during registration for EuMW. In general, membership applications received after August 1, or through the EuMW registration form are intended for the next calendar year. However, the discount for the EuMW fees applies immediately. EuMA membership fee is €25 for Professionals and €15 for Students. EuMA offers a three-year free membership for people residing in NIS and some African countries.

The EuMA website has its Knowledge Centres which presently contains over 19,000 papers published under the EuMA umbrella. Full texts are available to EuMA members only, who can make as many copies as they wish, at no extra-cost. Furthermore, The 'International Journal of Microwave and Wireless Technologies' is published annually with eight issues. EuMA members are entitled to free electronic access to the Journal. There is a special offer when subscribing to both Membership and printed Journal: €67 for Professionals, €57 for Students.

HOTELS AND TRAVEL

HOTEL RESERVATION

Horizon House has teamed up with Connex Hotels and Events, our preferred hotel booking supplier, to offer you the ability to book your accommodation for this event at the most competitive rates available. It is very easy to make an immediate hotel booking.

Simply visit their booking page <http://www.connexhotelsandevents.com/eumw-2017-nuremberg.html> and make your booking, or email sally@connexhotelsandevents.com. You will find a wide range of accommodation to suit every budget. Alternatively, see the hotel booking pages within this programme.

GETTING TO THE NÜRNBERG CONVENTION CENTER

The city of Nuremberg (German: Nürnberg) is located in the south of Germany and it is well connected to the European motorway, rail and flight networks, which allow easy access to the Nürnberg Convention Center (NCC). The NCC is connected by subway lines to the main railway station (about eight minutes) and to the airport (about 25 minutes).

Address: NürnbergMesse GmbH, Messezentrum 1, 90471 Nürnberg, Germany

By Car

Your navigation system will find the Nürnberg Convention Center by inserting the address: Karl-Schönleben-Strasse, Nuremberg, Germany or if you enter Messezentrum, Nuremberg as a special destination.

By Rail

Nuremberg is also well connected within the railway system. There are four different kinds of trains: ICE (Intercity Express), IC (Intercity), RE or RB (local trains) and the S (commuter train). The ICE trains are the fastest ones which run from Frankfurt am Main and Munich to Nuremberg in only 2.5 hours and 1 hour, respectively.

For more information on connections within the German railway system (Deutsche Bahn) visit www.bahn.com.

For more information on local connections and subway lines in and around Nuremberg visit www.vgn.de/home_eng/.

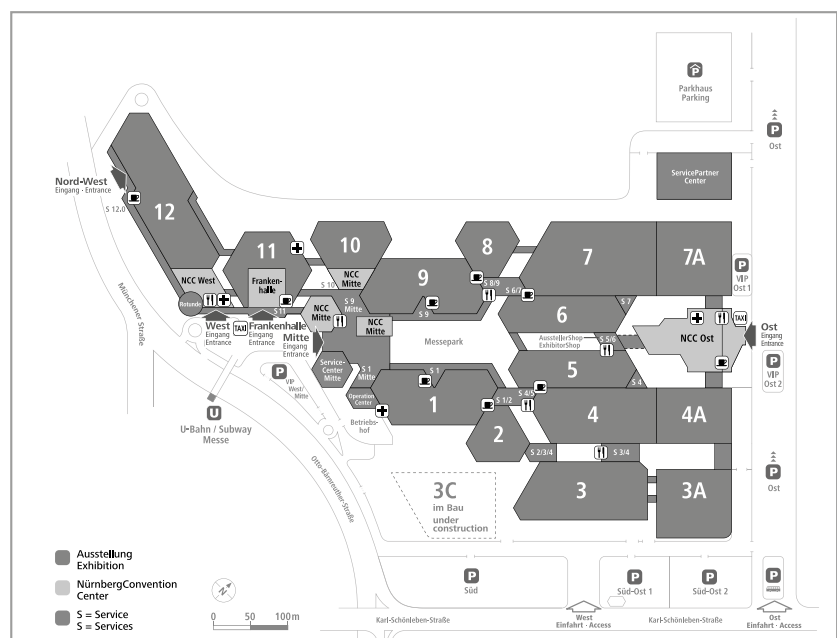
By Air

Nuremberg Airport (NUE) offers numerous direct flights from nearly all major European cities (more than 50 European direct connections are available). From overseas, Nuremberg Airport is easily reached by international flights via Frankfurt am Main or Munich. Within Germany, Nuremberg is also excellently connected by national flights. Possibly the most convenient international connection is via Frankfurt Int'l Airport and then onwards by train to Nuremberg. This takes approximately 2.5 hours.

For more information on connections to the Nuremberg Airport visit <http://www.airport-nuremberg.de/English>.

Free Public Transportation

Public transportation will be free for all conference delegates during the event in the local traffic network (bus, tram, and underground). Detailed information on the tickets will be provided prior to the conference online and by email.



GENERAL INFORMATION

OTHER USEFUL INFORMATION

WiFi

Sponsored by CST, WiFi is provided throughout the conference centre as well as the exhibition hall. Login details can be found within your delegate bag.

CLOAKROOM

The cloakroom is located on the right as you enter the NCC Ost.

PERSONAL INVITATION

To verify whether you will need a visa invitation letter in order to attend EuMW 2017, please go to <http://www.auswaertiges-amt.de>. Contact Prof. Dr Andreas Penirschke, Visa Chair EuMW 2017, Mittelhessen University of Applied Sciences, Friedberg, Germany via visa@eumw2017.com with your request for letters.

INSURANCE

It is highly recommended that all participants carry the proper travel and health insurance, as the organiser cannot accept any liability for any accidents or injury that occur during or when travelling to the event. Please also ensure that personal items are covered for loss, damage or theft either through a personal policy or by a corporate policy. We cannot accept any liability for personal items that are lost, damaged or stolen during or when travelling to and from European Microwave Week 2017.

ELECTRICITY

Electricity is supplied at 230V, 50Hz (socket type F ("Schuko plug")).

SOCIAL EVENTS & PARTNER PROGRAMME

Full details of the social events & dinners that are taking place during EuMW 2017 can be found in the 'Social Events & Partner Programme' section of this programme.

CREDIT CARDS

All major hotels and most restaurants and shops will accept credit cards. It is advisable to carry other identification as well. Visa and MasterCard are the most widely accepted cards.

SHOPPING & SIGHTSEEING

In the Old Town of Nuremberg you can feel the almost one thousand year old history. The special ambience invites you to extensive sightseeing tours. Numerous shopping possibilities and the active art and culture scene of Nuremberg are always worth a visit. Whether it is on the Main Market Square with its fruit and vegetable stalls under their red and white umbrellas, whether it is behind the glass facades of elegant shopping malls: Nuremberg's inner city offers a unique shopping atmosphere with 500 shops in this historical backdrop. During the week, you can shop here until 20:00. Picturesque roast sausage "kitchens" invite guests to sample Franconian specialities, while star-rated restaurants offer culinary delights even for the most discerning palate.

Do not leave Nuremberg without

- having watched the "Männleinlaufen", the clockwork on the facade of the "Frauenkirche" on the Main Market Square just five minutes before noon,
- having looked down on the roofs of the city from the Imperial Castle, and
- having eaten some of the famous Nuremberg roast sausages or a "Schäuferle".

For information on shopping and sightseeing, visit www.nuernberg.de/internet/portal_e/kultur.

Alternatively, see the "Partner Programme" section in this booklet for tours and excursions before, during and after EuMW 2017.

SOCIAL EVENTS

EuMIC Dinner

Date: Monday 3rd October 2016

Start: 19:00

Cost: Free to EuMIC delegates

Location: Historisches Restaurant "Zum Spiessgesellen",
Rathausplatz 4, 90403 Nürnberg

Due to the generous sponsorship of the Robert Bosch GmbH, it is our pleasure to invite delegates to the EuMIC conference dinner on Monday evening. The dinner will take place in an authentic restaurant in the heart of Nuremberg's historic city center. As there are a limited number of places, tickets will be allocated on a first-come, first-served basis. Details on ticket collection will be announced during the EuMIC Opening Session.

Welcome Reception

Date: Tuesday 10th October 2017

Duration: 18:30 - 21:30

Location: Room Sydney and Restaurant Vasco da Gama

Cost: Free to conference delegates & invited exhibitors

All registered conference delegates, as well as invited representatives from companies participating in the exhibition are invited to the EuMW 2017 Welcome Reception, sponsored

by Keysight Technologies, Horizon House Publications and EuMA. Delegates will need to bring their badge and exhibitors their invite along with them to gain entrance. The evening will begin with drinks at 18:30 followed by the General Chairs' handover from EuMW 2017, Nuremberg to EuMW 2018, Madrid as well as an address from the Platinum Sponsor, Keysight Technologies. The open-buffet dinner will be served from 19:00.

State Reception

Date: Wednesday 11th October 2017

Duration: 19:00 until 22:00

Location: Imperial Castle (Kaiserburg)

The Free State of Bavaria hosts a reception at the Imperial Castle of Nuremberg on Wednesday 11th October 2017, 19:00 to 22:00. The medieval Imperial Castle, one of Nuremberg's most prestigious historical landmarks, is easy to reach by public transportation or even by foot. Don't fail to visit it before joining the State Reception.

Address: Auf der Burg 13

www.kaiserburg-nuernberg.de



CONFERENCE REGISTRATION INFORMATION

Fast Track Badge Retrieval

Register online and print out your badge in seconds onsite from the Fast Track Check In Desk

Register Online at www.eumweek.com

ONLINE registration is open from 1st June 2017 up to and during the event until 13th October 2017.

ONSITE registration is open from 16:00 on 7th October 2017.

ADVANCE DISCOUNTED RATE (up to and including 8th September) **STANDARD RATE** (from 9th September & Onsite).

CONFERENCE REGISTRATION FEES

There are TWO different rates available for the EuMW conferences:

- **ADVANCE DISCOUNTED RATE** – for all registrations made online up to and including 8th September (these are approximately 40% cheaper than the Standard Rate).
- **STANDARD RATE** – for all registrations made online from 9th September and onsite.

Please see the Conference Registration Rates table on the following page for complete pricing information. All payments must be in € (Euros) – cards will be debited in € (Euros).

CONFERENCE REGISTRATION DETAILS

Online Registration

- All registrations should be made online at www.eumweek.com. Those completed up to and including 8th September will be charged at the 'Advance Discounted Rate' and those from 9th September will be charged at the 'Standard Rate'.
- Online registration is open from 1st June 2017 up to and during the event until 13th October 2017. You can also register ONSITE from 16:00 on Saturday 7th October 2017 and then at the times detailed below.

Onsite Registration

Onsite registration is available:

- Saturday 7th October 16:00 - 19:00
- Sunday 8th October 07:30 - 17:00
- Monday 9th October 07:30 - 17:00
- Tuesday 10th October 07:30 - 17:00
- Wednesday 11th October 07:30 - 17:00
- Thursday 12th October 07:30 - 17:00
- Friday 13th October 07:30 - 10:00

Onsite registration will be charged at the Standard Rates (see pricing table on the following page).

HOW TO REGISTER

Online

- All registrations should be made online at www.eumweek.com.
- Delegates can register for one, two or all three of the conferences, workshops and short courses.
- Discounts will be given to those registering for two or more conferences.
- Payment can be made online using Amex, Visa, Mastercard or Bank Transfer.
- Registrants paying by Credit Card will be sent an automatic email confirmation, with a receipt and badge barcode.
- Registrants choosing to pay by Bank Transfer will receive their confirmation, but their receipt and badge barcode will be sent only once payment has been received and cleared by Horizon House.

Onsite

- The registration area will be located at the entrance to the conference centre as sign posted.
- There will be Self Service terminals in the registration area where delegates can enter their details and pay immediately by swiping their credit cards through the readers attached to the terminals.
- Delegates can also choose to 'Pay at Cashier' and then proceed to the Cashier Point and pay using credit cards or cash. Receipts will be given accordingly.

If you have any questions regarding registration procedures and payment, please contact: eumwreg@itnint.com.

BADGE COLLECTION AT FAST TRACK CHECK IN DESK

- All online registrants should bring a printed copy of their email registration receipt with the barcode and a photo ID. At the entry to the convention centre, they may scan the barcode at the Fast Track check-in desks and present their ID to obtain the badge.
- Online registrants without printed emails may also obtain their badges at the Self Service registration terminals (photo ID required).
- All onsite registrants using the Self Service terminals will receive their printed badge upon payment.
- Once you have collected your badge, you can collect the conference proceedings on USB stick and the delegate bag for the conferences from the specified delegate bag area by scanning your badge. Processing will be quick and easy but queues may form at busy times, so please arrange to collect your badge well in advance of your first conference session.

COFFEE BREAKS AND WELCOME RECEPTION

- Upon presentation of their badge conference delegates will be served free coffee during the coffee breaks.
- There will be two coffee breaks per day. On Friday, there will be only one coffee break in the morning.
- The Welcome Reception takes place in Room Sydney and Restaurant Vasco da Gama after show close at 18:30 on Tuesday 10th October. Badges must be presented at the entrance.

STATE RECEPTION – 11TH OCTOBER 2017

The Free State of Bavaria hosts a reception at the Imperial Castle of Nuremberg on Wednesday 11th October 2017, 19:00 to 22:00. As only limited space is available, it is not possible to accommodate all attendees; a ticket is required to join the State Reception. Tickets will be available for conference delegates and invited persons on a first-come, first-served basis in the registration area. (NCC Ost, level 0) on Wednesday 11th October 2017, between 11:00 and 17:00.

CONFERENCE AMENITIES AT EUMW 2017

- Delegates will be granted free public transportation in Nuremberg.
- Free water will be supplied at dispensers distributed all over the NCC and at the Keysight booth in the exhibition hall.

CONFERENCE LOCATION

The conferences will be held in different rooms over the conference dates. Please refer to the Conference Matrix. Registration at one conference does not allow access to the sessions of the other conferences.

CONFERENCE REGISTRATION INFORMATION

EUROPEAN MICROWAVE WEEK 2017, 8th - 13th October, Nuremberg, Germany

Register Online at www.eumweek.com

ONLINE registration is open from 1st June 2017 up to and during the event until 13th October 2017.

ONSITE registration is open from 16:00 on 7th October 2017.

ADVANCE DISCOUNTED RATE (up to and including 8th September) STANDARD RATE (from 9th September & Onsite).

Reduced rates are offered if you have society membership to any of the following*: EuMA, GAAS, IET or IEEE.

EuMA membership fees: Professional € 25/year, Student € 15/year.

If you register for membership through the EuMW registration system, you will automatically be entitled to discounted member rates.

Reduced Rates for the conferences are also offered if you are a Student/Senior (Full-time students 30 years or younger and Seniors 65 or older as of 13th October 2017).

The fees shown below are invoiced in the name and on behalf of the European Microwave Association. EuMA's supplies of attendance fees in respect of the European Microwave Week 2017 are exempted from German VAT under Article 4 no. 22a German VAT Act.

ADVANCE REGISTRATION CONFERENCE FEES (UP TO AND INCLUDING 8TH SEPT.)

CONFERENCE FEES	ADVANCE DISCOUNTED RATE			
	Society Member (*any of above)		Non Member	
	Standard	Student/Sr.	Standard	Student/Sr.
<i>1 Conference</i>				
EuMC	€ 470	€ 130	€ 660	€ 190
EuMIC	€ 360	€ 120	€ 510	€ 170
EuRAD	€ 320	€ 110	€ 450	€ 160
<i>2 Conferences</i>				
EuMC + EuMIC	€ 670	€ 250	€ 940	€ 360
EuMC + EuRAD	€ 640	€ 240	€ 890	€ 350
EuMIC + EuRAD	€ 550	€ 230	€ 770	€ 330
<i>3 Conferences</i>				
EuMC + EuMIC + EuRAD	€ 810	€ 360	€ 1140	€ 520

STANDARD REGISTRATION CONFERENCE FEES (FROM 9TH SEPT. AND ONSITE)

CONFERENCE FEES	STANDARD RATE			
	Society Member (*any of above)		Non Member	
	Standard	Student/Sr.	Standard	Student/Sr.
<i>1 Conference</i>				
EuMC	€ 660	€ 190	€ 930	€ 270
EuMIC	€ 510	€ 170	€ 720	€ 240
EuRAD	€ 450	€ 160	€ 630	€ 230
<i>2 Conferences</i>				
EuMC + EuMIC	€ 940	€ 360	€ 1320	€ 510
EuMC + EuRAD	€ 890	€ 350	€ 1250	€ 500
EuMIC + EuRAD	€ 770	€ 330	€ 1080	€ 470
<i>3 Conferences</i>				
EuMC + EuMIC + EuRAD	€ 1140	€ 520	€ 1600	€ 740

WORKSHOP AND SHORT COURSE FEES (ONE STANDARD RATE THROUGHOUT)

FEES	STANDARD RATE			
	Society Member (*any of above)		Non Member	
	Standard	Student/Sr.	Standard	Student/Sr.
Half day WITH Conference registration	€ 100	€ 80	€ 130	€ 100
Half day WITHOUT Conference registration	€ 130	€ 100	€ 170	€ 130
Full day WITH Conference registration	€ 140	€ 110	€ 180	€ 130
Full day WITHOUT Conference registration	€ 180	€ 140	€ 240	€ 170

Other Items

STATE RECEPTION – 11TH OCTOBER 2017

Tickets for the State Reception are free, but are limited. They are available for delegates on a first-come, first-served basis.

Proceedings on USB Stick

All papers published for presentation at each conference will be on a USB stick, given out FREE with the delegate bags to those attending conferences. The cost for an additional USB stick is € 50.

International Journal of Microwave and Wireless Technologies (8 issues per year)

International Journal combined with EuMA membership: € 67 for Professionals or € 57 for Students.

Partner Programme and Social Events

Full details and contacts for the Partner Programme and other Social Events can be obtained via the EuMW website www.eumweek.com.

EUROPEAN MICROWAVE WEEK WORKSHOPS & SHORT COURSES

SUNDAY 8th October		
Half Day	SS-01	EuMC
Full Day	WS-01	EuMC
Full Day	WS-02	EuMC/EuMIC
Full Day	WS-03	EuMC
Full Day	WS-04	EuMC
Full Day	WS-05	EuMC/EuMIC
Full Day	WS-06	EuMC/EuMIC
Full Day	WS-07	EuMC
Full Day	WS-08	EuMC/EuMIC
Full Day	WS-09	EuMC/EuMIC
Full Day	WS-10	EuMC
Full Day	WS-11	EuMC
Half Day	WS-12	EuMC
Full Day	WS-13	EuMC
Half Day	WS-14	EuMC
Half Day	WS-15	EuMC

TUESDAY 10th October		
Full Day	WTu-01	EuMC/EuMIC

WEDNESDAY 11th October		
Half Day	SW-01	EuMC/EuRAD
Half Day	WW-01	EuMC
Half Day	WW-02	EuMIC/EuRAD
Half Day	WW-03	EuMC/EuMIC

THURSDAY 12th October		
Half Day	WTh-01	EuMC/EuRAD
Full Day	WTh-02	EuRAD
Full Day	WTh-03	EuMC/EuMIC

FRIDAY 13th October		
Full Day	SF-01	EuRAD
Half Day	SF-02	EuMC/EuRAD
Half Day	SF-03	EuRAD
Full Day	WF-01	EuRAD
Half Day	WF-02	EuMC
Half Day	WF-03	EuMC/EuRAD
Half Day	WF-04	EuRAD
Full Day	WF-05	EuMC
Full Day	WF-06	EuMC/EuRAD
Half Day	WF-07	EuMC/EuRAD
Half Day	WF-08	EuMC/EuRAD

SPECIAL FORUMS & SESSIONS

Date	Time	Title	Location	No. of Days	Fee
Wednesday 11th October	08:30 - 18:30	Defence, Security & Space Forum	St. Petersburg	1	€ 20 for delegates (those registered for EuMC, EuMIC or EuRAD) € 60 for all others (those not registered for a conference)
Monday 9th - Wednesday 11th October	08:30 - 17:50	European Microwave Student School	Neu Delhi	3	€ 40
Monday 9th - Wednesday 11th October	08:30 - 17:50	European Microwave Doctoral School	Singapur	3	€ 80

EUROPEAN MICROWAVE WEEK WORKSHOPS AND SHORT COURSES

SUNDAY 8th October

Half Day	SS-01	EuMC	Multibeam Antennas and Beamforming Networks
Full Day	WS-01	EuMC	Microwave Photonics: An Enabling Technology for 5G?
Full Day	WS-02	EuMC/EuMIC	Advances in GaN Device Technology for Millimetre-Wave Applications
Full Day	WS-03	EuMC	Wireless 100Gb/s and Beyond: Progress in Ultra-fast Wireless Communications
Full Day	WS-04	EuMC	Equipment and Antennas for Satellite Communication
Full Day	WS-05	EuMC/EuMIC	Microwave and THz Devices and Circuits Based on Graphene
Full Day	WS-06	EuMC/EuMIC	Integration of III-V Nanowire Semiconductors for Next Generation High Performance CMOS SOC Technologies and Competitive Solutions
Full Day	WS-07	EuMC	High-Q RF MEMS Devices and Multiphysical Cross-Layer Circuit Design
Full Day	WS-08	EuMC/EuMIC	High Efficiency Power Amplifiers and Smart Transmitters
Full Day	WS-09	EuMC/EuMIC	5G - From Concepts to Circuits
Full Day	WS-10	EuMC	Fan-out Wafer Level and 3D Packaging Technologies for RF and mm-Wave Applications: Available Technologies and Applications from Industry
Full Day	WS-11	EuMC	Chipless RFID Systems, Technology, and Applications
Half Day	WS-12	EuMC	Newest Trends in OTA Performance Testing for Automotive and 5G
Full Day	WS-13	EuMC	Advanced RF and Microwave Circuit Technologies
Half Day	WS-14	EuMC	Modelling, Identification and Suppression of Parasitic Modes in On-Wafer Measurements
Half Day	WS-15	EuMC	The Basics of Traveling Wave Tube Amplifiers

MONDAY 9th October

Full Day	WM-01	EuMC	Current and Future Use of Spectrum by PMSE - 4th PMSE Workshop at EuMW
Full Day	WM-02	EuMC	Electromagnetic Sensors for Life Science Applications
Full Day	WM-03	EuMC	Far-Field and Near-Field Techniques for Wireless Energy Transfer
Half Day	WM-04	EuMC	High Power RF and Microwave Amplifiers and Generators
Half Day	WM-05	EuMC	Connecting to MMIC at Millimetre-Waves
Half Day	WM-06	EuMC	THz Electronics Technology for Communications and Sensing
Half Day	WM-07	EuMC	mm-Wave Antenna Measurement Techniques and Facilities Planning
Full Day	WM-08	EuMC	Novel Fabrication Technologies for Sub-Millimetre Wave to THz Applications

TUESDAY 10th October

Full Day	WTu-01	EuMC/EuMIC	Terahertz Technologies: A Device and Application Prospective from Fundamentals to Implementations
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WEDNESDAY 11th October

Half Day	SW-01	EuMC/EuRAD	Modulation Schemes and Interference of Automotive Radars
Half Day	WW-01	EuMC	Technologies and Circuits for Advanced Automotive Radar and Related Applications
Half Day	WW-02	EuMIC/EuRAD	Millimetre Wave Radar Sensor Design in Nanoscale RF-CMOS Technologies
Half Day	WW-03	EuMC/EuMIC	Recent Advancements in Wide-Band and Efficient GaN Power Amplifiers

THURSDAY 12th October

Half Day	WTh-01	EuMC/EuRAD	Resource-Efficient Localisation in Wireless Sensor Networks
Full Day	WTh-02	EuRAD	Short Range mm-Wave Imaging Systems
Full Day	WTh-03	EuMC/EuMIC	Integrated Circuits for High Datarate THz-Communication

FRIDAY 13th October

Full Day	SF-01	EuRAD	Synthetic Aperture Radar (SAR)
Half Day	SF-02	EuMC/EuRAD	Radar Based Detection of Drones
Half Day	SF-03	EuRAD	Noise Radar Technology
Full Day	WF-01	EuRAD	Present and Future Perspectives of Passive Radar
Half Day	WF-02	EuMC	Wearable Antennas and Smart Textiles
Half Day	WF-03	EuMC/EuRAD	Highly Integrated mm-Wave Systems for Emerging Industrial and Consumer Radar-Based Applications
Half Day	WF-04	EuRAD	Active Electronically Scanned Array (AESA) Systems – Status and Trends
Full Day	WF-05	EuMC	The Internet of Space, a New Satellite Communication Technique
Full Day	WF-06	EuMC/EuRAD	Sub-Millimetre Wave and THz Imaging for Security
Half Day	WF-07	EuMC/EuRAD	Future Automotive Radar Systems
Half Day	WF-08	EuMC/EuRAD	Automotive Radar Measurement Solutions - For End-of-Line Purposes as well as in Aftersales



The 2017 Defence, Security and Space Forum

Wednesday 11th October, Room St. Petersburg, 08:30 - 18:30

EuMA
European Microwave Association

Microwave Journal

The Defence, Security and Space (DSS) Forum is jointly organised by the European Microwave Association (EuMA) and Microwave Journal, to complement important topics of the European Microwave Week in the defence, security and space sector.

This year's guiding topic is **The Internet of Space - Technologies and Applications**. Vast areas of the globe, from oceans and deserts to inhabited areas with lagging infrastructure development, are without sufficient Internet connectivity. Yet, commercial and societal progress as well as safety and security are increasingly linked to access to the information superhighway. Equally, military missions require reliable and secure data communication pathways. A new class of satellite communication services promises to cover those needs, using various platforms from Low Earth Orbit (LEO) to Geostationary (GEO) satellites, jointly referred to as the **Internet of Space**.

The Keynote speakers will, in two in-depth presentations, discuss technologies and applications from the viewpoint of a major player in the "large constellation" field, and share views of the opportunities the **Internet of Space** will offer for military markets and missions. The Executive Forum will add to these viewpoints from the perspective of established as well as newly emerging players in the field.

The **Internet of Space** is a nascent field where opportunities abound, yet many crucial technological decisions still have to be made – for many in the field, it offers a once-in-a-lifetime opportunity to make important contributions to a field closely related to state-of-the-art microwave and millimetre-wave technologies. Join us for an exciting day of technology, hear from the experts, and socialise during lunch and the concluding Cocktail Reception!

Programme

08:30 - 10:10 EuRAD Opening Session

10:10 - 10:50 Coffee Break

10:50 - 12:30

The Internet of Space – Technologies and Applications

Two keynote speakers from the industry will present their view on key applications and the related technologies needed for the realisation of the **Internet of Space**. The presentations will cover commercial as well as military applications.

- The World's Largest Satellite Constellation 'OneWeb' – Redefining Satellite Communications - **Wolfgang Duerr, Airbus DS Inc., USA**
- The Connections are Key: The Implications of the Internet of Things on Military Technology - **Joe Mariani, Deloitte, USA**

12:40 - 13:40 Strategic Analytics Lunch & Learn Session

This session adds a further dimension to the topics by offering a market analytics perspective, illustrating the status, development and potential of the market for the **Internet of Space**.

13:50 - 15:30 Microwave Journal Industry Panel Session

This session offers an industrial perspective on the key issues to be addressed in the defence, security and space sector. In accordance with this year's Defence, Security and Space theme the panel will investigate the opportunities for applications of the **Internet of Space** as well as address the technological challenges.

15:30 - 16:10 Coffee Break

16:10 - 17:50 DSS Executive Forum

High level speakers from leading Defence and Space companies present their views and experiences on the upcoming technologies and applications in the civil and military domains. They will be complemented by speakers from a government agency, consulting company and a start-up, who will offer their views on research needs, trends and New Space opportunities and challenges. The forum includes:

- Erich Auer, Tesat-Spacecom, Germany
- Wolfgang Duerr, Airbus DS Inc., USA
- Matthias Spott, eightyLEO, Germany
- Joe Mariani, Deloitte, USA
- Siegfried Voigt, DLR, Germany

17:50 - 18:30 Cocktail Reception

The Microwave Journal sponsored reception offers the opportunity to network and discuss informally the issues raised throughout the Forum.

Registration and Programme Updates

Registration fee is €20 for those who registered for a conference and €60 for those not registered for a conference. The Conference Special Events section of the EuMW website will give further details and updates.



Sponsored by:



EuMW 2017 Student Challenge

Date: Tuesday 10th October - Thursday 12th October

Location: Room Hamburg

Eligible students are invited to take part in the Student Challenge during EuMW 2017, which is organised by Thomas Ußmüller and Michael Höft (sc@eumw2017.org). The Student Challenge is an opportunity for Bachelor, Master, and Doctoral students from all over the world with a variety of academic backgrounds, to work together on a specific topic in the wide and challenging field of microwaves. The aim is to promote innovative thinking, teamwork and pro-active behaviour - skills future employers will highly value. The Student Challenge Prize of €1,500 is kindly sponsored by Thales Nederland B.V.

Teams

Each team is composed of a maximum of four members, preferably from different institutions and with a variety of backgrounds. All teams will present, explain, and defend a fresh, visionary, application-oriented concept by a short presentation (ePoster). The presentation must be based on at least two papers presented at the EuMW 2017, of which only one paper may be authored by a member of the team. Eventually, each team will give an elevator pitch of the innovative concepts they have devised. Hurry up, register promptly, the number of participants is limited!

Evaluation Criteria

- Novelty of the idea
- Relevance of the solution/vision proposed
- Feasibility of the idea
- Clarity of the poster
- Clarity of the oral presentation and discussion

Registration

To register, please send an e-mail to sc@eumw2017.org and attach a copy of your student identity card or a confirmation, signed by your responsible professor. The deadline for registration is 30th September 2017. Updated information can be found at: www.eumweek.com/students/student_competition.html.

Programme

Tuesday 10th October

13:50 - 14:50 Kick-off meeting: Theme disclosure, instructions, team formation (Room Hamburg)

Thursday 12th October

09:40 - 10:40 Poster presentation to jury and audience (Exhibition Hall)

13:50 - 15:50 Award ceremony during the Closing session EuMW 2017

THALES

EuMW 2017 Student Design Competitions

Date: Wednesday 11th October - Thursday 12th October

Location: Room Madrid and Shanghai

The Student Design Competitions involve master and doctoral students designing and measuring a microwave device developed prior to and this time also at the conference.

This year, three competitions will be offered:

Thrust 1: Transceiver Design

Thrust 1 is made to learn designing and measuring a transceiver as a result of the Student School and the Doctoral School at the conference and the actual competition will be held at the end of each school on Wednesday in Room Shanghai.

Thrust 2: Power-amplifier for the Internet of Things

Thrust 2 is dedicated to the development of an efficient power amplifier for the Internet of Things at 2.45 GHz before the conference.

Thrust 3: Rectenna

Thrust 3 is meant to develop a rectifying antenna, again prior to the conference.

Thrust 1 is a pure on-site competition within the Doctoral and Student Schools. Everything will be performed on-site, including the registration for the SDC.

Thrusts 2 and 3 are to be prepared before the conference and the results/devices presented at the conference in Nuremberg. Participants for these thrusts should submit their names and affiliations to sdcc@eumw2017.com by 1st September 2017.

The detailed rules for the Student Design Competition can be found at: http://www.eumweek.com/students/student_competition.html

The measurement equipment, as well as the prizes for the Student Design Competition are kindly sponsored by National Instruments.

Programme

Wednesday 11th October

09:00 - 17:50 Meeting and measurements Thrust 2 and 3
14:00 - 17:50 Measurement Thrust 1

Thursday 12th October

13:50 - 15:50 Award ceremony during the Closing session EuMW 2017



2nd European Microwave Student School "Radar Techniques and Technologies"

When: Monday 9th until Wednesday 11th October 2017

Organiser: H. Maune, TU Darmstadt

Location: Room Neu Delhi

This year's European Microwave Week features the second European Microwave Student School for bachelor and master students from all over Europe. This year's topic is "Radar Techniques and Technologies", spanning from Fundamentals of Radar technologies and hardware over RF system concepts and signal processing to real world applications and implementations. The programme features experts from academia and industry and it will enable a fundamental understanding of Radar techniques and technologies. The course will be formed by two intensive days of lectures accompanied by a hands-on design experience event on the third day. Together with the Doctoral School, students will build a modern digital transceiver. The best concepts will enter the Student Design Competition. Beside the lecture and training programme, there will be a social event together with the Doctoral School on Monday evening to provide contact with other students and research fellows from universities. The School is also open to interested PhD students.

Earning Credit Points

The European Microwave Student School will offer certificates to all attendees for earning credit points within the European Credit Transfer System (ECTS). If you need to have a written or oral exam please contact your professor well in advance for arranging the details of the examination process. By request of your professor via email to studentschool@eumw2017.com we will provide an exam sheet for oral or written examination by end of October 2017.

Registration

The registration fee for this event is €40. With the registration bachelor and master students with a valid student ID of an accredited university will receive a complimentary guest ticket to all EuMW sessions as well as to the exhibition.

For registration and further information please visit:
www.eumweek.com.

Registration closes 12th September 2017. Space is limited, so purchase your ticket well in advance.

Programme

Monday 9th October

- 08:30 - 08:40 Introduction
Dr. Holger Maune, TU Darmstadt
- 08:40 - 10:10 Fundamentals of Radar technologies
Prof. Dr. Nils Pohl, Ruhr-Universität Bochum
- 10:40 - 12:20 Radar Frontends
Dr. Peter Knott, Fraunhofer-Institut für Hochfrequenzphysik und Radartechnik
- 13:50 - 15:30 Signal Processing for Radar technologies
Prof. Dr. Abdelhak Zoubir, TU Darmstadt
- 16:00 - 17:30 System Concepts for the Radar of the Future
Prof. Dr. Werner Wiesbeck,
Karlsruher Institut für Technologie
- 18:00 Social Get-Together with Doctoral School

Tuesday 10th October

- 08:30 - 10:00 Automotive Applications
Prof. Dr. Stefan Schneider, Hochschule Kempten
- 10:30 - 12:00 Industrial Applications
Prof. Dr. Alexander Kölpin,
BTU Cottbus-Senftenberg
- 13:00 - 14:30 Radar Environment Generation
Dr. Steffen Heuel, Rohde & Schwarz GmbH & Co. KG
- 14:45 - 16:30 Spaceborne Synthetic Aperture Radar Systems and Technologies
Dr. Marwan Younis, Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)
- 16:30 - 17:00 Introduction to Hands-On Workshop
Prof. David Ricketts,
North Carolina State University
- 17:00 - 17:30 Closing Remarks
Dr. Holger Maune, TU Darmstadt

Wednesday 11th October

- 08:30 - 18:00 Hands-on Design Experience Event
"Building a Modern Digital Transceiver in One Day"
Prof. David Ricketts,
North Carolina State University

2nd European Microwave Doctoral School "RFIC Design Cycle and Emerging Topics"

When: Monday 9th October until Wednesday 11th October 2017

Location: Room Singapur (Monday and Tuesday)
Room Shanghai (Wednesday)

Organisers: Dietmar Kissinger, IHP GmbH / Technische Universität Berlin & Vadim Issakov, Infineon Technologies AG

About the European Microwave Doctoral School

Following the success of the premiere, this year's European Microwave Week features the second European Microwave Doctoral School. The intention of the Doctoral School is to cover all needs of a PhD student, which go beyond the normal conference programme. Therefore, the school attracted several excellent scientific speakers from all over the world to give presentations. This year's topic is: RFIC Design Cycle and Emerging Topics.

In contrast to typical conference presentations, the talks during the school are longer (50min) and will give an overview on various emerging topics in microwave engineering. Additionally, the school offers talks on soft skills. The programme includes a social event on Monday and a Hands-on Design Experience on Wednesday.

Registration

The School is dedicated (but not limited) to PhD students in the microwave domain. Registration fee for this event is €80 including coffee breaks and the dinner event on Monday. For registration please go to the registration site and select EuMW Doctoral School. Registration is open until 12th September 2017. Space is limited, so secure your ticket well in advance.

Programme

Monday 9th October

- 08:20 - 08:30 Introduction
- 08:30 - 09:20 New Frontiers in Terahertz Technology
Mona Jarrahi, University of California, Los Angeles, USA
- 09:20 - 10:10 SiGe HBT Technology and Modelling for mm-Wave Applications
Klaus Aufinger, Infineon Technologies, Neubiberg, Germany
- Coffee break
- 10:40 - 11:30 Latest Developments in SiGe BiCMOS Technologies with More-than-Moore Modules for mm-Wave & THz Applications
Mehmet Kaynak, IHP, Frankfurt (Oder), Germany
- 11:30 - 12:20 mm-Wave Calibration and De-Embedding
Andrej Rumiantsev, MPI Corporation, Hsinchu, Taiwan
- Lunch break
- 13:50 - 14:40 Emerging Technology on Wearables and IoT
Valerio Frascolla, Intel Deutschland, Neubiberg, Germany

- 14:40 - 15:30 Trends in Backhaul Communications
Franz Dielacher, Infineon Technologies Austria, Villach, Austria
- Coffee break
- 16:00 - 16:40 What's the Secret to a Successful Presentation?
Andrej Rumiantsev, MPI Corporation, Hsinchu, Taiwan
- 16:40 - 17:10 Getting Things Done: Clear Your Mind and Boost Your Productivity
Andrej Rumiantsev, MPI Corporation, Hsinchu, Taiwan
- 17:10 - 17:40 Introduction to Hands-On Workshop
David Ricketts, North Carolina State University, Raleigh, USA
- 18:00 Social Get-Together with Student School

Tuesday 10th October

- 08:30 - 09:20 System Integration - Assembly and Packaging Makes the Difference
Maciej Wojnowski and Klaus Pressel, Infineon Technologies, Germany
- 09:20 - 10:10 Packaging Concepts for Millimetre-Wave Transceivers with Integrated Antennas
Thomas Zwick, Karlsruhe Institute of Technology, Karlsruhe, Germany
- Coffee break
- 10:40 - 13:50 School Break, EuMW Opening Ceremony
- 13:50 - 14:40 Circuits and System Architectures for 100+Gb/s Wireless Backhaul at W-, D- and J-Bands
Sorin Voinigescu, University of Toronto, Toronto, Canada
- 14:40 - 15:30 System Aspects of Emerging mm-Wave Communication and Sensing Applications
Wim van Thillo, IMEC, Leuven, Belgium
- Coffee break
- 16:00 - 16:50 Integrated Microwave Sensors in SiGe with Antenna in Package: From Concepts to Solutions
Andreas Stelzer, Johannes-Kepler Universität, Linz, Austria
- 16:50 - 17:40 Front-End Technologies for Wireless Applications
Wolfgang Bösch, Graz University of Technology, Graz, Austria
- 17:40 - 17:50 Closing Remarks

Wednesday 11th October

- 08:30 - 18:00 Hands-on Design Experience Event
Building a Modern Digital Transceiver in One Day
David Ricketts, North Carolina State University, Raleigh, USA

For updates to the programme, visit www.eumweek.com/students/doctorschool.html

Young Professionals at European Microwave Week

As a group of young scientists and engineers at an early stage of our careers we share knowledge, enthusiasm and collaboration readiness around the globe. Multidisciplinarity and diversity in perspectives are our tools for pushing new technologies. We are Young Professionals and we will see you at EuMW with two of our sessions. On Tuesday we bring you "Young Professionals in Microwaves" with speakers from startups and academic mobility programmes to share their achievements. Thursday session "Macrowaving your career" brings interactive workshops on leadership skills, public speech, time and stress management to raise your research ambience. Finally, we invite you to meet us at our networking event "Young Professionals Meet-up" within a casual atmosphere of a nearby pub.



On the road to ADAS and HAD - cars shown at EuMWeek 2017

Within the entrance hall of the Nuremberg Messe at NCC OST there will be a special exhibition of technology demonstrators and test cars from an OEM and three TIER1s, from Mercedes-Benz (MB), Bosch, Hella, and Valeo, respectively.

EuMWeek 2017 is focusing on ADAS on its way to HAD in the future. There are four workshops and three sessions within EuRAD dealing with this subject. A panel discussion in the EuMC closing session will address this subject in a broad view: "Automated Driving. Enabled by Microwaves. What else?"

Millimetre-wave radar in the frequency regime of 76 to 81 GHz will be the backbone for automated driving under all weather conditions. The radar evolved and today well known modulation schemes are used in SS-LiDAR (solid state – light detection and

ranging) sensors. For HAD all available sensor types – LiDAR and cameras as well - are needed.

A cut-open chassis (MB) and a radar demonstrator (Hella - picture 1) show the complexity as well as the possibilities of the radar approach. Test cars equipped with radar (Bosch, Hella) are provided outside the Messe for test drives in the Nuremberg urban environment, while an Intelligent Drive Simulator (MB- picture 2) in the NCC Ost entrance hall gives the opportunity for a hands-on operating experience. Last but not least – in front of exhibition hall 7a – automated parking trials (Valeo) can be observed.

This special event can be visited during the normal exhibition hours – from Tuesday 10th to Thursday 12th October.



Picture 1: Hella – Radardemonstrator



Picture 2: Mercedes-Benz – Intelligent Drive Simulator

Special Session on "Communications: Past, Present and Future" – a Women in Microwave Engineering Event

Date: Tuesday 10th October 2017

Duration: 13:00 - 17:45

Location: Room Seoul, Reception Room Hongkong

Organisers: Amelie Hagelauer, University of Erlangen-Nuremberg, Germany

Sarah Linz, University of Erlangen-Nuremberg, Germany

We continue the tradition of holding the Women in Microwave Engineering event, sponsored by IEEE MTT-S during the European Microwave Week. This year's event will take you on a journey through the history and the future of communication technology. Of course, both women and men are welcome. Four female leaders in the field will discuss future trends in communications. At the end of the panel session, a visit to the 'Rundfunkmuseum Fürth'

demonstrates the historical role of the Nuremberg metropolitan area in the RF industry.

Please register for the social event by sending an e-mail to wim@eumw2017.com

Programme

- 13:00 - 14:00 Keynote Speech and Panel Discussion:
"Future trends in communications"
14:00 - 16:45 Social Event at "Rundfunkmuseum Fürth":
"The history of communications"
16:45 - 17:45 Reception at NCC Ost



EuMW 2017 Career Platform

This year's European Microwave Week will continue the successful tradition of the Career Platform. The Career Platform is a two-day event (10th and 11th October) co-located with the European Microwave Week, Europe's largest scientific and technical conference in the areas of high-frequency/microwave/millimetre-wave engineering and Radar. The Career Platform initiative aims to foster relationships between young researchers, graduates and the job market. A special session will be held on "Professional opportunities in the European microwave industry".

Please feel free to contact the Career Platform Chair and Co-Chair with any questions you may have or to obtain additional details. Also please connect with us via our LinkedIn group "RF and Microwave Jobs in Europe".

Career Platform Chair

Jochen Dederer

HENSOLDT, Woerthstrasse 85, 89077 Ulm, Germany

Email: jochen.dederer@hensoldt.net

Career Platform Co-Chair

Jean-Luc Polleux

Universite Paris-Est, ESYCOM, ESIEE Paris, France

Email: jean-luc.polleux@esiee.fr

Career Platform Special Session

Professional Opportunities in the European Microwave Industry

Date: Tuesday 10th October

Time: 16:10 – 17:50

Room: Riga

Registration: Free

Programme

- 16:10 - 16:30 University of Applied Sciences, Kempten
16:30 - 16:50 DAIMLER AG
16:50 - 17:10 Tesat-Spacecom GmbH & Co. KG
17:10 - 17:30 HENSOLDT
17:30 - 17:50 Questions and Answers

Career Platform Lounge

Date: Tuesday 10th and Wednesday 11th October

Time: 9:00 - 17:00

Registration: Free for visitors

The Career Platform will be an excellent opportunity for companies to meet students and young engineers looking for a career in the areas of high frequency, microwave, millimetre-wave engineering and Radar.

PARTNER PROGRAMME

Nuremberg (Nürnberg), Bavaria's second-largest city and the unofficial capital of Franconia, is an energetic place where the nightlife is intense and the beer is as dark as the coffee. For centuries, Nuremberg was the undeclared capital of the Holy Roman Empire and the preferred residence of most German kings, who kept their crown jewels here. Rich and stuffed with architectural wonders, it was also a magnet for famous artists, and the most famous of all, Albrecht Dürer, was born here. 'Nuremberg shines throughout Germany like a sun among the moon and stars,' gushed Martin Luther.

By the 19th century, the city had become a powerhouse in Germany's industrial revolution. The Nazis saw a perfect stage for their activities in working class Nuremberg. It was here that the fanatical party rallies were held, the boycott of Jewish businesses began and the infamous Nuremberg Laws outlawing German citizenship for Jewish people were enacted. On 2 January 1945, Allied bombers reduced the city to landfill, killing 6000 people in the process. After WWII the city was chosen as the site of the war crimes tribunal, now known as the Nuremberg Trials. Later, the painstaking reconstruction – using the original stone – of almost all the city's main buildings, including the castle and old churches in the Altstadt, returned the city to some of its former glory.

If you would like any other information, please contact Sally Garland on sally@connexhotelsandevents.com

Nuremberg Walking Tour



Tour highlights in the Old Town include the city walls, Craftsmen's Court, St Lawrence Church, Marketplace with the Beautiful Fountain and Wishing Ring, Old Town Hall, Albrecht-Dürer-Platz and the Imperial Castle Courtyards. At the Rally Grounds, you'll see Nuremberg's former

World War I memorial, the Luitpold Arena from "Triumph of the Will" and the site of the Luitpold Hall, The Great Street and the Congress Hall of the Nazi Party.

NO RESERVATIONS NECESSARY! You can buy your ticket in advance or simply pay cash to the guide on the day of the tour. We use Germany's efficient and environmentally friendly public transportation for our walking tours and any transport costs are included in the tour prices. Our goal is to both inform and entertain the English-speaking visitors to this great city. We offer non-strenuous tours led by experienced, fluent English-speaking guides and believe walking is the best way to see Nuremberg.

ALL TOURS LEAVE AT 11:15AM on Monday, Wednesday or Saturday
MEETING POINT: In front of the large centre entrance of the Nuremberg train station (Hauptbahnhof). The guide will be holding a red and white "Nuremberg Tours in English" sign.

PRICES: Full Tour - Old Town and Nazi Rally Grounds (4 hours including lunch break in marketplace) - €22.00/students €19.00
Old Town Tour (2 hours) - €10.00/students €9.00

The Nurnberg Card



Spend just €25.00 and reap the benefits of the Nurnberg Card! It gives you 2 days' FREE admission to ALL museums and attractions as well as 2 days' FREE travel on ALL public transport services within Nuremberg and the entire region of Nuremberg, Fürth and Stein. One essential requirement: You must stay overnight in Nuremberg or Fürth. The Nurnberg Card is free for children age 5 and under, children up to age 11 pay only €5.00 (when at least one Adult Card is purchased).

Cards can be purchased from any Nuremberg Tourist Offices and are also available from reception at most hotels.

30 | www.eumweek.com

The Kaiserburg



Dominating the city skyline, you can't fail to notice the Kaiserburg. At the time of the Holy Roman Empire, the castle was occasionally home to each of the emperors, and in the Middle Ages, it was one of the most important royal palaces. The sights here include the

new castle museum, the palace with the emperor's living quarters, the Romanesque Double Chapel, the Deep Well and the Sinwell Tower. The neighbouring garden is a must-see, too. It might be small, but it's a welcome contrast to the hustle and bustle of the city and is popular with residents, too. The castle's garden is open from April to October.

Address: Auf der Burg 13 www.kaiserburg-nuernberg.de
Free entrance with the Nürnberg Card



Albrecht-Dürer's House

The Albrecht-Dürer-Haus is one of the most famous museums and exhibitions in Nuremberg. Between 1509 and 1528, it was Albrecht Dürer's home and workplace. Today, the building is both a memorial and a

museum. The rooms feature period furnishings, and visitors can see a demonstration of the printing procedure used in Dürer's lifetime in one of the bedrooms. The top floor showcases copies of the artist's works. The museum houses a variety of temporary exhibitions featuring original works. We highly recommend taking the guided tour with Agnes Dürer, wife of the famous artist, she gives a faithful account of what life was like 500 years ago.

Address: Albrecht-Dürer-Str. 39 www.museen.nuernberg.de
Free entrance with the Nürnberg Card

Documentation Centre Nazi Party Rally Grounds



Even today, the former Reichsparteitagsgelände (Nazi Party Rally Grounds) in the south of the city is still home to gigantic ruins representing the Nazi regime's deluded notion of grandeur. The 11 km² complex was where the Nazi Party orchestrated its propaganda campaign. The

documentation centre located in the north wing of the Kongresshalle was designed by the Nazis to hold 50,000 people and was never completed. The permanent "Faszination und Gewalt" (Fascination and

PARTNER PROGRAMME

Terror) exhibition housed in the 1300 m² venue chronicles the causes, relationships and consequences of the Nazi dictatorship.

Address: Bayernstraße 110 www.museen.nuernberg.de
Free entrance with the Nürnberg Card

Historic Rock-Cut Cellars



An extensive labyrinth of underground passageways and cellar vaults has existed in the bedrock of castle hill for centuries - the Historic Rock-Cut Cellars. As early as 1380 red beer was stored in the subterranean cellars, sometimes comprising four levels, that had been cut into the Burgsandstein (local Nuremberg sandstone). During the air raids of World War II many citizens found shelter in these historical vaults.

Reservations and Meeting Point: Brewery Shop Tours are offered in German, English Audio-Guides are available.

Address: Bergstraße 19 www.historische-felsengaenge.de
Free entrance with the Nürnberg Card

Memorium Nuremberg Trials



The Memorium Nuremberg Trials is a permanent exhibition. It informs visitors about the background, progression and repercussions of the Nuremberg Trials at the original location where they were held. Audio guides in various languages are available. Guided tours of the

Memorium Nuremberg Trials are available for individual visitors at weekends.

Address: Bärenschanzstraße 72 www.museen.nuernberg.de
Free entrance with the Nürnberg Card

Main Market Square, Church of Our Lady and Beautiful Fountain



The large market square located at the heart of the city centre is surrounded by a multitude of must-see sights. The daily market takes place here too, where you can buy all sorts of tasty treats, flowers and spices. The ornate Beautiful Fountain is a well-photographed sight. The two rings on the fence are the focus of much attention. A legend says that if you turn the "golden ring" and make a wish, it will come true. The black ring, meanwhile, is said to bless women with children. The main market square is characterised by the facade of the Church of Our Lady constructed as an imperial royal chapel. Every day at noon the "Männleinlaufen" (mechanical clock and glockenspiel) takes place here - a daily event not to be missed!

Germanisches Nationalmuseum



The "Germanisches Nationalmuseum" is one of the largest museums of German art and culture in the world. The exhibitions take you on an exciting journey through time, showcasing hand axes from the Stone Age, the Ezelsdorf Golden Cone, medieval sculptures, the oldest globe in the world, paintings by Albrecht Dürer, baroque masterpieces and contemporary art. Other rooms feature textiles, clothes, jewellery, stained glass, handicraft, furniture and much more. The GNM is also home to the largest library of German art and culture, with more than 650,000 books.

Address: Kartäusergasse 1 www.gnm.de
Free entrance with the Nürnberg Card

Handwerkerhof



A sight with special flair. Situated at the heart of the city and surrounded by the towers and walls of the medieval fortifications, from the middle of March till the end of December the Handwerkerhof invites visitors to discover a wealth of experiences. The "little city at the Königstor" (King's gate) opposite the Hauptbahnhof offers both traditional crafts and Franconian hospitality in charming surroundings. Why not round off your visit by trying some hearty specialties, washed down with a fresh Nuremberg beer or Franconian wine in one of the cosy restaurants.

Address: Königstor opposite the Hauptbahnhof www.handwerkerhof.de

GoHo

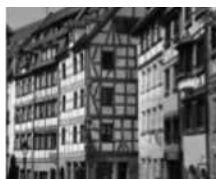


For a proper hedonist, there is no lifestyle without culture and cuisine, which is why they feel so much at home in Gostenhof. You can stroll from the vintage shop to the cycle workshop, from the friendly optician to the crazy designer shop. The hip district of

Gostenhof on the edge of the Nuremberg city centre is still a kind of insider tip. Gostenhof is a must for devotees of individual treasures of the beaten track.

Address: Gostenhof www.in-goho.de

Tanners' Lane



The largest ensemble of old artisan houses in Nuremberg can be found in the Weißgerbergasse (tanners' lane). Predominantly half-timbered, the historical town houses, often with their own wells and garden, testify to the affluence that could be attributed to the art of leather making. Instead of the busy tanners in the Middle Ages, the Weißgerbergasse today is populated with cafés, bars, small boutiques and handicraft workshops.

Trödelmarkt

The Nuremberg Trödelmarkt, located between Unschlittplatz and the Karlsbrücke (Charles Bridge), was originally a trading area for junk. Today this 1000 m² square accommodates cosy little shops offering the unusual. Here you will find extravagant jewellery stores, individual boutiques, assorted wooden toys and amusing living accessories.

Bamberg City Tour with optional Brewery Tour

Duration about 2h/4h, start 10:00h

Cost: €6-10 depending on number of participants, minimum 10, maximum 25.

Travel to Bamberg has to be arranged individually, regional trains run twice an hour, cost about €20 round-trip.

Bamberg is one of the most beautiful cities in Germany with its winding, narrow lanes and romantic facades with extravagant paintwork. It is called the "Franconian Rome" as it is also spread over seven hills. Bamberg has been assigned as UNESCO World Heritage in 1993.

Amongst other highlights, you will visit the cathedral and the Rose Garden where you have a marvellous view of the Old Town. If booked with the brewery tour, you will get an insight in Bamberg's beer variety. If you wish to participate at this tour, please contact Rainer Wansch (rainer.wansch@iis.fraunhofer.de) no later than two weeks prior to EuMW.

MONDAY



Kiew

Riga

St. Petersburg

EuMIC01

MMICs for mm-Wave Subsystems

Chair: Ingmar Kallfass, University of Stuttgart
Co-Chair: Joachim Oberhammer, KTH Royal Institute of Technology

EuMIC02

RF-Power and Thermal Behaviour of GaN and Silicon Devices

Chair: Frank van den Bogaart, TNO
Co-Chair: Claudio Lanzieri, Leonardo S.p.A.

EuMIC03

Integrated Receivers and Transceivers

Chair: Frank van Vliet, TNO Defense, Safety and Security
Co-Chair: Massimo C. Comparini, Telespazio, Italy & France

08:30 - 08:50

EuMIC01-1 A WR3-Band Reflective-Type Phase Shifter MMIC with Integrated Amplifier for Error- and Loss Compensation

Daniel Mueller¹, Andreas Beck¹, Hermann Massler², Axel Tessmann², Arnulf Leuther², Thomas Zwick¹, Ingmar Kallfass³, ¹Karlsruhe Institute of Technology (KIT), ²Fraunhofer Institute for Applied Solid State Physics (IAF), ³University of Stuttgart

EuMIC02-1 GaN-on-Silicon - Present Challenges and Future Opportunities

Timothy Boles, MACOM Technology Solutions

EuMIC03-1 High Performance GaN Single-Chip Frontend for Compact X-Band AESA Systems

Patrick Schuh, Hardy Sledzik, Rolf Reber, Airbus DS Electronics and Border Security

08:50 - 09:10

EuMIC01-2 A 24.7dB Low Noise Amplifier with Variable Gain and Tunable Matching in 130nm SiGe at 200GHz

Paul Stärke, David Fritsche, Corrado Carta, Frank Ellinger, Technische Universität Dresden

EuMIC02-2 Transfer of AlGaN/GaN RF-Devices onto Diamond Substrates via van der Waals Bonding

Thomas Gerrer, Volker Cimalla, Stefan Müller, Patrick Waltereit, Fouad Benkelifa, Thomas Maier, Heiko Czap, Christoph Nebel, Rüdiger Quay, Fraunhofer Institute for Solid State Physics IAF

EuMIC03-2 A 24-GHz Transceiver with RF Power Envelope Digital Control for Automotive Radar ICs

Giorgio Maiellaro, Gesualdo Alessi, Angela Bruno, Antonino Calcagno, Nunzio Micalizzi, Amedeo Di Mauro, Enza Susino, Angelo Scuderi, Salvatore Scaccianoce, STMicroelectronics

09:10 - 09:30

EuMIC01-3 A 94 GHz Programmable Frequency Divider with Inductive Peaking for Wideband and Highly Stable Frequency Synthesizers

Marcel van Delden¹, Nils Pohl¹, Klaus Aufinger², Thomas Musch¹, ¹Ruhr-Universität Bochum, ²Infineon Technologies AG

EuMIC02-3 TCAD Based Segmented Modelling of Large RF Power-Transistors-Die for Finger Level Analysis and Optimization

Ibrahim Khalil, NXP Semiconductors

EuMIC03-3 Broadband Multi-Octave Receiver from 1-32 GHz for Monolithic Integrated Vector Network Analyzers (VNA) in SiGe-Technology

Marco Dietz¹, Thomas Girg¹, Andreas Bauch¹, Klaus Auffinger², Amelie Hagelauer¹, Dietmar Kissinger³, Robert Weigel¹, ¹Friedrich-Alexander Universität Erlangen-Nürnberg, ²Infineon Technologies AG, ³HP Microelectronics and Technische Universität Berlin

09:30 - 09:50

EuMIC01-4 0.16 mW, 7-70 GHz Distributed Power Detector with 75 dB Voltage Sensitivity in 130 nm Standard CMOS Technology

Saad Qayyum, Renato Negra, RWTH Aachen University

EuMIC02-4 Anomaly and Threshold Voltage Shifts in GaN and GaAs HEMTs over Temperature

Mohammad Abdul Alim¹, Ali A Rezazadeh², Christophe Gaquiere³, ¹University of Chittagong, ²The University of Manchester, ³Université des Sciences et Technologies de Lille 1

EuMIC03-4 40-45 GHz High-IF Stage for Extremely Wide Tuning Range Receivers in 0.13 um SiGe BiCMOS

Hebatallah Abdeen¹, Shuai Yuan², Hermann Schumacher³, Volker Ziegler³, Askold Meusling³, ¹Ulm University, ²Asia-Pacific Mechanical and Electronic Co. Ltd, ³Airbus Group Innovations

09:50 - 10:10

EuMIC01-5 A 100-140 GHz SiGe-BiCMOS Sub-Harmonic Down-Converter Mixer

Neda Seyedhosseinzadeh¹, Abdolreza Nabavi¹, Sona Carpenter², Zhongxia Simon He², Mingquan Bao³, Herbert Zirath², ¹Tarbiat Modares University, ²Chalmers University of Technology, ³Ericsson AB

EuMIC02-5 Self-Heating and Polarization Effects in AlGaN/AlN/GaN/AlGaIn Based Devices

Khalid Ahmeda¹, Brendan B. Ubochi¹, Karol Kalna¹, Brahim Benbakht², ¹Swansea University, ²John Moores University

EuMIC03-5 80 GHz Impulse Radio Receiver with Quadrature PPM Demodulation in 55 nm CMOS Technology

Hiroshi Matsumura, Fujitsu Laboratories Ltd.



St. Petersburg

EuMIC04

EuMIC Opening Session

Chair: Ingmar Kallfass, EuMIC 2017 Chair

Co-Chairs: Georg Boeck, EuMIC 2017 TPC Chair and Friedel Gerfers, EuMIC 2017 Secretary

10:50 - 11:10

Welcome Address

Opening of the European Microwave Integrated Circuits Conference 2017

Ingmar Kallfass, EuMIC 2017 Chair

11:10 - 11:50

Silicon is the New Steel: The Bad and the Great

Tom Lee, Stanford University

Steel transformed civilization in the 20th century, shifting from high-tech material to commodity in the process, just as textiles had before steel. Silicon is undergoing an analogous transition, becoming a commodity as the action shifts from circuits to systems. This talk will identify the multiple convergent trends that are impelling us toward the terascale age, and argue that these present historic opportunities and monumental challenges that extend from DC to the millimeter wave. Solving these problems will complete the transition of silicon from today's ubiquity, to the invisibility that marks a truly successful technology. Silicon is the new steel.

11:50 - 12:30

III-V MOSFET Technologies and Devices

Lars-Erik Wernersson, Lund University

III-V device technology is an enabler for high-performance electronics. The advantageous transport properties and the wide range of heterostructure design possible have generated devices with f_{max} performance above 1 THz. The material properties allow us to design the transistor channel characteristics, but also the transistor layout has been optimized to reduce the parasitics. Combined, III-V technology offers advantages in terms of noise performance, linearity, and power capability, what is essential for high-performance electronics. In particular at millimeter wave frequencies, these properties are critical for radar and communication systems.

For consumer applications and cost-sensitive markets, integration of III-V technology on cheap Si substrates and fabrication on large scale wafers with CMOS-compatible processes are attractive. It will save cost, reduce the use of scarce materials, and also make the technology available for larger market segments. It will also facilitate future system integration to further improve performance. However, critical challenges that needs consideration include the materials integration of III-Vs on Si as well as the complementary functionality and the III-V MOSFET performance. The introduction of the dielectric gate isolation is essential to improve the transistor scalability and to reduce the gate leakage.

III-V nanowires offers a path for integration of high-performance MOSFETs on Si. Due to the confined geometry, defects are less likely to propagate to the transistor channel and to deteriorate the transistor performance. The nanowire geometry further provides improved electrostatic control what is essential for device scaling and for reduction of the impact of interface defects. Besides, radial strain relaxation allows for novel heterostructure design combining materials with strong lattice mismatch and allowing further freedom in transistor optimization.

Lateral and vertical III-V MOSFETs both have demonstrated a very rapid increase in performance over the last few years. With a maturing technology, both g_m and f_{max} is increasing steadily. The transistor off-state current levels are decreasing and the $1/f$ -noise characteristics are improving. III-V and SiGe MOSFET co-integration strategies are developed as well as all-III-V CMOS technology being established. Combined, the progress is suggesting benefits for millimeter wave applications as will be outlined in this presentation.

10:50 - 12:30

EuMIC05 | EuMIC Interactive Session

Chair: Daniel Maassen, Technische Universität Berlin

Co-Chair: Georg Boeck, Berlin Institute of Technology, GloMic GmbH

12:30 – 14:10

The ePosters are on display from 12:30 – 14:10

The authors are present for discussion from 12:30 – 14:10



Conference Centre	Conference Centre	Conference Centre	Conference Centre
<p>EuMIC05-1 Low-Phase-Noise Eight-Phase VCO Using Bottom Series Coupling Technique Muh-Dey Wei¹, Renato Negra¹, Sheng-Fuh Chang², Yen-Huang Hsu², ¹RWTH Aachen University, ²National Chung Cheng University</p>	<p>EuMIC05-5 An 8.3 nW -72 dBm Event Driven IoE Wake Up Receiver RF Front End Jesse Moody, Pooyan Bassirian, Abhishek Roy, Yukang Feng, Shou Li, Robert Costanzo, N. Scott Barker, Benton Calhoun, Steven M. Bowers, University of Virginia</p>	<p>EuMIC05-10 GaN-Based Digital Transmitter Chain Utilizing Push-Pull Gate Drivers for High Switching Speed and Built-In DPD Florian Huehn, Andreas Wentzel, Wolfgang Heinrich, FBH-Berlin</p>	<p>EuMIC05-15 Millimeter-Wave Graphene-based Varactor for Flexible Electronics Mohamed Elsayed, HFE RWTH-Aachen</p>
<p>EuMIC05-2 A 148 GHz Regenerative Sampling Oscillator Hatem Ghaleb, Mohammed El-Shennawy, Corrado Carta, Frank Ellinger, TU Dresden</p>	<p>EuMIC05-6 Robust Verification of Look-Up-Table-Based Models for All-Digital RF-Transmitters Norbert Leder, Bernhard Pichler, Gottfried Magerl, Holger Arthaber, Technische Universität Wien</p>	<p>EuMIC05-11 Simplified Thru-Only 4-Port De-Embedding Method Chun-Yu Fan, Muh-Dey Wei, Renato Negra, RWTH Aachen University</p>	<p>EuMIC05-16 Design of a Linearized and Efficient Doherty Amplifier for C-Band Applications Steffen Probst, Timo Martinelli, Steffen Seewald, Bernd Geck, Dirk Manteuffel, Leibniz Universität Hannover</p>
<p>EuMIC05-3 A Nonlinear Impulse Sampler for Detection of Picosecond Pulses in 90 nm SiGe BiCMOS Himanshu Aggrawal, Aydin Babakhani, Rice University</p>	<p>EuMIC05-7 Analysis of a Thin Film Dielectric Characterization Method Based on the Impedance Difference of Two MIM Capacitors Alejandro Niembro-Martin, Denis Mercier, CEA</p>	<p>EuMIC05-12 D-band LNA Using a 40 nm GaAs mHEMT Technology Riccardo Cleriti¹, Walter Ciccognani¹, Sergio Colangeli¹, Antonio Serino¹, Ernesto Limiti¹, Peter Frijlink², Michel Renvoise², Ralf Doerner³, Maruf Hossain⁴, ¹University of Rome Tor Vergata, ²OMMIC, ³Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, ⁴Goethe University of Frankfurt am Main</p>	<p>EuMIC05-17 GaN MMIC SPDTs for C-Ku Band Beam Forming Networks Applications Andrea Bentini, Diego Palombini, Daniele Rampazzo, Elettronica SpA</p>
<p>EuMIC05-4 A Low-Power 60 GHz Integrated Sixport Receiver Front-End in a 130 nm BiCMOS Technology Matthias Völkel¹, Marco Dietz¹, Robert Weigel¹, Amelie Hagelauer¹, Dietmar Kissinger^{2,3}, Friedrich-Alexander Universität Erlangen-Nürnberg, ²TU Berlin, ³IHP Microelectronics</p>	<p>EuMIC05-8 Suppression of Lag Phenomena and Current Collapse in Field-Plate AlGaIn/GaN HEMTs with High Acceptor Density in a Buffer Layer Ysunori Saito, Ryouhei Tsurumaki, Kazushige Horio, Shibaura Institute of Technology</p>	<p>EuMIC05-13 Rugged AlGaAs P-I-N Diode Switches James Brogle, Andrzej Rozbicki, Timothy Boles, MACOM Technology Solutions</p>	
	<p>EuMIC05-9 Reactively Matched 3-Stage C-X-Ku Band GaN MMIC Power Amplifier G. Christopher Barisich^{1,2}, Edward Gebara², Huifang Gu², Craig Storey³, Pouya Aflak³, John Papapolymerou⁴, ¹Georgia Institute of Technology, ²Nanowave Technologies, Inc., ³National Research Council of Canada, ⁴Michigan State University</p>	<p>EuMIC05-14 Gain-Configurable Lower Sideband Parametric Downconverter Zhixing Zhao, Globalfoundries</p>	



Kiew

Riga

St. Petersburg

EuMIC06

THz Integrated Circuits

Chair: Robin Sloan, The University of Manchester
Co-Chair: Herbert Zirath, Chalmers University of Technology

EuMIC07

Advanced Silicon Devices and Circuits

Chair: Dimitris Pavlidis, National Science Foundation
Co-Chair: Didier Floriot, United Monolithic Semiconductors

EuMIC08

Wideband Multifunction Components

Chair: Ali A Rezazadeh, The University of Manchester
Co-Chair: Frank van Vliet, TNO Defense, Safety and Security

EuMIC06-1 Industrial Session Keynote

THz Integrated Circuits

Bill Deal, Northrop Grumman

EuMIC07-1 Industrial Session Keynote

Frontiers of Information Technology

Heike Riel, IBM Research

EuMIC08-1 A 19–34 GHz SiGe HBT Square-Law Detector with Ultra-Low 1/f Noise for Atmospheric Radiometers

Christopher Coen, Adrian Ildefonso, Zachary Fleetwood, John Cressler, Georgia Institute of Technology

13:50 - 14:10

EuMIC06-2 A 250 GHz Millimeter Wave Amplifier MMIC Based on 30 nm Metamorphic InGaAs MOSFET Technology

Arnulf Leuther¹, Matthias Ohlrogge¹, Lukas Czornomaz², Thomas Merkle¹, Frank Bernhardt¹, Axel Tessmann¹, ¹Fraunhofer IAF, ²IBM Zurich Research Laboratory

EuMIC07-2 Reliability Analysis of BiCMOS SiGe: C Technology Under Aggressive Conditions for Emerging RF and mm-Wave Applications

Insaf Lahbib¹, Dominique Lesénéchal¹, Aziz Doukkali¹, Thanh Vinh Dinh¹, Laurent Leyssenne¹, Cristian Andrei², Guy Imbert², Sidina Wane^{2,1}, Patrick Martin¹, Philippe Descamps¹, ¹LaMIPS-CRISMAT-Presto-Engineering, ²NXP-Semiconductors

EuMIC08-2 A Phase Coherent 7-bit Digital Step Attenuator on 0.18 μm SOI

Arash Ebrahimi Jarihani, Fatih Kocer, Middle East Technical University

14:10 - 14:30

EuMIC06-3 A 0.3-THz SiGe-Based Frequency Doubler Chip with 3-dB 50 GHz Bandwidth and 17 dB Peak Conversion Gain

Faisal Ahmed, Muhammad Furqan, Andreas Stelzer, Johannes Kepler University Linz

EuMIC07-3 A 10 GHz Bandwidth Balanced Photoreceiver with 41 V/W Optical Conversion Gain

Robert Costanzo, Zhanyu Yang, Nicolas Raduazo, Andreas Beling, Steven M. Bowers, University of Virginia

EuMIC08-3 An Ultra Broadband 0.5 - 18 GHz BPSK Modulator

Paul Sangare¹, Christophe Loyez², Kevin Carpentier², Markus Mayer¹, Francois Parickmiller¹, Nathalie Rolland², ¹Arelis, ²IEMN, ³IRCIICA

14:30 - 14:50

EuMIC06-4 Ultra-Wideband Signal Generation at 300 GHz in a SiGe BiCMOS Technology

Sven Thomas¹, Benedikt Welp¹, Nils Pohl^{1,2}, ¹Fraunhofer FHR, ²Ruhr-University Bochum

EuMIC07-4 A Broadband 10-95 GHz Variable Gain Amplifier in a 130 nm BiCMOS Technology

Andreas Bauch, Friedrich-Alexander University Erlangen-Nürnberg

EuMIC08-4 A Compact and Low DC Power Distributed Amplifier with Cascaded Gain Stages Using Signal-Reused Technique in 0.18 μm CMOS

Chen-Wei Wu, Tzu-Yuan Huang, Yuan-Hung Hsiao, Yi-Ching Wu, Huei Wang, National Taiwan University

14:50 - 15:10

EuMIC06-5 Ultra-Broadband Common Collector-Cascade 4-Cell Distributed Amplifier in 250 nm InP HBT Technology with over 200 GHz Bandwidth

Stavros Giannakopoulos¹, Klas Eriksson², Izzat Darwazah³, Zhongxia Simon He¹, Herbert Zirath¹, ¹Chalmers University of Technology, ²Ruag Space AB, ³University College London

EuMIC07-5 Integrated Scalable and Tunable RF CMOS SOI Quadrature Hybrid Coupler

Vincent Knopik¹, Boris Moret², Eric Kerherve², ¹STMicroelectronics, ²University of Bordeaux, IMS Laboratory

EuMIC08-5 A 42 Gbps VCSEL Driver with Adjustable 2-Tap Feed-Forward Equalizer in 14 nm SOI CMOS

Mahdi Khafaji¹, Jan Pliva¹, Martin Zoldak², Ronny Henker¹, Frank Ellinger¹, ¹TU Dresden, ²Argotech a.s.

15:10 - 15:30

Kiev

EuMIC09

New Approaches for Broadband GaN Power Amplifiers

Chair: Patrick Schuh, HENSOLDT
Co-Chair: Paolo Colantonio, University of Rome Tor Vergata

16:10 - 16:30

EuMIC09-1
Industrial Session Keynote

The Struggle for Bandwidth – GaN and the Non-Uniform Distributed Power Amplifier

Charles Campbell, Qorvo

16:30 - 16:50

EuMIC09-2
New Concept to Control the Gain of GaN-Cascodes in Broadband Power Amplifiers

Thomas Huber^{1,2}, Rüdiger Quay³, Wolfgang Bösch², ¹Rohde&Schwarz GmbH & Co. KG, ²Graz University of Technology, ³Fraunhofer Institute for Solid State Physics IAF

16:50 - 17:10

EuMIC09-3
Highly Efficient GaN RF Power Amplifier MMIC Using Low Voltage Driver

Mustafa Acar, Osman Ceylan, Felicia Kiebler, Sergio Pires, Stephan Maroldt, Ampleon

17:10 - 17:30

EuMIC09-4
Wideband High-Efficiency Digital Power Amplifier in GaN

Paul Watson, Tony Quach, AFRL/RYD

17:30 - 17:50

EuMIC09-5
3.5-GHz Ultra-Compact GaN Class-E Integrated Doherty MMIC PA for 5G Massive-MIMO Base Station Applications

Stephan Maroldt, Mariano Ercoli, Ampleon



Riga

St. Petersburg

EuMIC10

Device and Behavioural Modelling

Chair: Michael Schlechtweg, Fraunhofer Institute for Solid State Physics IAF
Co-Chair: Alberto Santarelli, University of Bologna

EuMIC11

Oscillators and Synthesizers

Chair: Georg Boeck, Berlin Institute of Technology, GloMic GmbH
Co-Chair: Sébastien Chartier, HENSOLDT

EuMIC10-1
HEMT Large-Signal Integral Transform Model Including Trapping and Impact Ionization

Friedbert van Raay, Matthias Ohlrogge, Fraunhofer Institute for Solid State Physics IAF

EuMIC11-1
7-13 GHz MMIC GaN HEMT Voltage-Controlled-Oscillators (VCOs) for Satellite Applications

Thanh Ngoc Thi Do¹, Mikael Hörberg¹, Szchau Lai¹, Sven-Henrik Wöllersjö², Daniel Johansson², Herbert Zirath¹, Dan Kuylenstierna¹, ¹Chalmers University of Technology, ²RUAG Space AB

16:10 - 16:30

EuMIC10-2
Global Modeling of GaN HEMT Resistive Current Including Charge Trapping and Self-Heating for Multi-Bias Multi-Class PA Performance Prediction

Gian Piero Gibiino, Rafael Cignani, Alberto Santarelli, Fabio Filicori, University of Bologna

EuMIC11-2
A 3.9 - 4.5 GHz Class-C VCO with Accurate Current Injection Based on Capacitive Feedback

Arpan Sureshbhai Thakkar¹, Srinivas Theertham², Sankaran Aniruddhan¹, Peeyoosh Mirajkar², Jagdish Chand Goyal², ¹IIT Madras, ²Texas Instruments (India) Pvt. Ltd.

16:30 - 16:50

EuMIC10-3
Charge Conservative FET Modelling Using ANNs

Justin King, Ciarán Wilson, University College Dublin

EuMIC11-3
A 2 GS/s 118 mW Digital-Mapping Direct Digital Frequency Synthesizer in 65nm CMOS

Abdel Martinez Alonso, Xia Yuan, Masaya Miyahara, Akira Matsuzawa, Tokyo Institute of Technology

16:50 - 17:10

EuMIC10-4
Closed-Form Solutions to Large-Signal PA Problems

David Root, Jan Verspecht, Jianjun Xu, Keysight Technologies

EuMIC11-4
A Low-Phase Noise 12 GHz Digitally Controlled Oscillator in 65 nm CMOS for a FMCW Radar Frequency Synthesizer

Dominic Maurath, Ahmad Tavakoli, Sönke Vehring, Philipp Scholz, Yaoshun Ding, Georg Boeck, Friedel Gersfers, Technische Universität Berlin

17:10 - 17:30

EuMIC10-5
Load Error Correction for High Power Load Dependent X-Parameter Measurements

Bernhard Pichler, Norbert Leder, Gottfried Magerl, Holger Arthaber, Technische Universität Wien

EuMIC11-5
An Integrated Frequency Synthesizer in 130 nm SiGe BiCMOS Technology for 28/38 GHz 5G Wireless Networks

Frank Herzel¹, Maciej Kucharski¹, Arzu Ergintav¹, Johannes Borngräber¹, Herman Ng¹, Joerg Domke¹, Dietmar Kissinger^{1,2}, ¹IHP, ²Technische Universität Berlin

17:30 - 17:50

TUESDAY

47TH EUROPEAN CONFERENCE MICROWAVE 2017



Kiew

EuMC/EuMIC01
High Performance Si-Based Power Amplifiers
 Chair: Franco Giannini, University of Rome Tor Vergata
 Co-Chair: Renato Negra, RWTH Aachen University

Riga

EuMIC12
Device Characterisation
 Chair: Teresa M. Martín-Guerrero, Universidad de Málaga, Andalucía Tech
 Co-Chair: Nils Weimann, Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik

St. Petersburg

EuMIC13
Highly Integrated mm-Wave Transceivers
 Chair: Bill Deal, Northrop Grumman
 Co-Chair: Dan Kuylenstierna, Chalmers University of Technology

08:30 - 08:50

EuMC/EuMIC01-1
A 100-145 GHz Area-Efficient Power Amplifier in a 130 nm SiGe Technology
 Mingquan Bao¹, Zhongxia Simon He², Herbert Zirath², ¹Ericsson AB, ²Chalmers University of Technology

EuMIC12-1
EM Simulation Assisted Parameter Extraction for the Modeling of Transferred-Substrate InP HBTs
 Tom Keinicke Johansen¹, Nils Weimann², Ralf Doerner², Maruf Hossain², Maruf Hossain², Wolfgang Heinrich², ¹Technical University of Denmark, ²Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik

EuMIC13-1
Industrial Session Keynote
Highly Integrated mm-Wave Transceivers for Communication Systems
 Vadim Issakov, Infineon Technologies AG

08:50 - 09:10

EuMC/EuMIC01-2
A 109-137 GHz Power Amplifier in SiGe BiCMOS with 16.5 dBm Output Power and 12.8% PAE
 Maciej Kucharski¹, Johannes Borngräber¹, Herman Ng¹, Dietmar Kissinger^{1,2}, ¹IHP, ²TUB

EuMIC12-2
On the Optimization of GaN HEMT Layout for Highly Rugged Low-Noise Amplifier Design
 Cristina Andrei¹, Ralf Doerner², Sergey Shevchenko², Wolfgang Heinrich², Matthias Rudolph^{1,2}, ¹Brandenburg University of Technology, ²Ferdinand-Braun-Institute

EuMIC13-2
A 219-266 GHz Fully-Integrated Direct-Conversion IQ Receiver Module in a SiGe HBT Technology
 Pedro Rodriguez Vazquez², Janusz Grzyb¹, Neelanjan Sarmah¹, Bernd Heinemann², Ullrich R. Pfeiffer¹, ¹University of Wuppertal, ²IHP Microelectronics

09:10 - 09:30

EuMC/EuMIC01-3
Common Drain CMOS Power Amplifier: An Alternative Power Amplifier
 Muhammad Abdullah Khan, Renato Negra, RWTH Aachen University

EuMIC12-3
Evaluation of High-Voltage Transistor Reliability Under Nonlinear Dynamic Operation
 Gianni Bosi¹, Antonio Raffo¹, Valeria Vadalà¹, Francesco Trevisan¹, Gabriele Formicone², Jeff Burger², James Custer², Giorgio Vannini¹, ¹University of Ferrara, ²Integra Technologies, Inc.

EuMIC13-3
A Direct Carrier I/Q Modulator for High-Speed Communication at D-Band Using 130 nm SiGe BiCMOS Technology
 Sona Carpenter, Zhongxia Simon He, Herbert Zirath, Chalmers University of Technology

09:30 - 09:50

EuMC/EuMIC01-4
High-Efficiency Watt-Level MASMOS Power Amplifier for LTE Applications
 Fabien Mesquita¹, Eric Kerhervé¹, Anthony Giotto¹, Yann Creveuil², Myriamne Regis², ¹IMS laboratory, ²ACCO

EuMIC12-4
Poly-Harmonic Distortion Model Extraction in Charge-Controlled One-Port Devices
 Teresa M. Martín-Guerrero, José T. Entrambasaguas, Carlos Camacho-Peñalosa, Universidad de Málaga, Andalucía Tech

EuMIC13-4
A 60 GHz SiGe BiCMOS Double Receive Channel Transceiver for Radar Applications
 Efe Öztürk¹, Dieter Genschow¹, Uroschanit Yodprasit¹, Berk Yilmaz¹, Dietmar Kissinger², Wojciech Debski¹, Wolfgang Winkler¹, ¹Silicon Radar GmbH, ²IHP Microelectronics

09:50 - 10:10

EuMC/EuMIC01-5
12/25 W Wideband LDMOS Power Amplifier IC (3400-3800 MHz) for 5G Base Station Applications
 Xavier Hue, NXP Semiconductors

EuMIC12-5
RF Sensitivity Analysis of Independent-Gates FinFETs for Analog Applications Exploiting the Back-Gating Effect
 Ahsin Murtaza Bughio, Simona Donati Guerrieri, Fabrizio Bonani, Giovanni Ghione, Politecnico di Torino

EuMIC13-5
On-Chip Post-Production Tuning of I/Q Frequency Converters Using Adjustable Coupler Terminations
 Christopher Grötsch¹, Sandrine Wagner², Axel Tessmann², Ingmar Kallfass¹, ¹University of Stuttgart, ²Fraunhofer Institute for Solid State

Istanbul	Kopenhagen	Seoul	Shanghai		TUESDAY	
<p>EuMC01 Multiport Planar Coupling Structures Chair: Bart Nauwelaers, KU Leuven University Co-Chair: Cristiano Tomassoni, University of Perugia</p>	<p>EuMC02 Tunable Passive and Active Filters Chair: José I Alonso, Universidad Politécnica de Madrid Co-Chair: Rolf Jakoby, Technische Universität Darmstadt</p>	<p>EuMC/EuMIC02 Special Session: Funding for Research Chair: Hermann Schumacher, Ulm University Co-Chair: Ingmar Kallfass, University of Stuttgart</p>	<p>EuMC03 Novel Technologies for Future Wireless Communication Systems Chair: Jozef Modelski, Warsaw University of Technology Co-Chair: Yang Hao, Queen Mary University of London</p>			
<p>EuMC01-1 Gysel Type Unbalanced-to-Balanced Equal Power Divider Amar Nath Yadav, Ratnajit Bhattacharjee, Indian Institute of Information Technology Guwahati</p>	<p>EuMC02-1 A Coupling Matrix Synthesis for a Tunable Bandpass Filter Alexander Jaschke, Fraunhofer Institute for Integrated Circuits</p>	<p>EuMC/EuMIC02-1 Electrical, Communications and Cyber Systems at the National Science Foundation Dimitris Pavlidis, National Science Foundation</p>	<p>EuMC03-1 Industrial Session Keynote Millimetre-Wave Technology Trends for 5G Antenna Arrays and Massive MIMO Architectures - An Industry View Renato Lombardi, Huawei</p>	08:30 - 08:50		
<p>EuMC01-2 Planar Miniaturized Balanced-to-Single-Ended Power Divider with Arbitrary Power Division Weiwei Zhang¹, Fadhel M. Ghannouchi², Abul Hasan², Yuanan Liu¹, Yongle Wu¹, ¹Beijing University of Posts and Telecommunications, ²University of Calgary</p>	<p>EuMC02-2 Design of Dual-Mode Tunable Filter Surrounded by an Electrical Wall to Obtain Shielding Effect Ceyhun Karpuz, Gülfem Balasu Firat Unuk, Pinar Öztürk Özdemir, Pamukkale University</p>	<p>EuMC/EuMIC02-2 Managing and promoting innovation in Defence: EDA's Activities Related to Microelectronics Patrick Langlois, European Defense Agency</p>	<p>EuMC03-2 Low Power Consumption Vector-Sum Phase Shifters Using Zero-Pi Amplifiers for Millimeter-Wave Beamforming Toshihiro Shimura, Takenori Ohshima, Yoji Ohashi, Fujitsu Laboratories Ltd.</p>	08:50 - 09:10		
<p>EuMC01-3 Design of a Planar Ultra-Wideband Four-Way Power Divider/Combiner Using Defected Ground Structures Michele Squartecchia, Bruno Cimoli, Virginio Midilli, Tom Keinicke Johansen, Vitaliy Zhurbenko, Technical University of Denmark</p>	<p>EuMC02-3 Temperature-Compensated Open-Loop Tuning of a Dual-Notch Absorptive Bandstop Filter Wesley Allen, Dimitrios Peroulis, Purdue University</p>	<p>EuMC/EuMIC02-3 ESA Programs Marie-Geneviève Périchaud, Jouni Latti, European Space Agency,</p>	<p>EuMC03-3 Automotive Antenna Diversity System for Satellite Radio with High Phase Accuracy in Low SNR-Scenarios Simon Senega, Ali Nassar, Stefan Lindenmeier, Universität der Bundeswehr München</p>	09:10 - 09:30		
<p>EuMC01-4 Arbitrary Power Division Ratio Power Divider with Prescribed Wideband Negative Group Delay Girdhari Chaudhary¹, Juhee Han¹, Yongchae Jeong¹, Jongsik Lim², ¹Chonbuk National University, ²Soonchunhyang University</p>	<p>EuMC02-4 An Integrated Microwave Tunable Dual-Band Q-Enhanced LC Band-Pass Filter in 0.13 -m SiGe BiCMOS Farooq Amin, Sanjay Raman, Kwang-Jin Koh, Virginia Tech</p>	<p>EuMC/EuMIC02-4 Microwaves for Ground Breaking Research - Fundamental Science in Electrical Engineering and Funding Opportunities in Germany - Damian Dudek, DFG, German Research Foundation</p>	<p>EuMC03-4 Low Gain Imbalance Low Noise Amplifier-Phase Shifter in 65 nm CMOS for 60 GHz Phased Array Receiver Chul Woo Byeon¹, Chul Soon Park², ¹Wonkwang University, ²KAIST</p>	09:30 - 09:50		
<p>EuMC01-5 Substrate Integrated Waveguide Crossover Formed by Orthogonal TE102 Resonators Sara Salem Hesari, Jens Bornemann, University of Victoria</p>	<p>EuMC02-5 Design Considerations and Effects of Class-AB Polarization in Active Filters Realised by Means of Active Inductors Leonardo Pantoli, Vincenzo Stormelli, Giorgio Leuzzi, University of L'Aquila</p>		<p>EuMC03-5 Analytical and Measured Estimation for 4-Value Multiplexing OAM Communication Using Loop Array Antennas Hiroto Otsuka, Ryohei Yamagishi, Akira Saitou, Ryo Ishikawa, Kazuhiko Honjo, University of Electro-Communications</p>	09:50 - 10:10		



Tokio

EuMW01

EuMW/EuMC Opening Session

Chair: Arne Jacob, EuMW 2017 General Chair

Co-Chair: Matthias Hein, EuMC 2017 Chair

Kiew

EuMIC14

Foundry Session

Chair: Massimo C. Comparini, Telespazio, Italy & France

Co-Chair: Michael Schlechtweg, Fraunhofer Institute for Solid State Physics IAF

10:50

Welcome Address

Opening of the European Microwave Week 2017

Arne Jacob, EuMW 2017 General Chair

Robert Weigel, EuMW 2017 Honorary Chair

EuMA Welcome Address

Wolfgang Heinrich, EuMA President

Greetings from IEEE MTT-S

Dylan Williams, IEEE MTT-S President

Opening of the European Microwave Conference 2017

Matthias Hein, EuMC 2017 Chair

11:10

5G: The True Enabler of the Internet-of-Things

Bruno Jacobfeuerborn, CTO, Deutsche Telekom AG, and CEO, Deutsche Funkturm GmbH

5G is a phenomenon. All around the globe operators are announcing their roll-out plans, but nearly everytime the definition of 5G sounds a little bit different. After 2G to 4G, for the first time, not the user is in the focus, but use cases. Today people are connected in principle – tomorrow everything that can be connected, will be connected. However, things have completely different demands than users of flesh and blood. To create an ultra-flexible, integrated infrastructure capable of satisfying all these different demands is only one of the challenges of the 5G era. How can operators meet the capacity demands inherent to 5G networks without sacrificing customer quality-of-experience? New wireless backhuls will leverage traditional microwave bands, enhancing them, introducing higher modulation schemes, and taking advantage of spectral-efficiency techniques such as line-of-sight MIMO or in-band full duplex communication. But 5G is much more than just the next mobile radio standard.

11:45

Awards Ceremony

Alexander Yarovoy, EuMA Awards Chair

EuMA Outstanding Career Award EuMA Distinguished Service Award

12:05

From RF Signals to Smart Sensor Solutions

Reinhard Ploss, CEO, Infineon Technologies AG

Major innovations are under way in the automotive segment as well as in many consumer and industrial applications – many of them driven by semiconductor RF sensing solutions. Radar technology is one of the enabling technologies for autonomous driving. Moving forward, radar solutions will support new types of human-machine-interface, a smarter situational control in everyday situations and though enable completely new use cases of contextual awareness. One key advantage of RF sensing over optical solutions is the capability to track individual persons or objects while protecting privacy and personal data. RF sensing is a fundamental technology on the way to smart buildings and cities supporting solutions like smart doors, or smart street lights providing added value to individual users and operators – i.e. city and traffic administration, electricity providers – or the society in general. To form smart sensor solutions, not only the effective RF signal processing in hardware is instrumental, but also software algorithms combining big data, machine learning, and artificial intelligence. Based on key enabling infrastructures, agreed security standards and a solid use-case understanding, market success is built on an intelligent combination of these technologies, providing value to the community. The keynote will illustrate key benefits based on use cases and the required composition of the system.

12:40

End of Session

Several key representatives of RF and microwave semiconductor foundries will give short presentations of their foundry capabilities with respect to the impact of advanced GaN, GaAs and silicon technologies for military and Space, as well as civilian applications in sensing and communication. This includes details of current fully-released and commercially available processes and processes in development. There will also be an opportunity for questions and answers during this interactive forum.

10:50 - 12:40

12:40 - 13:20

TUESDAY



Kiew

EuMC/EuMIC03 **Power Amplifier Linearisation**

Chair: Geneviève Baudoin, ESIEE Paris, ESYCOM
Co-Chair: Claude Duvaud, XLIM Lab



Riga

EuMC/EuMIC04 **Interconnects and Packaging**

Chair: Shmuel Auster, Elta Systems
Co-Chair: Jan Hesselbarth, University of Stuttgart



St. Petersburg

EuMC/EuMIC05 **Reconfigurable and Tunable RF and Microwave Circuits**

Chair: Patrick Scheele, HENSOLDT - Airbus DS Electronics and Border Security GmbH
Co-Chair: Anthony Ghiotto, IMS laboratory

EuMC/EuMIC03-1 ***New Ka-Band Analog Predistortion Linearizer Allowing a 2.9 GHz Instantaneous Wideband Satellite Operation***

Jean-Francois Villemazet¹, Hissa Yah¹, Benoit Lefebvre¹, Fabien Baudeigne¹, Jean Maynard¹, Geoffroy Soubercaze-Pun², Luc Lapierre², ¹Thales Alenia Space France, ²Centre National d'Etudes Spatiales

EuMC/EuMIC03-2 ***A Reconfigurable In-Band Digital Predistortion Technique for mm-Wave Power Amplifiers Excited by a Signal with 640 MHz Modulation Bandwidth***

Chao Yu¹, Debin Hou¹, Honglei Sun¹, Fan Meng¹, Xiao-Wei Zhu¹, Jianfeng Zhai¹, Jixin Chen¹, Anding Zhu², ¹Southeast University, ²University College Dublin

EuMC/EuMIC03-3 ***Impact of the Normalization Gain of Digital Predistortion on Linearisation Performance and Power Added Efficiency of the Linearized Power Amplifier***

Siqi Wang, Mazen Abi Hussein, Olivier Venard, Geneviève Baudoin, Université Paris Est

EuMC/EuMIC03-4 ***Spectrum-Folding Scalar-Feedback Architecture for Wideband DPD with Simple Feedback Circuit***

Suguru Habu¹, Caoyu Li², Yasushi Yamao¹, ¹The University of Electro-Communications, ²University of Electronic Science and Technology

EuMC/EuMIC03-5 ***Concurrent Dual-Band Digital Predistortion Based on Canonical Piecewise Linear Functions***

Zhijian Yu, Shanghai Huawei Technologies Co., Ltd.

EuMC/EuMIC04-1 ***Industrial Session Keynote*** ***Future Antenna and Packaging Alternatives for High Reliability Millimeter Wave Applications***

Thomas Gottwald, Schweizer Electronic AG

EuMC/EuMIC04-2 ***Sub-THz Micromachined Waveguides for Wafer Level Integration of MMICs***

Pekka Pursula, Antti Lamminen, Mikko Kantanen, Jaakko Saarihahti, Vladimir Ermolov, VTT Technical Research Centre of Finland

EuMC/EuMIC04-3 ***Low-Loss mm-Wave Transition from On-Chip Microstrip to Rectangular Waveguide***

Daniel López Cuenca, Golzar Alavi, Jan Hesselbarth, University of Stuttgart

EuMC/EuMIC04-4 ***SiP Solutions for Wireless Transceiver Impedance Matching Networks***

Graciele Batistelli¹, Timo Holzmann¹, Stephan Leuschner², Andreas Wolter², Antonio Passamani³, Johannes Sturm¹, ¹FH Kärnten, ²Intel Deutschland GmbH, ³Intel Mobile Communications Austria GmbH

EuMC/EuMIC04-5 ***Scalable Ka Band Switch Matrix in Compact LTCC Package for Satellite Communication Application***

Francesco Vitulli¹, Francesco Scappaviva², Giovanni Nicolai³, ¹Thales Alenia Space Italia, ²MEC s.r.l., ³Elital s.r.l.

EuMC/EuMIC05-1 ***Novel Phase Reconfigurable Synthesized Transmission Line and its Application to Reconfigurable Hybrid Coupler***

Huy Nam Chu, Hua-Chien Liao, Gao-Yi Li, Tzyh-Ghuang Ma, National Taiwan University of Science and Technology

EuMC/EuMIC05-2 ***Realising Reconfigurable Stub Impedance Matching Networks Using MEMS Switches***

Farzad Yazdani, Raafat Mansour, University of Waterloo

EuMC/EuMIC05-3 ***Liquid-Crystal-Based Amplitude Tuner Fabricated in LTCC Technology***

Ananto Eka Prasetyadi¹, Matthias Jost¹, Baerbel Schulz², Matthias Quibeldey³, Torsten Rabe², Ruediger Follmann³, Rolf Jakob¹, ¹Technische Universität Darmstadt, ²Bundesanstalt für Materialforschung und -prüfung, ³IMST GmbH

EuMC/EuMIC05-4 ***Design of a Reconfigurable Rectangular Waveguide Phase Shifter with Metallic Posts***

Lucas Polo-López, J. L. Masa-Campos, Jorge A. Ruiz-Cruz, Escuela Politécnica Superior, Universidad Autónoma de Madrid

EuMC/EuMIC05-5 ***Liquid Crystal Based Phase Shifter in a Parallel-Plate Dielectric Waveguide Topology at V-Band***

Roland Reese, Ersin Polat, Matthias Jost, Matthias Nickel, Rolf Jakob, Holger Maune, Technische Universität Darmstadt

13:50 - 14:10

14:10 - 14:30

14:30 - 14:50

14:50 - 15:10

15:10 - 15:30

TUESDAY

TUESDAY

47TH EUROPEAN MICROWAVE CONFERENCE 2017

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	Prag	Istanbul	Kopenhagen	Shanghai
	<p>EuMC04 Integrated Antennas - Circuit and Feed Design Chair: Ulrich R. Pfeiffer, University of Wuppertal Co-Chair: Tuami Lasri, Université des Sciences et Technologies de Lille 1</p>	<p>EuMC05 Novel Planar Passive Components Chair: Dominique Baillargeat, XLIM UMR 725², University of Limoges/CNRS Co-Chair: Ferran Martin, Universitat Autònoma de Barcelona</p>	<p>EuMC06 Radio Frequency Identification (RFID) Chair: Thomas Ussmueller, University of Innsbruck Co-Chair: Alexandru Takacs, LAAS-CNRS</p>	<p>EuMC07 Antenna Array Technology - Design, Manufacturing, and Applications Chair: Yang Hao, Queen Mary University of London Co-Chair: Lorenz-Peter Schmidt, Uni Erlangen</p>
13:50 - 14:10	<p>EuMC04-1 Fully Integrated LNA & Antenna for Ultra-Low Noise Figure Receivers Paulus Krueger, North-West University</p>	<p>EuMC05-1 Magnetless Ring Circulators for Full Duplex Division Wireless Communication Kyle Holzer, Jeffrey Walling, University of Utah</p>	<p>EuMC06-1 Extremely Temperature-Resistant, Polarimetric Radar Barcode Maximilian Poepperl, Julian Adametz, Martin Vossiek, Friedrich-Alexander-University Erlangen</p>	<p>EuMC07-1 Design of a Ka-Band Sparse Array Antenna for Spaceborne SAR Applications Dave Bekers¹, Sebastiaan Jacobs¹, Roland Bolt¹, Stefania Monni¹, Danilo Fortini², Chiara Germani², Pasquale Capece², Giovanni Toso³, ¹TNO, ²Thales Alenia Space Italia, ³ESA ESTEC</p>
14:10 - 14:30	<p>EuMC04-2 An SIW Fed Dual-Band and Dual-Polarized Lens Antenna at K/Ka-Band Thomas Jaschke, Hans K. Mitto, Arne F. Jacob, Hamburg University of Technology</p>	<p>EuMC05-2 A Ku Band High-Power, Low-Insertion-Loss Single Pole, Triple Throw Switch Kyle Holzer, Jeffrey Walling, University of Utah</p>	<p>EuMC06-2 Dedicated Antenna Less Power Efficient OOK Transmitter for mm-Cubic IoT Nodes Ryo Shirai, Osaka University</p>	<p>EuMC07-2 Characterization of Dual-Band Dual-Linearly Polarized Transmitarray Antennas Trung Kien Pham, University of Rennes 1</p>
14:30 - 14:50	<p>EuMC04-3 Coaxial-Fed Dual-Layer SIW Horn Antenna with Improved E-Plane Radiation Pattern Mahbubeh Esmaeili, Jens Bornemann, University of Victoria</p>	<p>EuMC05-3 Via-Free Microstrip to Slotline Baluns Using Slotted Microstrip Cross-Junction Abdelhamid Nasr, Amr Safwat, Hadia El Hennawy, Ain Shams University</p>	<p>EuMC06-3 Passive Differential UHF RFID Front-Ends in a 40 nm CMOS Technology Lukas Zoescher^{1,2}, Peter Herkess¹, Jasmin Grosinger², Ulrich Muehlmann¹, Dominik Amsch², Wolfgang Bösch², ¹NXP Semiconductors, ²Graz University of Technology</p>	<p>EuMC07-3 3D Printed Rotman Lens Karina Hoel^{1,2}, Nathan Jastram³, Stein Kristoffersen¹, Dejan Filipovic³, ¹Norwegian Defence Research Establishment (FFI), ²University of Oslo, ³University of Colorado Boulder</p>
14:50 - 15:10	<p>EuMC04-4 A Millimeter-Wave TE₂₀-Mode SIW-Fed Patch Antenna Array with Differential Feeding Network Wenquan Che¹, Huayan Jin¹, Wanchen Yang¹, Kuo-Sheng Chin², ¹Nanjing University of Science and Technology, ²Chang Gung University</p>	<p>EuMC05-4 Broadband Coupled Line Matching Network for Two Dissimilar Port Reference Impedances Rusan Barik, D.S. Chandu, S.S. Karthikeyan, Indian Institute of Information Technology Design & Manufacturing Kancheepuram</p>	<p>EuMC06-4 Space Mapping Design Method for an Antenna Transducer of a Bend Sensor RFID Tag Francesco Berra¹, Jasmin Grosinger², Alessandra Costanzo¹, ¹University of Bologna, ²Graz University of Technology</p>	<p>EuMC07-4 A Self-Calibration System Prototype for Ka-Band Phased Array Antennas Mehdi Salehi, Safieddin Safavi-Naeini, University of Waterloo</p>
15:10 - 15:30	<p>EuMC04-5 A Filtering Combined Series- and Parallel-Fed Patch Antenna Array Fu-Chang Chen, South China University of Technology</p>	<p>EuMC05-5 A 28 dB Wide Dynamic Range Rectifier Array Employing Three Rectifying Devices Xiaoyu Wang, Samar Abdelnasser, Amir Mortazawi, University of Michigan, Ann Arbor</p>	<p>EuMC06-5 Wireless and Passive Nuclear Radiation Sensors Cristina Arenas, Julien Philippe, Dominique Henry, Alexandre Rumeau, Hervé Aubert, Patrick Pons, LAAS-CNRS</p>	<p>EuMC07-5 Focusing Patterns Within Far and Near Field for a Novel 2D Sparse MIMO Array Harun Cetinkaya, Simon Kueppers, Reinhold Herschel, Nils Pohl, Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR</p>

EuMC/EuMIC06 | EuMC/EuMIC Interactive Session

Chair: Felix Rautschke, Berlin Institute of Technology

Co-Chair: Ilona Rolfes, Ruhr-University Bochum

14:30 - 16:10

The ePosters are on display from 14:30 - 16:10

The authors are present for discussion from 14:30 - 16:10



Exhibition Hall	Exhibition Hall	Exhibition Hall	Exhibition Hall
<p>EuMC/EuMIC06-1 6-18 GHz 13 W Reactive Matched GaN Power Amplifier MMIC Hong Qi Tao, Southeast University</p>	<p>EuMC/EuMIC06-6 Substrate-Less Oscillator Module Realized by Gap Waveguide Technology for Millimeter Wave Applications Ali Banai, Behzad Ahmadi, Sharif University of Technology</p>	<p>EuMC/EuMIC06-10 Power Amplifier Efficiency Ceilings Due to Signal Modulation Type Earl McCune, Eridan Communications</p>	<p>EuMC/EuMIC06-14 Microstrip Fractal-based Phase Shifter Elias M. F. de Oliveira^{1,2}, Leon P. Pontes², Crislane P. N. da Silva², Bruno G. M. de Oliveira³, Marcos T. de Melo², Ignacio Llamas-Garro⁴, ¹Universidade Federal Rural de Pernambuco, ²Universidade Federal de Pernambuco, ³Instituto Federal de Pernambuco, ⁴Centre Tecnologic de Telecomunicacions de Catalunya (CTTC/CERCA)</p>
<p>EuMC/EuMIC06-2 Low-Loss and Compact 2.4-GHz CMOS Bandpass Filter with Finite Transmission Zeros Sen Wang, Ru-Yu Wang, National Taipei University of Technology</p>	<p>EuMC/EuMIC06-7 Controlling the Oscillator Frequency Synchronization by a Low-Frequency Drive Anastasiia Nimets¹, Klaus Schünemann¹, Dmytro Vavriv², ¹Hamburg University of Technology, ²Institute of Radio Astronomy of National Academy of Sciences of Ukraine</p>	<p>EuMC/EuMIC06-11 Digital Predistortion Based on B-Spline CPWL Models in a RoF LTE Mobile Fronthaul Carlos Mateo, Pedro Luis Carro, Paloma Garcia Ducar, Jesus de Mingo, Iñigo Salinas, University of Zaragoza</p>	<p>EuMC/EuMIC06-15 An UHF Rectifier with 100% Bandwidth Based on a Ladder LC Impedance Matching Network Spyridon-Nektarios Daskalakis¹, Apostolos Georgiadis¹, Ana Collado¹, Manos Tentzeris², ¹Heriot Watt, ²Georgia Institute of Technology</p>
<p>EuMC/EuMIC06-3 A Q-Band Broadband On-Chip Antenna with Switches Backed by an Off-Chip Reflector in 0.18 μm CMOS SOI Technology Yexi Song¹, Yunqiu Wu¹, Yin Tian², Kai Kang¹, ¹University of Electronic Science and Technology of China, ²Air Force Engineering University</p>	<p>EuMC/EuMIC06-8 Relationship Between a Pruned Volterra Model Structure and Impairments in an I/Q-Modulator Carlos Crespo-Cadenas, Javier Reina-Tosina, Maria J. Madero-Ayora, Juan A. Becerra-González, Universidad de Sevilla</p>	<p>EuMC/EuMIC06-12 A Concurrent Triple-Band Digital Transmitter Using Feedforward Noise Cancellation for Delta-Sigma Modulation SungWon Chung, Rui Ma, Koon Hoo Teo, Mitsubishi Electric Research Laboratories</p>	<p>EuMC/EuMIC06-16 Wide Dynamic Range Rectifier Circuit with Sequential Power Delivery Technique Koshi Hamano¹, Ryuya Tanaka¹, Satoshi Yoshida¹, Hiroto Sakaki^{1,2}, Kenjiro Nishikawa¹, Shigeo Kawasaki³, Kunihiro Kawai⁴, Hiroshi Okazaki⁴, Shoichi Narahashi⁴, Naoki Shinohara⁵, ¹Kagoshima University, ²Mitsubishi Electric Corporation, ³Japan Aerospace Exploration Agency, ⁴NTT DOCOMO, INC, ⁵Kyoto University</p>
<p>EuMC/EuMIC06-4 Theory of Resonant Frequency Spectrum of Tunable Multi-Loop Spin-Wave Optoelectronic Oscillators Andrey Nikitin, Vitaliy Vitko, Alexandr Kondrashov, Alexey Ustinov, Boris Kalinikos, Saint Petersburg Electrotechnical University «LET»</p>	<p>EuMC/EuMIC06-9 An Investigation on Current Collapse Induced Memory Effects of GaN Power Amplifier for LTE Base Station Applications Yoji Murao, Tomoya Kaneko, NEC Corporation</p>	<p>EuMC/EuMIC06-13 Performance of the First Three Preproduction 35-50 GHz Receiver Front-Ends for Atacama Large Millimeter / Submillimeter Array Yuh-Jing Hwang¹, Chau-Ching Chiong¹, Yau-De Huang¹, Chi-Den Huang², Ching-Tang Liu², Fang-Chia Hsieh², Yen-Hsiang Tseng², Po-Han Chiang¹, Chih-Cheng Chang¹, Chin-Ting Ho¹, Shou-Ting Jian¹, Chien-Feng Lee¹, Yi-Wei Lee¹, Alvaro Gonzalez², John Efland⁴, Kamaljeet Saini⁴, Marian Pospieszalski⁴, Ricardo Finger⁵, Valeria Tapia⁵, Nicolas Reyes⁵, ¹Academia Sinica Institute of Astronomy and Astrophysics (ASIAA), ²National Chung-Shan Institute of Science and Technology, ³National Astronomical Observatory of Japan (NAOJ), ⁴National Radio Astronomy Observatory (NRAO), ⁵Universidad de Chile</p>	<p>EuMC/EuMIC06-17 Towards New Vistas in Pre-amplifier Design for MRI Daniel H. Johansen, Juan D. Sanchez-Heredia, Vitaliy Zhurbenko, Jan Henrik Ardenkjær-Larsen, Technical University of Denmark</p>
<p>EuMC/EuMIC06-5 Ultra Wideband 3D Interconnects Using Aerosol Jet Printing up to 110 GHz Jubaid Qayyum¹, Marvin Abt², Aljoscha Roch², Ahmet Ulusoy¹, John Papapolymerou¹, ¹Michigan State University, ²Fraunhofer-USA</p>			

Kiew	Prag	St. Petersburg
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EuMC08
GaN-Based Power Amplifiers
 Chair: Giovanni Ghione, Politecnico di Torino
 Co-Chair: Olof Bengtsson, Ferdinand-Braun-Institut, Leibniz-Institut fuer Hochstfrequenztechnik

EuMC09
Integrated Antennas - Technology and Design
 Chair: Bart Smolders, Eindhoven University of Technology - TU/e
 Co-Chair: Jan Hesselbarth, University of Stuttgart

EuMIC15
EuMIC Closing Session
 Chair: Ingmar Kallfass, EuMIC 2017 Chair
 Co-Chairs: Georg Boeck, EuMIC 2017 TPC Chair and Friedel Gerfers, EuMIC 2017 Secretary

16:10 - 16:30

EuMC08-1
Two Stage 4 – 8 GHz, 5W GaN-HEMT Amplifier
 Stefan May, Daniel Maassen, Felix Rautschke, Georg Boeck, Technical University of Berlin

EuMC09-1
Scan Loss Mitigation via Subarrays. A Full-Scale Concept Demonstrator
 Fannush Shofi Akbar¹, Leonardus Ligthart², Gamantyo Hendratoro¹, Ioan Lager², ¹Institut Teknologi Sepuluh Nopember, ²Delft University of Technology

16:10 - 16:50
The Path to Global Connectivity – Wireless Communication enters the Next Generation
 Josef Hausner, Intel Deutschland

As mobile broadband (MBB) technologies evolve, devices need to support increasing bandwidth with multiple frequencies and dramatically exploding data rates. New air interfaces in 5G will show once again the gain in data rates as we have seen from 2G, to 3G, to HSPA, to LTE, and LTE advanced. These technologies in a single device provide the best possible services with great user experience to all people no matter where they are. Developing the next generation takes advantage of higher density in analog and digital silicon circuitry to enable low cost high performance solutions. Next to those MBB systems, massive and reliable machine-type communications – also known as the Internet of Things – will get developed under the umbrella of 5G technologies. This talk will elaborate on challenges of related radio and semiconductor technologies, and highlight architectural breakthroughs to enable next generation solutions for global connectivity.

16:30 - 16:50

EuMC08-2
Reconfigurable Packaged GaN Power Amplifier Using Thin-Film BST Varactors
 Sebastian Preis¹, Felix Lenz², Alex Wiens², Rolf Jakob², Wolfgang Heinrich¹, Olof Bengtsson¹, ¹Ferdinand-Braun-Institut, Leibniz-Institut fuer Hochstfrequenztechnik, ²Technische Universität Darmstadt

EuMC09-2
Utilization of Protruded Resonators to Design a Miniaturized Slot Antenna with Dual Band-Notched Characteristic for UWB Communications
 Rahim Hajaligogani, Gazi University

16:50 - 17:20
EuMIC Awards Ceremony
 Ingmar Kallfass, EuMIC 2017 Chair
 Michal Mrozowski, EuMW 2017 Awards Chair

Rohde&Schwarz Address
EuMIC Prize
EuMIC Young Engineer Prize
GaAs Association Address
GaAs Association Student Fellowships

16:50 - 17:10

EuMC08-3
Extended Operation of Class-F Power Amplifiers Using Input Waveform Engineering
 Elisa Cipriani¹, Paolo Colantonio¹, Franco Giannini¹, Antonio Raffo², Valeria Vadalà², Gianni Bosi², Giorgio Vannini², ¹University of Rome Tor Vergata, ²University of Ferrara

EuMC09-3
240 GHz Antenna Integrated on Low-Cost Organic Substrate Packaging Technology Targeting High-Data Rate sub-THz Telecommunication
 Elsa Lacombel^{1,2}, Frederic Ganesello², Cyril Luxey¹, Heiko Gulan³, Thomas Zwick³, Aimeric Bisognin^{2,1}, Diane Titz¹, ¹University of Nice Sophia-Antipolis, ²STMicroelectronics, ³Karlsruhe Institute of Technology

17:20 - 17:30
Closing of the EuMIC 2017
 Ingmar Kallfass, EuMIC 2017 Chair

17:10 - 17:30

EuMC08-4
Built-in AM/AM and AM/PM Distortion Study of Generalized Symmetrical Doherty Amplifier
 Hao-Yu Liu, Xiao-Hu Fang, Kwok-Keung M. Cheng, The Chinese University of Hong Kong

EuMC09-4
3D Monocone Antenna with an Integrated Feed
 Deepak Shamvedi¹, Oliver McCarthy^{1,2}, Eoghan O' Donoghue^{1,2}, Paul O' Leary¹, Ramesh Raghavendra^{1,2}, ¹Waterford Institute of Technology, ²SEAM Research Centre

17:30 - 17:40
Invitation to EuMIC 2018 in Madrid
 Teresa M. Martín Guerrero, EuMIC 2018 Chair

17:30 - 17:50

EuMC08-5
A 10 W S-Band Power Amplifier for Future 5G Communication
 Sebastian Drews, Felix Rautschke, Daniel Maassen, Chi Thanh Nghe, Georg Boeck, Technische Universität Berlin

EuMC09-5
Properties of Antennas Made with Sprayed Selective Silver Metallization
 Michael Petisme, Arnaud Jammes, Koen Staelens, Jet Metal Technologies

16:10 - 17:50

Istanbul

Kopenhagen

Seoul

Shanghai

EuMC10

Novel Technologies for Passive Components

Chair: Roberto Sorrentino, University of Perugia
Co-Chair: Francisco Medina, Universidad de Sevilla

EuMC11

Wireless Power Transfer

Chair: Alessandra Costanzo, University of Bologna
Co-Chair: Kamran Ghorbani, Royal Melbourne Institute of Technology

EuMC12

Front-End Components for Radio Astronomy, Communications, and Radar

Chair: Noriharu Suematsu, Tohoku University
Co-Chair: Almudena Suarez, University of Cantabria

EuMC13

Antennas in Printed Technology

Chair: Dirk Heberling, RWTH Aachen University
Co-Chair: Marco Pasian, University of Pavia

EuMC10-1

Screen Printed Lumped Element Filters Based on Silver Nanoparticle Ink

Denis Mercier, CEA

EuMC11-1

Capacitive Wireless Powering for Electric Vehicles with Near-Field Phased Arrays

Jose Estrada, Sreyam Sihna, Brandon Regensburger, Khurram Afridi, Zoya Popovic, University of Colorado, Boulder

EuMC12-1

216-256 GHz Fully Differential Frequency Multiplier-by-8 Chain with 0 dBm Output Power

Mohamed Eissa¹, Andrea Malignaggi¹, Minsu Ko¹, Klaus Schmalz¹, Johannes Borngräber¹, Ahmet Ulusoy², Dietmar Kissinger^{1,3}, ¹IHP Microelectronics, ²Michigan State University, ³Technical University of Berlin

EuMC13-1

A High Pass Type Frequency Selective Surface in Multilayer Techniques for Single Reflector Offset Antennas

Georg Strauss¹, Andreas Röhrner¹, Thomas Lohrey², ¹Munich University of Applied Sciences, ²Eutelsat S.A.

EuMC10-2

Methodology to Develop a Low-Loss Dual-Band Stripline Circulator

Hamza Turki¹, Laure Huitema¹, Thierry Monediere¹, Bertrand Lenoir², Christophe Breuil², ¹XLIM Research Institute - UMR CNRS 7252, ²Inoveos SARL

EuMC11-2

A Novel Coupling-Factor-Independent Highly-Efficient Resonant-Based Wireless Power Transfer System

Xiaoyu Wang, Amir Mortazawi, Omar Abdelatty, University of Michigan, Ann Arbor

EuMC12-2

Spatial-Frequency-Scanning Data Transmission for mmW Multi-User Wireless Communication Systems

Enoc Roselló¹, Philipp Hügler², Parisa Harati¹, Shoichi Shiba^{1,3}, Ingmar Kallfass^{1,3}, Christian Waldschmidt², ¹University of Stuttgart, ²Ulm University, ³Fujitsu Laboratories Ltd.

EuMC13-2

A Flexible Dielectric Leaky-Wave Antenna at 160 GHz

Martin Geiger, Martin Hitzler, Christian Waldschmidt, Ulm University

EuMC10-3

A Semiconductor Based Millimeter-Wave Waveguide Junction Circulator

Ghassan Nihad Jawad, Christopher Duff, Robin Sloan, The University of Manchester

EuMC11-3

Matched Resonant Inductive WPT Using the Coupling-Independent Regime: Theory and Experiments

Monti Giuseppina¹, Alessandra Costanzo², Franco Mastrì², Luciano Tarricone¹, Mauro Mongiardo³, Marco Dionigi², Wenquan Che⁴, Qinghua Wang⁴, ¹University of Salento, ²University of Bologna, ³University of Perugia, ⁴Nanjing Univ. of Science and Technology

EuMC12-3

W-band Frequency Converters for Wideband Microwave Spectroscopy in Radioastronomy

Sonia Garcia-Alvaro, Jose Antonio Lopez Perez, Maria Patino Esteban, Pablo Garcia Carreño, Jose Antonio Lopez Fernandez, Instituto Geografico Nacional

EuMC13-3

Design and Characterisation of Series and Corporate Feed Differential Arrays for Broadband 60 GHz Radar Applications

Wael Ahmad¹, Jeng-Hau Lu², Raqibul Hasan¹, Dietmar Kissinger³, Herman Ng¹, ¹IHP, ²National Chiao Tung University, ³TU Berlin

EuMC10-4

A 3-D Metal-Direct-Printed, Low-Cost, and Light Hexagonal Waveguide Ka-Band Branch Line Coupler

Motomi Abe, Hidenori Yukawa, Yu Ushijima, Takuma Nishimura, Naofumi Yoneda, Moriyasu Miyazaki, Mitsubishi Electric Corporation

EuMC11-4

High Efficiency Wireless Power Transmission System Against Misalignment Between Coils

Yoshihiko Kuwahara, Yuuji Sakayanagi, Shizuoka University

EuMC12-4

Zero-Bias Schottky Power Detector Design for Six-Port Based Radar Systems

Fabian Michler¹, Stefan Lindner¹, Fabian Lurz¹, Stefan Erhardt¹, Robert Weigel¹, Alexander Koelpin², ¹University of Erlangen-Nuremberg, ²BTU Cottbus - Senftenberg

EuMC13-4

Reduction of Mutual Coupling Between Closely Spaced Patch Antennas Using Dielectric Stratification Technique

Yanki Aslan, Delft University of Technology

EuMC10-5

Tunable and Input-Matched Attenuator Based on Few-Layer Graphene

Muhammad Yasir¹, Maurizio Bozzi¹, Luca Perreggini¹, Silvia Bistarelli², Antonino Cataldo², Stefano Bellucci², ¹University of Pavia, ²National Institute of Nuclear Physics (INFN) Frascati

EuMC11-5

Low-Cost UHF Near-Field Power Transmission for RFID Applications

Marco Fantuzzi¹, Alessandra Costanzo¹, Smail Tedjini², Pierre Lemaitre-Auger², ¹University of Bologna, ²University Grenoble Alpes

EuMC12-5

A Dual-Band 90-Degree SiGe HBT Active Phase Shifter Using Band-Pass and Band-Stop Designs

Yasushi Itoh, Shonan Institute of Technology

EuMC13-5

A Novel Additive-Manufactured Multiple-Infill Ultra-Lightweight Cavity-Backed Slot Antenna for UWB Applications

Valentina Palazzi¹, Ryan Bahr², Bijan Tehrani², Jimmy Hester², Jo Bito², Federico Alimenti¹, Paolo Mezzanotte¹, Luca Roselli¹, Manos Tentzeris², ¹University of Perugia, ²Georgia Institute of Technology

16:10 - 16:30

16:30 - 16:50

16:50 - 17:10

17:10 - 17:30

17:30 - 17:50

TUESDAY

WEDNESDAY



Hongkong

Kiew

Riga

EuMC14

Antennas for mm-Wave Applications

Chair: Ioan Lager, Delft University of Technology
Co-Chair: Alessandro Galli, Sapienza University of Rome

EuMC15

Impedance Matching Solutions for GaN Power Amplifiers

Chair: Eric Kerhervé, IMS laboratory
Co-Chair: Christian Fager, Chalmers University of Technology

EuMC16

Special Session: Novel Microwave Devices and Measurements in Central Europe

Chair: Jozef Modelski, Warsaw University of Technology
Co-Chair: Jan Vrba, Czech Technical University in Prague

08:30 - 08:50

EuMC14-1

Mixed-Domain Gating Algorithm for Time-Domain Characterisation of Millimetre-Wave Antennas

Lars Ohlsson, Iman Vakili, Daniel Sjöberg, Lars-Erik Wernersson, Lund University

EuMC15-1

Triband 1.2/1.8/2.7 GHz Doherty Power Amplifier Using Novel Output Combining Network

Bassem Abdelrahman, Hesham Ahmed, Military Technical College

EuMC16-1

Direction-of-Arrival Estimation Using an ESPAR Antenna with Simplified Beam Steering

Lukasz Kulas, Gdansk University of Technology

08:50 - 09:10

EuMC14-2

A Zero-IF Auto-Calibration System For Phased Array Antenna

Mehdi Salehi, Safieddin Safavi-Naeini, University of Waterloo

EuMC15-2

Harmonics Suppressed Band-Pass Matching Network for High Efficiency Power Amplifier

Junhyung Jeong¹, Phirun Kim¹, Yongchae Jeong¹, Jongsik Lim², ¹Chonbuk National University, ²Soonchunhyang University

EuMC16-2

Microwave Amplifiers Using GaN HEMTs on Truly Bulk GaN Substrates

Marcin Góralczyk¹, Dawid Kuchta¹, Wojciech Wojtasiak¹, Andrzej Taube^{1,2}, ¹Warsaw University of Technology, ²Institute of Electron Technology

09:10 - 09:30

EuMC14-3

A Novel Synthesis Method for Millimeter-Wave Antenna with Contoured-Beam at Near-Field Region

Gang Xu, Institute of Electronic Engineering, China Academy of Engineer Physics

EuMC15-3

A Sequential Power Amplifier at 3.5 GHz for 5G Applications

Philipp Neining^{1,2}, Christian Friesicke¹, Sebastian Krause¹, Dirk Meder¹, Roger Lozar¹, Thomas Merkle¹, Rüdiger Quay¹, Thomas Zwick², ¹Fraunhofer Institute for Solid State Physics IAF, ²Karlsruhe Institute of Technology (KIT)

EuMC16-3

Tunable Shielded Dielectric Resonator Short-Circuited at the Disk Face

Kostiantyn Savin¹, Victor Kazmirenko¹, Yuriy Prokopenko¹, Borys Pratsiuk², Guy Vandenbosch³, ¹National Technical University of Ukraine «KPI», ²Cyklum Co., ³Katholieke Universiteit Leuven

09:30 - 09:50

EuMC14-4

Analysis of Photoconductive Antennas Power Radiation by Norton Equivalent Circuit

Alessandro Garufo, Giorgio Carluccio, Nuria Lombart Juan, Andrea Neto, Ioan Lager, Delft University of Technology

EuMC15-4

Revisiting Power vs. Bandwidth in Broadband CW Amplifiers by Exploring 100 V Bias Operation

Gabriele Formicone, Jeff Burger, James Custer, Richard Keshishian, Integra Technologies, Inc.

EuMC16-4

CNT-Based Microwave Filter for C and X-Band Applications

Martino Aldrigo¹, Mircea Dragoman¹, Alina Cristina Bunea¹, Dan Neculoiu¹, Stephane Xavier², Afshin Ziaei², ¹National Institute for Research and Development in Microtechnologies - IMT, ²TRT France

09:50 - 10:10

EuMC14-5

Investigation and Development of Custom-Designed Calibration Substrates: An Introduction

Maren Willemsen, Sybille Holzwarth, Oliver Litschke, IMST GmbH

EuMC15-5

Highly Efficient Wideband Harmonic-Tuned Power Amplifier Using Low-Pass Matching Network

Khondker Rabbi, Jiafeng Zhou, Yi Huang, University of Liverpool

EuMC16-5

SIW Choke-Based Technique for Accurate Dielectric Measurements in the 3.5 – 5 GHz Band

Valentin Buiculescu, Martino Aldrigo, Alexandra Stefanescu, IMT Bucharest



St. Petersburg

EuRAD01**EuRAD Opening Session**

Chair: Martin Vossiek, EuRAD 2017 Chair

Co-Chairs: Nils Pohl, EuRAD 2017 TPC Chair, and Peter Knott, EuRAD 2017 Secretary

08:30 - 08:40**Welcome Address****Opening of the European Radar Conference 2017**

Martin Vossiek, EuRAD 2017 Chair

08:40 - 09:20**The Renaissance in Radar Remote Sensing - Our New Vision for Earth and the Planets**

Paul Rosen, Section Manager, NASA Jet Propulsion Laboratory

The age of spaceborne radar remote sensing was born in 1978 with the launch of SEASAT, an experimental satellite carry an array of microwave instruments – a radiometer, an altimeter, and a synthetic aperture radar. Designed and built by NASA's Jet Propulsion Laboratory, SEASAT demonstrated in its short lifespan the uniqueness and utility of radar's all-weather day/night capabilities and led to a sustained and accelerating international growth in the number and variety of radar instruments that are orbiting Earth and the planets. Unlike optical sensors, radar sees the electrical and structural properties of an object and therefore give us a view of worlds that is quite different from our everyday experience. With wavelengths that span a range from millimetres to kilometres, radars can scatter from ice crystals in clouds as well as penetrate deep into ice crusts of planetary objects. Spacefaring nations consider Earth imaging radar to be critical to their scientific and operational needs, and a growing number of systems are being launched around the world. The volume of radar data being acquired of Earth is growing rapidly as the benefits of continuous time-series around the globe are becoming apparent. Sophisticated techniques in change detection and quantitative geodesy using interferometric and polarimetric methods are revolutionising the fields of solid earth science, glaciology, and ecosystems science, among others. Radar altimeters operationally measure ocean topography, mm-wavelength radar sounders profile cloud and precipitation, and scatterometers determine ocean winds. These data are becoming essential climate records, with a scientific imperative for continuing measurements.

With the availability of low-cost space-qualified digital hardware, radars are becoming more flexible, more capable, and less expensive per unit area observed. Along with the standardisation of cubesats and small spacecraft, many companies are now planning dense constellations of radar satellites to feed the growing commercial market for radar imagery. In addition to that facility-class missions are becoming more capable and flexible collecting petabytes of data each year. This will only grow in the future.

NASA/JPL has been engaged in Earth and planetary spaceborne radar instrument design and development for fifty years, nearly since the beginning of the space program. Given NASA's science-driven research portfolio, these radar systems over the years have adapted and responded to the evolving US scientific and programmatic priorities for earth and planetary observations. In this talk, an overview of the major developments in spaceborne radar systems will be presented, with some emphasis on NASA/JPL missions. The talk will highlight the intersections of science and innovation in spaceborne radar developments, including some of the most interesting science and technology achievements obtained over the years, and describe upcoming initiatives that support future directions in Earth and planetary observations.

09:20 - 10:00**Space Surveillance and Tracking: Operational Setup and Needs**

Gerald Braun, Head of Space Situational Awareness Department, German Space Administration, Director (civ.)

German Space Situational Awareness Center

The Space Strategy of the German Government sets the scene for the build-up and operation of a national Space Situational Awareness (SSA) capability. In 2011 the German Federal Ministry of Defence and the Federal Ministry for Economic Affairs and Energy signed an agreement to establish and develop a dual operational SSA centre. The activity was delegated to the German Airforce and the German Space Administration. Since the start of the activity end of 2011 considerable progress has been made. The German Space Situational Awareness Center (GSSAC) has taken up operational service provision in 2016. A R&D strategy to determine operational SSA requirements has been established, and key activities in the military and civil domains have been synchronised and started. Furthermore, between 2015 and 2017 Germany co-initiated and has been leading the European SST Support Framework, the joint civil-military effort of five European member states which forms the base of a future an operational European operational SST capability.

10:00 - 10:10**EuRAD 2017 Forecast**

Nils Pohl, EuRAD 2017 TPC Chair

Peter Knott, EuRAD 2017 Secretary

08:30 - 10:10

WEDNESDAY

Prag

Istanbul

EuMC17

RF MEMS and Sensors

Chair: Mehmet Kaynak, IHP Microelectronics, Sabanci University
Co-Chair: John Papapolymou, Michigan State University

EuMC18

Design Techniques and Implementations of Planar Couplers

Chair: Steve Nightingale, CMS Technologies
Co-Chair: Marco Pasian, University of Pavia

08:30 - 08:50

EuMC17-1 New Power Handling Characterization for RF MEMS Capacitive Switches

David Molinero, Shawn Cunningham, Art Morris, Wispry

EuMC18-1 A Fully Planar Broadband Rat-Race Coupler with Stepped-Impedance and Coupled Microstrip Lines

Bo-Yuan Wang¹, Lin-Sheng Wu¹, Tao Guan², Liang-Feng Qiu¹, Jun-Fa Mao¹, ¹Shanghai Jiao Tong University, ²Huawei Technologies CO., LTD

08:50 - 09:10

EuMC17-2 Packaged BiCMOS Embedded RF-MEMS Test Vehicles for Space Applications

Selin Tolunay Wipf¹, Alexander Göritz², Matthias Wietstruck¹, Maurizio Cirillo³, Christian Wipf¹, Wolfgang Winkler², Mehmet Kaynak^{1,2}, ¹IHP Microelectronics, ²Silicon Radar GmbH, ³Sabanci University

EuMC18-2 General Synthesis Method for Variable Couplers, Switches, Bridges, and Power Dividers and Combiners

Abbas Omar, University of Magdeburg

09:10 - 09:30

EuMC17-3 Nanometer-Length Characterization with CMOS-MEMS Scanning Microwave Microscopes

Mostafa Azizi¹, Neil Sarkar^{1,2}, Duncan Strathearn^{1,2}, Raafat Mansour¹, ¹University of Waterloo, ²CSPI Corp.

EuMC18-3 EM-Driven Compact Cell Topology Selection For Explicit Size Reduction of Hybrid Rat-Race Couplers

Piotr Kurgan, Slawomir Koziel, Reykjavik University

09:30 - 09:50

EuMC17-4 BST Thin Film Bulk Acoustic Resonator Optimisation for Un-Cooled IR Sensors Application

Milad Zolfagharloo Koochi, Xiaoyu Wang, The University of Michigan

EuMC18-4 Rapid Dimension Scaling of Compact Microwave Couplers with Power Split Correction

Slawomir Koziel¹, Adrian Bekasiewicz¹, John W. Bandler², ¹Reykjavik University, ²McMaster University

09:50 - 10:10

EuMC18-5 Compact Six-Port Junction Using Broadside-Coupled CPW Couplers for a Broadband Six-Port Receiver

Saad Qayyum, Renato Negra, RWTH Aachen University

Kopenhagen

Seoul

EuMC19

Special Session: Stochastic Electromagnetics

Chair: Peter Russer, Technische Universität München
Co-Chair: Philippe Besnier, INSA

EuMC20

Wireless Communication Channels

Chair: Jyri Putkonen, Nokia Bell Labs
Co-Chair: Michael Vogt, Ruhr-University Bochum

EuMC19-1 *Principal Component Analysis Applied in Modeling of Stochastic Electromagnetic Field Propagation*

Michael Haider¹, Johannes Russer¹, Andrey Baev²,
Yury Kuznetsov², Peter Russer¹, ¹Technische
Universität München, ²Moscow Aviation Institute

EuMC20-1 *Industrial Session Keynote* *The Art of Communication and the Role of Space Systems to Connect Society*

Glyn Thomas, Airbus Defence & Space

08:30 - 08:50

EuMC19-2 *Bringing Chaos Inside the Reverberation Chamber*

Gabriele Gradoni¹, Luca Bastianelli², Valter
Mariani Primiani², Franco Moglie², ¹University of
Nottingham, ²Università Politecnica delle Marche

EuMC20-2 *5G E-band Backhaul System Measurements in Urban Street-Level Scenarios*

Zhou Du¹, Eckhard Ohlmer², Kimmo Aronkytö¹, Jyri
Putkonen¹, Jouko Kapanen¹, Daniel Swist², ¹Nokia
Bell Labs, ²National Instruments

08:50 - 09:10

EuMC19-3 *Statistics of Reflection and Transmission in the Strong Overlap Regime of Fully Chaotic Reverberation Chambers*

Ulrich Kuhl, Olivier Legrand, Fabrice Mortessagne,
Khalid Oubaha, Martin Richter, Institute of Physics
in Nice, University of Côte d'Azur

EuMC20-3 *Channel Measurements for the Evaluation of Noncoherent Massive MIMO Systems*

Melanie Bense, Robert Weigel, Friedrich-
Alexander-University Erlangen

09:10 - 09:30

EuMC19-4 *Probabilistic Assessment of Braid Transfer Impedance with Restricted Number of Measurements*

Sébastien Lalléchère¹, Chaouki Kasmi², Lars-Ole
Fichte³, José Lopes Esteves³, Sébastien Girard¹,
Pierre Bonnet¹, Françoise Paldian¹, ¹Université
Clermont Auvergne, ²French Network and
Information Security Agency, ³Helmut Schmidt
University

EuMC20-4 *Receiving GSM Broadcast Channels with an Ultra- Low Power Sub-GHz Transceiver*

Stefan Erhardt¹, Robert Weigel¹, Alexander
Koelpin², ¹Friedrich-Alexander-University Erlangen,
²BTU Cottbus - Senftenberg

09:30 - 09:50

EuMC19-5 *Characteristics of Stochastic Responses in MTL Hybrid Systems by Using SDAE Formulation*

Lubomir Brancik, Edita Kolarova, Milan Sigmund,
Bmo University of Technology

EuMC20-5 *Temporal Evolution Analysis of Indoor-to-Outdoor Radio Channels in the 868 MHz ISM/SRD Frequency Band*

Sebastian Rauh¹, Thomas Lauterbach², Hendrik
Lieske¹, Gerd Kilian³, Joerg Robert¹, Albert
Heuberger¹, ¹Lehrstuhl für Informationstechnik
(Kommunikationselektronik), ²Technische
Hochschule Nürnberg Georg Simon Ohm,
³Fraunhofer Institut for Integrated Circuits

09:50 - 10:10

EuMC21 | EuMC Interactive Session 1

Chair: Daniel Mueller, Karlsruhe Institute of Technology (KIT)

Co-Chair: Christian Bornkessel, TU Ilmenau

10:00 - 11:40

The ePosters are on display from 10:00 - 11:40

The authors are present for discussion from 10:00 - 11:40

Exhibition Hall	Exhibition Hall	Exhibition Hall	Exhibition Hall
<p>EuMC21-1 Design of Filtering Power Dividers for Desired Filter Responses Using Parallel Coupled-Line Filters Chih-Jung Chen, National Taiwan Ocean University</p>	<p>EuMC21-6 Performance Optimization of Capacitively Compensated Directional Couplers Chi Thanh Nghe¹, Felix Rautschke¹, Georg Boeck^{1,2}, ¹Berlin Institute of Technology, ²GloMic GmbH</p>	<p>EuMC21-9 Design of Balun Filters with High Frequency Selectivity and Low Insertion Loss Yu-Heng Ye¹, Chen-En Jang¹, Kuo-Sheng Chin¹, Eric S. Li¹, ¹Chang Gung University, ²National Taipei University of Technology</p>	<p>EuMC21-13 Characterisation of Planar Groove Gap Cavities and Waveguide Titus Oyedokun, University of Cape Town</p>
<p>EuMC21-2 Synthesis of an N-Way Arbitrary Power Divider Sheng Cheng, Michael Pavlick, Johns Hopkins University Applied Physics Laboratory</p>	<p>EuMC21-7 Performance Comparison of a Four-Pole Folded Filter Realized with Standard and Empty Substrate Integrated Waveguide Technologies José Antonio Ballesteros¹, Elena Diaz-Caballero², Marcos D. Fernandez¹, Hector Esteban¹, Angel Belenguer¹, Vicente Enrique Boria Esbert², ¹University of Castilla-La Mancha, ²Polytechnic University of Valencia</p>	<p>EuMC21-10 General Synthesis Method for Negative Group Delay Response: A Filter Base Approach Ranjan Das¹, Qingfeng Zhang², ¹IIT Bombay, ²Southern University of Science and Technology, China</p>	<p>EuMC21-14 Analysis of an Overmoded Re-Entrant Cavity David Marques-Villarroya, Felipe L. Peñaranda-Foix, Beatriz Garcia-Banos, Jose Catala-Civera, Jose Gutierrez-Cano, ITACA Research Institute</p>
<p>EuMC21-3 Miniaturized Wilkinson Power Divider with Complex Isolation Network for Physical Isolation Tso-Jung Chang, Ting-Jui Huang, Heng-Tung Hsu, National Chiao Tung University</p>	<p>EuMC21-8 Cost-Effective SIW Band-Pass Filters for Millimeter Wave Applications - A Method to Combine Low Tolerances and Low Prices on Standard PCB Substrates Franz Roehrl¹, Roman Sammer¹, Johannes Jakob¹, Werner Bogner¹, Robert Weigel¹, Uwe Hassel¹, Stefan Zorn¹, ¹DIT Deggendorf Institute of Technology, ²University of Erlangen-Nuremberg, ³Rohde & Schwarz GmbH & Co. KG</p>	<p>EuMC21-11 A Ku-Band Diplexer Based on 3 dB Directional Couplers Made by Plastic Additive Manufacturing Etienne Laplanche, Olivier Tantot, Nicolas Delhote, Aurélien Périgaud, Serge Verdeyme, Stéphane Bila, Dominique Baillargeat, XLIM UMR 725², University of Limoges/CNRS</p>	<p>EuMC21-15 A Metal 3D-Printed T-Junction OMT with an Offset Stepped Post Hidenori Yukawa, Yu Ushijima, Motomi Abe, Naofumi Yoneda, Moriyasu Miyazaki, Mitsubishi Electric Corporation</p>
<p>EuMC21-4 Planar Dual-Band Crossover with Arbitrary Frequency Ratios Using Coupled Lines Wenjia Feng, Yu Zhao, Wenquan Che, Nanjing University of Science & Technology</p>	<p>EuMC21-5 A Small-Size Measurement Directional Bridge Based on PCB Integrated Ferrite-Core Loaded Transformer Nikolai Drobotun¹, Philipp Mikheev², ¹MICRAN, Research and Production Company, ²Tomsk State University of Control Systems and Radioelectronics</p>	<p>EuMC21-12 A Reconfigurable Unequal Filtering Power Divider Based on Switched-Filter Matching Network Shih-Fong Chao, National Kaohsiung marine university</p>	<p>EuMC21-16 Circulator Integrated in LTCC with Screen Printed Ferrite for Space Application Shicheng Yang, Wei Shi, Hao Bai, Ting Zhang, China Aerospace Science and Technology</p>
			<p>EuMC21-17 A Non-Magnetic Gyrator Utilizing Switched Delay Lines Jack Krol, Songbin Gong, University of Illinois at Urbana-Champaign</p>

Hongkong

EuMC/EuRAD01

Antenna Systems - Industrial Perspectives

Chair: Matthias Geissler, IMST GmbH
Co-Chair: Ioan Lager, Delft University of Technology

Kiew

EuMC22

High-Efficiency Power Amplifiers

Chair: Philippe Eudeline, Thales Air Systems SAS
Co-Chair: Denis Barataud, XLIM Research Institute, University of Limoges

Riga

EuMC23

Focused Session: Advanced Microwave Materials

Chair: Oksana Shramkova, Technicolor R&D France
Co-Chair: Polina Kapitanova, ITMO University

Prag

EuMC24

Additive Manufacturing Techniques for RF Applications

Chair: Kamal Samanta, Sony Europe
Co-Chair: Joachim Oberhammer, KTH Royal Institute of Technology

EuMC/EuRAD01-1 Slim Ka-Band Triple Band Polariser Network for User and Gateway Antenna Feed Application

Un-Pyo Hong, Michael Schneider, Ralf Gehring, Airbus

EuMC22-1 Efficiency Enhancement and Linearization of GaN PAs Using Reduced- Bandwidth Supply Modulation

Morten Olavsbråten¹, Dragan Gecan¹, Maxwell Duffy², Gregor Lasser², Zoya Popovic², ¹NTNU, ²University of Colorado

EuMC23-1 All-Dielectric Bianisotropic and Multimode Unidirectional Microwave Metasurfaces

Polina Kapitanova¹, Mikhail Odit¹, Mohammad Danaeifar², Pavel Belov¹, Andrey Miroshnichenko², Yuri Kivshar³, ¹ITMO University, ²Khaje Nasir Toosi University of Technology, ³Australian National University

EuMC24-1 Experimental Research Activity on Additive Manufacturing of Microwave Passive Waveguide Components

Giuseppe Addamo¹, Oscar Antonio Peverini¹, Giuseppe Virone¹, Mauro Lumia¹, Riccardo Tascone¹, Flaviana Calignano², Diego Manfredi², ¹CNR-IEIT, ²CSFT-IIT

EuMC/EuRAD01-2 Design and Testing of a Polarimetric X-Band Antenna for Avionic Weather Radar

Roland Bolt¹, Giovanni Galgani², Gabriele Scozza², Nadia Haider¹, Stefania Monni¹, Francois Delbary², ¹TNO, ²IDS Ingegneria dei Sistemi S.p.A., ³Rockwell Collins France

EuMC22-2 4.5-/4.9 GHz-Band Tunable High-Efficiency GaN HEMT Power Amplifier

Kazuki Mashimo, Ryo Ishikawa, Kazuhiko Honjo, University of Electro-Communications

EuMC23-2 Multipole Electromagnetic Wave Scattering by Nonspherical High- Refractive-Index Particles

Andrey Evlyukhin, Boris Chichkov, Laser Zentrum Hannover e.V.

EuMC24-2 A Polyjet 3D Printed Alternative for Package to RFIC Interconnects

Michael Craton, Jennifer Byford, John Papapolymerou, Premjeet Chahal, John Albrecht, Michigan State University

EuMC/EuRAD01-3 RF Analysis at K-Band of a Radome-Covered Ground Station at Polar Latitudes

Andrea Martellosio¹, Marco Pasian¹, Filippo Concaro², Piermario Besso², ¹University of Pavia, ²European Space Operations Center (ESOC)

EuMC22-3 Improving Efficiency, Linearity and Linearisability of an Asymmetric Doherty Power Amplifier by Modulating the Peaking Amplifier's Supply Voltage

Alexander Alt, Jonathan Lees, Cardiff University

EuMC23-3 Recent Development of Conception of Trapped Modes in Low-Loss All- Dielectric Metamaterials

Vladimir Tuz¹, Vyacheslav Khardikov², Natalia Sydoruk³, Denis Novitsky⁴, Sergey Prosvirnin⁵, ¹Jilin University, ²V.N. Karazin Kharkiv National University, ³Institute of Radio Astronomy of National Academy of Sciences of Ukraine, ⁴B.I. Stepanov Institute of Physics, National Academy of Sciences of Belarus

EuMC24-3 3D-Printed Chalk Powder for Microwave Devices: Experimental Results for a NRD-Guide in Ku-Band

Enrico Massoni, Pedro Fidel Espin-Lopez, Marco Pasian, Maurizio Bozzi, Luca Perreggini, Gianluca Alaimo, Stefania Marconi, Ferdinando Auricchio, ¹University of Pavia,

EuMC/EuRAD01-4 Radiometric Accuracy and One-Year-Stability of Sentinel-1A Determined Using Point Targets

Kersten Schmidt, Nuria Tous Ramon, Marco Schwerdt, German Aerospace Center (DLR)

EuMC22-4 Wide-Band High-Efficiency GaN HEMT Amplifier Based on Dual-Band Multi- Harmonic Treatments

Yuki Takagi, Ryo Ishikawa, Kazuhiko Honjo, University of Electro-Communications

EuMC23-4 Amplification of Surface Plasmons in Active Nonlinear Hyperbolic Systems

Oksana Shramkova¹, Marios Mattheakis², Giorgos Tsironis³, ¹Technicolor R&D France, ²Harvard University, ³University of Crete

EuMC24-4 Effect of Build Orientation and Surface Finish on Surface Resistance in Microwave Components Produced by Selective Laser Melting

Nicholas Clark, Samuel Hefford, Adrian Porch, Cardiff University

EuMC/EuRAD01-5 Test on the Prototype of a Multiple-Beam Reflector Antenna Subsystem

Qinghua Lai, East China Institute of Electronic Engineering

EuMC22-5 The Efficiency/Bandwidth Trade-Off in Class-G Supply-Modulated Power Amplifiers

Nikolai Wolff, Wolfgang Heinrich, Olof Bengtsson, Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik

EuMC23-5 Tunable Microwave Metamaterials Based on Ordinary Water

Andrei Lavrinenko¹, Rasmus Jacobsen¹, Samel Arslanagic¹, Svetlana Kuznetsova², Andrei Andryeuskii¹, Mikhail Odit³, Polina Kapitanova³, ¹Technical University of Denmark, ²University of Nizhny Novgorod, ³ITMO University

EuMC24-5 Evaluation of Metal Coating Techniques up to 66 GHz and their Application to Additively Manufactured Bandpass Filters

William Feuray¹, Anthony Delage¹, Aymen Abdelghani¹, Johann Sence¹, Olivier Tantot¹, Stéphane Bila¹, Kamel Frigui¹, Serge Verdeyme¹, Nicolas Delhote¹, Koen Staelens², ¹Xlim, ²Jet Metal Technologies

10:50 - 11:10

11:10 - 11:30

11:30 - 11:50

11:50 - 12:10

12:10 - 12:30

WEDNESDAY



	Istanbul	Kopenhagen	Seoul	Singapur
	EuMC25 Advanced Waveguide Structures Chair: Luca Perregriani, University of Pavia Co-Chair: Jan Machac, Czech Technical University in Prague	EuMC26 Special Session: Microwave Research in Latin America Chair: José Rayas-Sánchez, ITESO - The Jesuit University of Guadalajara Co-Chair: Silvio Barbin, University of Sao Paulo	EuMC/EuRAD02 Microwave Systems Chair: Ilona Rolfes, Ruhr-University Bochum Co-Chair: Bianca Will, FH Südwestfalen	EuMC27 Components and Techniques for Microwave Vacuum Electronics Chair: Antti Räisänen, Aalto University Co-Chair: Marion K. Matters-Kammerer, Eindhoven University of Technology - TU/e
10:50 - 11:10	EuMC25-1 Bundled Waveguide Solution for Multibeam Satellite Applications Uwe Rosenberg ¹ , Ralf Beyer ¹ , Peter Krauss ¹ , Thomas Sieverding ¹ , Markus Voegerl ¹ , Andreas Raith ² , Jaione Galdeano ³ , Christoph Ernst ³ , ¹ Mician Global Engineering GbR, ² Rohde&Schwarz GmbH & Co. KG, ³ ESTEC	EuMC26-1 Academic and Industrial Research Activities on RF and Microwaves in Latin America: An Overview José Rayas-Sánchez, Zabdíel Brito-Brito, ITESO - The Jesuit University of Guadalajara	EuMC/EuRAD02-1 System Design of a Fast W-Band Line Scan Camera Using a Broadband SFCW Approach Andries Küter, Stefan Reible, Thomas Geibig, Dirk Nüßler, Fraunhofer FHR	EuMC27-1 Planar Slow Wave Structures for Millimeter-Wave Vacuum Electron Devices Giacomo Ulisse, Viktor Krozer, Goethe University Frankfurt
11:10 - 11:30	EuMC25-2 Dual Band Rectangular Waveguide Polarizer Using Corrugated/ Elongated Conductive Plates for Ka-Band Yu Ushijima, Hidenori Yukawa, Naofumi Yoneda, Moriyasu Miyazaki, Mitsubishi Electric Corporation	EuMC26-2 Eye Diagram System Margining Surrogate-Based Optimization in a Server Silicon Validation Platform Francisco Rangel-Patino ¹ , Jose Chavez-Hurtado ² , Andres Viveros-Wacher ¹ , Jose Rayas-Sanchez ² , Nagib Hakim ³ , ¹ Intel Corp., Zapopan, Mexico, ² ITESO - The Jesuit University of Guadalajara, ³ Intel Corp., Santa Clara, CA	EuMC/EuRAD02-2 High-Resolution FMCW Terahertz Thickness Measurements Nina Schreiner ¹ , Bessem Baccouche ¹ , Wolfgang Sauer-Greff ¹ , Ralph Urbansky ² , Fabian Friederich ¹ , ¹ Fraunhofer ITWM, ² Kaiserslautern University of Technology	EuMC27-2 Study of Millimetre Wave Extended Interaction Oscillation Using Pseudospark-Sourced E-Beams Adrian Cross ¹ , Huabi Yin ¹ , Liang Zhang ¹ , Guoxiang Shu ¹ , Wenlong He ¹ , Junping Zhao ³ , Yong Yin ⁴ , ¹ University of Strathclyde, ² School of Electronics and Information Engineering, Xi'an Jiaotong University, ³ University of Electronic Science & Technology of China
11:30 - 11:50	EuMC25-3 Slow-Wave Microstrip Lines: Electrical Model – Application to a Branch-Line Coupler in PCB Technology Duc Long Luong ¹ , Didier Vincent ¹ , Florence Podevin ² , Emmanuel Pistono ² , Philippe Ferrar ² , Hamza Issa ³ , Darine Kaddour ² , ¹ University Jean Monnet, Saint Etienne, ² Univ. Grenoble Alpes, IMEP-LAHC Grenoble, ³ Beirut Arab University	EuMC26-3 Variation on the psSAR in the Brain due to Differences in the Head Modelling Claudio Enrique Fernández-Rodríguez ¹ , Alvaro Augusto Almeida de Salles ² , ¹ IFRS, ² UFRGS	EuMC/EuRAD02-3 A Low-Cost Multi-Target Simulator for FMCW Radar System Calibration and Testing Werner Scheibelhofer ¹ , Reinhard Feger ¹ , Andreas Haderer ² , Andreas Stelzer ¹ , ¹ Johannes Kepler University Linz, ² Inras GmbH	EuMC27-3 An Improved Energy Spectrum Model and its Application in Multipactor Discharge Simulation Wanzhao Cui, China Academy of Space Technology(XI'AN)
11:50 - 12:10	EuMC25-4 Miniaturized Folded Ridged Half-Mode Substrate Integrated Waveguide Transmission Lines Thomas Jones, Mojgan Daneshmand, University of Alberta	EuMC26-4 Satimo SG64 Anaechoic Chamber Performance in Microwave Frequencies Guillermo Rafael-Valdivia, Marcos Daza-Guardamino, Manuel Tapia-Sota, Universidad Catolica San Pablo	EuMC/EuRAD02-4 An M-Sequence-Based Baseband Network Analyzer Using a Combination of Hardware and Software Correlator Gordon Notzon, Lukas Polzin, Robert Storch, Thomas Musch, Michael Vogt, Ruhr-Universität Bochum	EuMC27-4 Design of a TE10-to-TE61 Mode Coupler for a 372 GHz Gyrotron Travelling Wave Amplifier Liang Zhang, Jason Garner, Craig Donaldson, Wenlong He, Alan Phelps, Adrian Cross, University of Strathclyde
12:10 - 12:30	EuMC25-5 Non-Reciprocal Mode Converting Substrate Integrated Waveguide Amir Afshani, Ke Wu, Ecole Polytechnique de Montreal	EuMC26-5 Extraction of the High Frequency Small Signal Electrical Equivalent Circuit of High Voltage CMOS FET (HVMOS) J. Loo-Yau ^{1,2,3} , ¹ Cinvestar-GDL, ² CICESE, ³ UAG	EuMC/EuRAD02-5 A Modular Multiport Vector Network Analyser for Electromagnetic Tomography Applications Markus Freilinger ¹ , Sebastian Poltschak ¹ , Reinhard Feger ¹ , Andreas Stelzer ¹ , Abouzar Hamidipour ² , Markus Hopper ² , Ramon Planas ³ , Serguei Semenov ² , Tommy Henriksson ² , ¹ Johannes Kepler University Linz, ² EMTensor GmbH	EuMC27-5 Equivalent Circuit Modelling of Travelling Wave Accelerating Structures and Its Applications Nasrin Nasr Esfahani, Patrick Kramer, Christine Vollinger, CERN

WEDNESDAY



Hongkong

Kiew

Riga

Prag

EuMC/EuRAD03

Focused Session: Conformal Antennas and Arrays

Chair: Peter Knott, Fraunhofer FHR
Co-Chair: Loic Bernard, French-German Research Institute of Saint-Louis (ISL)

EuMC28

Amplifiers and Receivers

Chair: Teresa M. Martín-Guerrero, Universidad de Málaga, Andalucía Tech
Co-Chair: Ichihiko Toyoda, Saga University

EuMC29

Metasurfaces and Frequency-Selective Surfaces

Chair: Francisco Medina, Universidad de Sevilla
Co-Chair: Andrei Lavrinenko, Technical University of Denmark

EuMC30

Sub-THz Components and Electro-Optical Systems

Chair: Tom Keinicke Johansen, Technical University of Denmark
Co-Chair: Jyri Putkonen, Nokia Bell Labs

EuMC/EuRAD03-1 An Algorithm for Calculating Green's Functions of Curved Multilayer Metasurface Structures

Zvonimir Sipus, Marko Bosiljevac, University of Zagreb

EuMC28-1 Design of High Efficiency Doherty Power Amplifier Applying Power Controlling Technology with 15 dB Output Power Back-Off

Tian Qi, SongBai He, University of Electronic Science and Technology of China

EuMC29-1 Spatial Filtering Frequency Selective Surface for Wide-Angle Scanning Phased Arrays

Cristina Yepes¹, Daniele Cavallo¹, Andrea Neto¹, Erio Gandini², Stefania Monni², Frank van Vliet², ¹Delft University of Technology, ²TNO Defense, Safety and Security

EuMC30-1 A 230-300 GHz Low-Loss Micromachined Waveguide Hybrid Coupler

Jan Svedin¹, Robert Malmqvist¹, Joachim Oberhammer², Bernhard Beuerle², Umer Shah², ¹FOI, ²KTH Royal Institute of Technology

13:50 - 14:10

EuMC/EuRAD03-2 Design and Manufacturing of Conformal Antenna Array on a Conical Surface at 5.2 GHz

Vincent Jaeck¹, Loic Bernard¹, Kouroch Mahdjoubi², Ronan Sauleau², Sylvain Collardey², Philippe Pouliguen², Patrick Potier², ¹ISL, ²IETR, ³DGA

EuMC28-2 On the Measurement of Pulse Recovery Times in Gallium Nitride Low Noise Amplifiers

Nicholas Novaris, Paul Blount, Charles Trantanello, Custom MMIC

EuMC29-2 Triple-Band Circularly Polarized Antenna on a Two-Layered High Impedance Surface With Two In-Phase Reflection Bands

D.S. Chandu, Rusan Barik, S.S. Karthikeyan, Indian Institute of Information Technology Design & Manufacturing Kancheepuram

EuMC30-2 Coplanar Transitions Based on Aluminum Nitride Interposer Substrate for Terabit Transceivers

Yunfeng Dong, Tom Keinicke Johansen, Vitaliy Zhurbenko, Peter Jesper Hanberg, Technical University of Denmark

14:10 - 14:30

EuMC/EuRAD03-3 A Conformal Multi-Frequency Antenna Array for Safety-of-Life Satellite Navigation

Kazeem Yinusa, Lukasz Greda, Achim Dreher, German Aerospace Center (DLR)

EuMC28-3 Low Power UWB CMOS LNA Using Resistive Feedback and Current-Reused Techniques under Forward Body Bias

Jyh-Chyurn Guo, Ching-Shiang Lin, National Chiao Tung University

EuMC29-3 Design of Compact Multiband Frequency Selective Surfaces with Meandered Elements

Simone Genovesi¹, Filippo Costa², Agostino Monorchio², ¹University of Pisa, ²CNIT - University of Pisa

EuMC30-3 Modulation Characteristics of a Laser-Diode Hybrid Integrated into a Ceramic Multilayer Module for Radio-over-Fiber Applications

Summy Mathew, Tilo Welker, Nam Gutzeit, Steffen Spira, Ralf Stephan, Jens Müller, Matthias Hein, TU Ilmenau

14:30 - 14:50

EuMC/EuRAD03-4 Sequentially Shifted Beamforming from a Conformed Conical Array

Sumit Karki, J. Ignacio Echeveste, Thomas Pairon, Christophe Craeye, Université catholique de Louvain

EuMC28-4 Investigation of a Conformal Amplifier Embedded in an Aerospace Composite Structure

Thomas Baum¹, Kamran Ghorbani¹, Richard Ziolkowski², Kelvin Nicholson³, ¹RMIT University, ²University of Technology Sydney, ³Defence Science and Technology Group

EuMC29-4 Design of an Ultra-Thin Antenna With Low RCS Based on Phase Gradient Metasurface

Bo Li¹, Qi Chen¹, Chun Yang¹, Xiaobo Liu², Anxue Zhang², ¹China Academy of Engineering Physics, ²Xi'an Jiaotong University

EuMC30-4 Millimeter-Wave Electro-Optic Modulator

Hiroshi Murata¹, Hironori Aya¹, Toshiyuki Inoue¹, Atsushi Sanada¹, Yusuf Nur Wijayanto^{2,3}, Atsushi Kanno³, Tetsuya Kawanishi^{3,4}, ¹Osaka University, ²Indonesian Institute of Sciences, ³National Institute of Information and Communications Technology, ⁴Waseda University

14:50 - 15:10

EuMC/EuRAD03-5 Flexible UHF/VHF Vivaldi Antenna for Broadband and Gas Balloon Applications

Jean Marie Floch, Anthony Presse, Anne Claude Tarot, IETR

EuMC28-5 Wideband IF Signal Processor for Microwave Spectroscopy in Radio Astronomy

Maria Patino Esteban, Jose Antonio Lopez Perez, Pablo Garcia Carreño, Sonia Garcia-Alvaro, Jose Antonio Lopez Fernandez, Instituto Geografico Nacional

EuMC29-5 Symmetry Approach to the Dark Modes and Electromagnetically Induced Transparency Engineering

Anatole Lupu, Centre de Nanosciences et de Nanotechnologies

15:10 - 15:30

WEDNESDAY

WEDNESDAY



	Istanbul	Kopenhagen	Seoul	Singapur
	EuMC31 Novel Synthesis and Design Techniques for Microwave Filters Chair: Giuseppe Macchiarella, Politecnico di Milano Co-Chair: Luciano Accattino, AC Consult	EuRAD02 Synthetic Aperture Radar Chair: Pierfrancesco Lombardo, Sapienza University of Rome Co-Chair: Risto Vehmas, Tampere University of Technology	EuMC32 Advances in Measurements Chair: Thomas Musch, Ruhr-Universität Bochum Co-Chair: Andreas Wentzel, FBH-Berlin	EuMC33 Focused Session: Microwave Vacuum Electronics Chair: John Jelonnek, Karlsruhe Institute of Technology Co-Chair: Wenlong He, The University of Strathclyde
13:50 - 14:10	EuMC31-1 Accurate Design of Corrugated Waveguide Low-Pass Filters Using Exclusively Closed-Form Expressions Fernando Teberio, Israel Arnedo, Jon Mikel Percas, Ivan Arregui, Txema Lopetegui, Miguel A. G. Laso, Public University of Navarre	EuRAD02-1 SAR Processing Without a Motion Measurement System Jan Torgrimsson ¹ , Patrik Dammert ² , Hans Hellsten ² , Lars Ulander ¹ , ¹ Chalmers University of Technology, ² SAAB Electronic Defence Systems	EuMC32-1 Industrial Session Keynote Advanced Methods for Network and Spectrum Measurements in mm-Wave and THz Bands Joel Dunsmore, Keysight Technologies	EuMC33-1 Advances in Spatial-Harmonic Magnetrons with Cold Secondary-Emission Cathode Dmytro Vavriv ¹ , Vasyliy Naumenko ¹ , Klaus Schünemann ² , Vladymyr Markov ¹ , Aleksandr Syvorov ¹ , ¹ Institute of Radio Astronomy of National Academy of Sciences of Ukraine, ² Hamburg University of Technology
14:10 - 14:30	EuMC31-2 Realisation of Filters with Improved Selectivity Using Lumped and Quasi-Lumped Terminating Half Sections Sandra Marin ¹ , Jorge Daniel Martinez ¹ , Vicente Enrique Boria Esbert ² , ¹ Universitat Politècnica de Valencia, ² Universitat Politècnica de Valencia	EuRAD02-2 Analysis of Geometrical Approximations in Signal Reconstruction Methods for Multistatic Large Along-Track Baseline SAR Constellations Nida Sakar, German Aerospace Center (DLR)	EuMC32-2 Novel Experimental Determination of Differential Amplifier Noise Parameters Luciano Boglione, U.S. Naval Research Laboratory	EuMC33-2 Novel Spatial-Harmonic Magnetrons and Their Potential Applications Nasrin Nasr Esfahani, CERN
14:30 - 14:50	EuMC31-3 Synthesis of Ladder-Type Acoustic Filters in the Band-Pass Domain Iuliia Evdokimova, Jordi Verdú, Pedro de Paco, UAB	EuRAD02-3 An Analysis of Ship Azimuth Smearing in Spaceborne SAR Imagery Shen Chiu, Defence R&D Canada - Ottawa	EuMC32-3 Considerations on Accurate Characterization of Differential Devices Using Baluns Vadim Issakov ¹ , Badou Sene ¹ , Erick Aguilar ² , Andreas Werthof ¹ , Snezana Jenei ¹ , Robert Weigel ² , ¹ Infineon Technologies AG, ² Friedrich-Alexander Universität Erlangen-Nürnberg	EuMC33-3 Measurement of a Broadband High Power Gyro-TWA Operating in W-Band Frequency Wenlong He, University of Strathclyde
14:50 - 15:10	EuMC31-4 Efficient Implementation of the Aggressive Space Mapping Technique for Microwave Filter Design Javier Ossorio García, José Joaquín Vague Cardona, Vicente Enrique Boria Esbert, Marco Guglielmi, Polytechnic University of Valencia	EuRAD02-4 Improving the Estimation Accuracy and Computational Efficiency of ISAR Range Alignment Risto Vehmas, Juha Jylhä, Tampere University of Technology	EuMC32-4 Pulsed RF Characterization of Envelope Tracking Systems for Improved Shaping Function Extraction Sophie Paul ¹ , Nikolai Wolff ¹ , Christophe Delepaut ² , Václav Valenta ² , Wolfgang Heinrich ¹ , Olof Bengtsson ¹ , ¹ Ferdinand-Braun-Institut, Leibniz-Institut fuer Hoechstfrequenztechnik, ² ESA ESTEC	EuMC33-4 Passive Mode-Locking and Generation of Ultrashort Pulses in Electron Oscillators with Saturable Absorber in the Feedback Loop Naum Ginzburg ¹ , Grigory Denisov ¹ , Michail Vilkov ¹ , Irina Zotova ¹ , Alexander Sergeev ¹ , Sergey Samsonov ¹ , Sergey Mishakin ¹ , John Jelonnek ² , Alexander Marek ² , ¹ Institute of Applied Physics, RAS, ² Karlsruhe Institute of Technology
15:10 - 15:30	EuMC31-5 Lossy Multiband Filters and Ghost Passbands Riana Geschke, University of Cape Town	EuRAD02-5 Investigating Shadow Radiation of 3-Dimensional Radar Targets in the Near Field Davide Comite, Marta Tecla Falconi, Pierfrancesco Lombardo, Frank Silvio Marzano, Alessandro Galli, Sapienza University of Rome	EuMC32-5 Benchmarking of RF Measurement Systems for Digital Predistortion Using Iterative Learning Control Nikolai Wolff, Wolfgang Heinrich, Olof Bengtsson, Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik	EuMC33-5 Real-Time, Remote Detection of Radioactive Material Using a High Power Millimeter/THz Wave Vacuum Device EunMi Choi, Ulsan National Institute of Science and Technology (UNIST)

EuMC34 | EuMC Interactive Session 2

Chair: Benjamin Nuss, Karlsruhe Institute of Technology (KIT)
Co-Chair: Ilona Rolfes, Ruhr-University Bochum

14:30 - 16:10

The ePosters are on display from 14:30 - 16:10

The authors are present for discussion from 14:30 - 16:10

Exhibition Hall	Exhibition Hall	Exhibition Hall	Exhibition Hall
<p>EuMC34-1 <i>Slow-Wave Substrate Integrated Waveguide with Partially Polyline Loading</i> Yuliang Zhou¹, Haiyan Jin¹, Yong Mao Huang¹, Hailu Jin²,¹University of Electronic Science and Technology of China,²Chengdu Research Institute of UESTC</p>	<p>EuMC34-6 <i>How Tough are the Front-End Requirements for 4G-and-Beyond Handsets?</i> Sander Bronckers, Anne Roc'h, Bart Smolders, Eindhoven University of Technology</p>	<p>EuMC34-10 <i>MIMO Backscatter Channel and Data Transmission Measurements</i> Eckhard Denicke, Henning Hartmann, Bernd Geck, Dirk Manteuffel, Leibniz Universität Hannover</p>	<p>EuMC34-14 <i>A New Self-Calibration Technique for Microwave Multiport Measurements</i> Marc Zimmermanns, Ilona Rolfes, Ruhr-Universität Bochum</p>
<p>EuMC34-2 <i>Integrated Micromachined Waveguide Absorbers at 220-325 GHz</i> Bernhard Beuerle, James Champion, Umer Shah, Joachim Oberhammer, KTH Royal Institute of Technology</p>	<p>EuMC34-7 <i>The Electromagnetic Fields of a 64 MHz Quadrature Driven Birdcage Coil in ASTM Phantom</i> Mikhail Kozlov^{1,2}, Leonardo Angelone³, Wolfgang Kainz²,¹Max Planck Institute for Human Cognitive and Brain Sciences,²MR:comp GmbH,³U.S. FDA</p>	<p>EuMC34-11 <i>The Influence of Time-Variant Propagation Effects Due to Rotating Wind Turbines</i> Frank Weinmann, Josef Worms, Peter Knott, Fraunhofer FHR</p>	<p>EuMC34-15 <i>Second-Order Error Correction of a Pre-Calibrated Vector Network Analyser for Wafer-Level Measurements</i> Aleksandr Savin, Tomsk State University of Control Systems and Radioelectronics (TUSUR)</p>
<p>EuMC34-3 <i>Path Loss Model in Amazonian Border Region for VHF and UHF Television Bands</i> German Castellanos, Guillermo Teuta, Escuela Colombiana de Ingeniería</p>	<p>EuMC34-8 <i>Numerical Feasibility Study of New Combined Hyperthermia System for Head and Neck Region</i> Ondrej Fiser, Ilija Merunka, Jan Vrba, Czech Technical University in Prague</p>	<p>EuMC34-12 <i>Optimal Delta-Sigma Modulation Based Noise Shaping for Truly Aliasing-Free Digital PWM</i> Omer Tanovic, Rui Ma, Mitsubishi Electric Research Laboratories</p>	<p>EuMC34-16 <i>Accurate Synchronization Method of 38 GHz 5G Channel Measurement System</i> Yi-Qi Lin, Wei-Chung Cheng, Tsung-Hsin Liu, Yu-Rong Chen, Wern-Ho Sheen, Zuo-Min Tsai, National Chung Cheng University</p>
<p>EuMC34-4 <i>Analysis of Absorption Mechanism in a Planar Radome Absorber</i> Sofian Hamid, Dirk Heberling, RWTH Aachen University</p>	<p>EuMC34-9 <i>Detection of Minimum Geometrical Variation by Free Space Based Chipless Approach and its Application to Authentication</i> Zeshan Ali¹, Nicolas Barbot¹, Romain Siragusa¹, David Hely¹, Etienne Perret¹, Maxime Bemier², Frédéric Garet²,¹Institut Polytechnique de Grenoble,²University of Savoie Mont Blanc,</p>	<p>EuMC34-13 <i>Extreme States and Anomalous Dispersion of Surface Waves in Composite Gyroelectromagnetic Materials</i> Iliia Fedorin¹, Volodymyr Fesenko², Vladimir Tuz^{2,3},¹National Technical University Kharkiv Polytechnical Institute,²Institute of Radio Astronomy of National Academy of Sciences of Ukraine,³International Center of Future Science, Jilin University</p>	<p>EuMC34-17 <i>Architecting a Multi-GHz Real-Time RF Streaming System</i> Neil Feiereisel, Shivansh Chaudhary, National Instruments</p>
<p>EuMC34-5 <i>Differential Waveguide Cuvette for Complex Permittivity Measurement of High Loss Liquids at Microwaves</i> Zoya Eremenko, . Ya. Usykov Institute for Radiophysics and Electronics National Academy of Sciences of Ukraine</p>			

WEDNESDAY

47TH EUROPEAN CONFERENCE MICROWAVE 2017



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	Hongkong	Kiew	Riga	Prag
	EuMC/EuRAD04 Beam Steering Antennas and Technologies Chair: Christian Person, IMT Atlantique Co-Chair: Georg Fischer, FAU Erlangen-Nuremberg	EuMC35 Advanced Oscillator Design Chair: Sébastien Chartier, HENSOLDT Co-Chair: Juan-Mari Collantes, UPV/EHU	EuMC36 Metamaterials, Periodic Structures, and Applications Chair: Jan Machac, Czech Technical University in Prague Co-Chair: Ferran Martín, Universitat Autònoma de Barcelona	EuMC37 Special Session: Microwave Research in Asia Pacific Chair: Kamran Ghorbani, Royal Melbourne Institute of Technology Co-Chair: Roberto Sorrentino, University of Perugia
16:10 - 16:30	EuMC/EuRAD04-1 76-81 GHz LTCC Antenna for an Automotive Miniature Radar Frontend Frank Sickinger ¹ , Ernst Weissbrodt ¹ , Martin Vossiek ² , Valeo Schalter und Sensoren GmbH, ² University of Erlangen-Nuremberg	EuMC35-1 A 52 to 67 GHz Dual-Core Push-Push VCO in 40 nm CMOS Vadim Issakov ¹ , Johannes Rimmelspacher ^{1,2} , Saverio Trotta ¹ , Marc Tiebout ¹ , Amelie Hagelauer ² , Robert Weige ¹ , Infineon Technologies AG, ² Friedrich-Alexander Universität Erlangen-Nürnberg	EuMC36-1 Accurate Circuit Model for a Planar Resonant Blazed Grating Carlos Molero ¹ , Raul Rodriguez-Berral ¹ , Francisco Medina ¹ , Francisco Mesa ¹ , Mohammad Memarian ² , Tatsuo Itoh ³ , ¹ Universidad de Sevilla, ² Sharif University of Technology, ³ University of California Los Angeles (UCLA)	EuMC37-1 Recent Research Activities on Microwave Filters, Amplifiers, and Wireless Power Transfer Systems Toshio Ishizaki, Ryukoku University
16:30 - 16:50	EuMC/EuRAD04-2 The Cost-Effective Integration of Radiating Elements into an X-Band Multipack Horst Bilzer, Christian Holtzhausen, Felix Thurow, Manuel Böck, Leigh Glasgow, Peter Rützel, Airbus DS Electronics and Border Security	EuMC35-2 Design of Low Phase Noise Feedback-Type Harmonic Oscillator Using SIW-CMSRR Diplexer Zhipeng Li, China Academy of Engineering Physics	EuMC36-2 A Metasurface Assisted Half-Mode Leaky Waveguide Cheng Tao ¹ , Mohammad Memarian ² , Tatsuo Itoh ³ , ¹ University of California Los Angeles (UCLA), ² Sharif University of Technology	EuMC37-2 Efficiency and Bandwidth Enhancement in Power Amplifiers for Wireless Communication Karun Rawat ¹ , Shiban Kouf ¹ , ¹ Indian Institute of Technology Roorkee, ² Indian Institute of Technology Delhi
16:50 - 17:10	EuMC/EuRAD04-3 X-Band Distributed Phase Shifter Based on Sol-Gel BCTZ Varactors Denis Mercier, CEA	EuMC35-3 Ku-Band Oscillator Using Integrated Defected Ground Structure Resonator in 0.18 um CMOS Technology Nusrat Jahan, Adel Barakat, Ramesh K. Pokharel, Kyushu University	EuMC36-3 High Miniaturization Potential of Slow-Wave Transmission Lines Based on Simultaneous Inductor and Capacitor Loading Jordi Selga, Paris Vélez, Jordi Bonache, Ferran Martín, Universitat Autònoma de Barcelona	EuMC37-3 Antenna Incorporate with Artificial Magnetic Conductor Mohamad Kamal A Rahim, Universiti Teknologi Malaysia
17:10 - 17:30	EuMC/EuRAD04-4 Monopulse RLSA Antenna at 24 GHz Based on a Gap-Waveguide Cavity Feed Manuel Sierra Castañer ¹ , Adrián Tamayo Domínguez ¹ , Mariano Barba Gea ¹ , Eva Rajo Iglesias ² , José Luis Vázquez Roy ² , ¹ Universidad Politécnica de Madrid, ² Universidad Carlos III de Madrid	EuMC35-4 An Improved Ultra-Low-Phase Noise Tunable YIG Oscillator Operating in the 6 - 12 GHz Range Wadim Stein ¹ , Florian Huber ¹ , Saygin Bildik ² , Michael Aigle ¹ , Martin Vossiek ¹ , ¹ Institute of Microwaves and Photonics, University of Erlangen and Nuremberg, Erlangen, ² Rohde und Schwarz GmbH, Munich	EuMC36-4 3D Printed Luneburg Lens for Flexible Beam Steering at Millimeter Wave Frequencies Anke Kubach, Alex Shoykhetbrod, Reinhold Herschel, Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR	
17:30 - 17:50	EuMC/EuRAD04-5 Frequency Beam Steering Antenna for Millimeter Wave Checkpoint Scanners Mohammad Alibakhshikenani ¹ , Ernesto Limiti ¹ , Bal S. Virdee ² , Lotfollah Shafai ³ , ¹ University of Rome Tor Vergata, ² London Metropolitan University, ³ University of Manitoba	EuMC35-5 Phase-Sensitivity Analysis of Injection-Locked Mutually Coupled Oscillators Mabel Ponton, Silvia Hernández, Almudena Suarez, University of Cantabria	EuMC36-5 A Dual-Band Frequency Selective Surface Using Four Arms Star Geometry Associated to Trapezoidal Rings for WiFi Applications Alfredo Gomes Neto ¹ , Jefferson Costa e Silva ¹ , João Batista de Oliveira Silva ¹ , Custódio Peixeiro ² , ¹ Federal Institute of Paraíba, IFPB, ² University of Lisboa	

WEDNESDAY



Istanbul

Kopenhagen

Seoul

Singapur

EuMC38

Substrate-Integrated Waveguide Filters and Diplexers

Chair: Dmitry Kholodnyak, St. Petersburg Electrotechnical University "LETI"
Co-Chair: Quendo Cédric, Lab-STICC UBO, MOM Group

EuRAD03

Radar Remote Sensing

Chair: Laurent Ferro-Famil, University of Rennes 1
Co-Chair: Felix Yanovsky, National Aviation University

EuMC39

On-Wafer Device Characterisation

Chair: Andreas Stelzer, Johannes Kepler University Linz
Co-Chair: Lutfi Albasha, American University of Sharjah

EuMC40

High-Power Microwave and mm-Wave Sources

Chair: Dmytro Vavriv, Institute of Radio Astronomy of National Academy of Sciences of Ukraine
Co-Chair: John Jelonnek, Karlsruhe Institute of Technology

EuMC38-1

A Novel Class of Half-Mode SIW Filters with Extracted Poles

Giuseppe Macchiarella¹, Cristiano Tomassoni², Enrico Massoni³, Maurizio Bozzi³, Luca Perregrini³,
¹Politecnico di Milano, ²University of Perugia, ³University of Pavia

EuRAD03-1

Operational Approach for Doppler-Polarimetric Estimating Intensity of Turbulence in Rain

Felix Yanovsky, Anna Rudiakova, Yuliya Averyanova, National Aviation University

EuMC39-1

Experimental Investigation of the Lateral Resolution of a Homemade Near Field Microwave Microscope

Tianjun Lin, Sijia Gu, Tuami Lasri, Université des Sciences et Technologies de Lille 1

EuMC40-1

Industrial Session Keynote Vacuum Versus Solid State RF Sources: Complementarity Better Than Competition

Philippe Thouvenin, Thales Electron Devices

16:10 - 16:30

EuMC38-2

Realization of Single-Layer Ka-Band Dual-Mode Substrate Integrated Waveguide Filters and Diplexer Using a Circular Cavities With Via Perturbation

Weichen Huang, Research Dept., Huawei Technologies Corporation, Shanghai, China

EuRAD03-2

Analysis of Rain Clutter Detections in Commercial 77 GHz Automotive Radar

Rossiza Gourava, Oleg Krasnov, Alexander Yarovoy, Delft University of Technology

EuMC39-2

Nano-Probing Station Incorporating MEMS Probes for 1D Device RF On-Wafer Characterization

Kamel Haddadi, Khadim Daffe, Marzouk Jaouad, Abdelhatif El Fellahi, Tao Xu, Steve Arscott, Gilles Dambrine, Institute of Electronics, Microelectronics and Nanotechnology

EuMC40-2

Analog Predistortion for High Power Amplifier Over the Ku-Band (13.75-14.5 GHz)

Clement Mallet¹, Claude Duvaud², Laurent Carre³, Smail Bachir², ¹ACTIA Telecom / XLIM Lab, ²XLIM Lab, ³ACTIA Telecom

16:30 - 16:50

EuMC38-3

A Dual-Mode Quasi-Elliptic Filter in Air-Filled Substrate Integrated Waveguide Technology

Cristiano Tomassoni¹, Lorenzo Silvestri², Maurizio Bozzi², Luca Perregrini², Anthony Ghiotto³,
¹University of Perugia, ²University of Pavia, ³University of Bordeaux

EuRAD03-3

Comparison of Tropical Forest Above Ground Biomass Estimation Techniques Based on Polarimetric and Tomographic SAR Data Acquired at P-Band

Bassam El Hajj Chehade, University of Rennes 1

EuMC39-3

Impact of Parasitic Coupling on Multiline TRL Calibration

Gia Ngoc Phung¹, Franz Josef Schmückle¹, Ralf Doerner¹, Thomas Fritzsche², Wolfgang Heinrich¹,
¹Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, ²Fraunhofer Institut für Zuverlässigkeit und Mikrointegration (IZM)

EuMC40-3

Comparative Study of Envelope Models for Multi-Tone Simulation of Traveling-Wave Tubes

Djamschid Safi¹, Philip Birtel², Sascha Meyne¹, Arne F. Jacob¹, ¹Hamburg University of Technology, ²Thales Electronic Systems GmbH

16:50 - 17:10

EuMC38-4

An E-Band Hybrid-Coupled Diplexer Built of Silica-Based Post-Wall Waveguide

Yusuke Uemichi¹, Osamu Nukaga¹, Kei Nakamura¹, Xu Han¹, Yuta Hasegawa¹, Ryouhei Hosono¹, Shuhei Amakawa², Kiyoshi Kobayashi¹, Ning Guan¹, ¹Fujikura Ltd., ²Hiroshima University

EuRAD03-4

Simulation of EM Wave Using Buffer-Layered Antenna and Orthogonal MIMO Scheme for Groundwater Detection

Fazilla Farihas, Idrin Pasya, Mohd Tarmizi Ali,
¹Universiti Teknologi MARA

EuMC39-4

Dispersion Behavior of the Apparent Permittivity for Quasi-TEM Transmission Lines up to 110 GHz

Oliver Huber, Gottfried Magerl, Holger Arthaber, TU Wien

EuMC40-4

The Upgrade of the Intermediate Power Amplifier of the TRIUMF 520 MeV Cyclotron's RF System

Nikolai Avreline, TRIUMF

17:10 - 17:30

EuMC38-5

Implementation of Negative Coupling in Gap-Waveguide Filters

Masoud Arezoomand, Abbas Pirhadi, Shokrollah Karimian, Shahid Beheshti University

EuRAD03-5

A Simulation Concept Based on the FDFD Method for Ground Penetrating Radar Used in Humanitarian Demining

Jochen Jebramcik, Jan Barowski, Dennis Pohle, Christoph Baer, Ilona Rolles, Ruhr-University Bochum

EuMC39-5

Microwave and Millimeter-Wave Characterization of Conductive Ink Film in Rectangular Waveguide

Xuchen Wang, Ana Diaz-Rubio, Sergei Tretyakov, Aalto University

EuMC40-5

KIT Coaxial Gyrotron Development: From ITER towards DEMO

Sebastian Ruess, Konstantinos Avramidis, Maximilian Fuchs, Gerd Gartenbein, Stefan Illy, Parth Kalaria, Thorsten Kobarg, Ioannis Pagonakis, Tomasz Rzesnicki, Manfred Thumm, Jörg Weggen, John Jelonnek, Karlsruhe Institute of Technology

17:30 - 17:50

WEDNESDAY

THURSDAY

47TH EUROPEAN MICROWAVE CONFERENCE 2017



Hongkong

EuMC/EuRAD05

Advanced Radar Technologies and Systems

Chair: Volker Ziegler, Airbus Group Innovations
Co-Chair: Philippe Eudeline, Thales Air Systems SAS

47TH EUROPEAN MICROWAVE CONFERENCE 2017



Kiew

EuMC/EuRAD06

Polarisation Diversity and Measurements

Chair: Dietmar Kissinger, TU Berlin
Co-Chair: Alexander Koelpin, BTU Cottbus - Senftenberg

47TH EUROPEAN MICROWAVE CONFERENCE 2017

Riga

EuMC41

Medical Microwave Applications

Chair: Andreas Stelzer, Johannes Kepler University Linz
Co-Chair: André Vander Vorst, European Microwave Association



St. Petersburg

EuRAD04

Automotive Radar 1

Chair: Marina Gashinova, University of Birmingham
Co-Chair: Piotr Samczynski, Warsaw University of Technology

08:30 - 08:50

EuMC/EuRAD05-1 MIMO Versus Conventional Radar Performance Against Jammers

Eli Brookner, Raytheon Retired

EuMC/EuRAD06-1 Improvement of Dynamic Range for Arbitrary Radar Systems Using Antenna Polarization Modulation

Daniel Schindler, Robert Bosch GmbH

EuMC41-1 High Precision Realtime RF-Measurement System for Imaging of Stroke

Sebastian Poltschak¹, Markus Freilinger¹, Reinhard Feger¹, Andreas Stelzer¹, Abouzar Hamidipour², Tommy Henriksson², Markus Hopfer², Ramon Planas², Serguei Semenov², ¹Johannes Kepler University Linz, ²EMTensor GmbH

EuRAD04-1 Performance Analysis of 79 GHz Polarimetric Radar Sensors for Autonomous Driving

Stefan Trummer¹, Gerhard Hamberger², Richard Koerber¹, Uwe Siart², Thomas F. Eibert², ¹Astyx, ²Technische Universität München

08:50 - 09:10

EuMC/EuRAD05-2 A 36-40 GHz Full 360° Ultra-Low Phase Error Passive Phase Shifter with a Novel Phase Compensation Technique

Cheng-Yu Chen¹, Yun-Shan Wang¹, Yu-Hsuan Lin¹, Yuan-Hong Hsiao², Yi-Ching Wu¹, Huei Wang¹, ¹National Taiwan University, ²Taiwan Semiconductor

EuMC/EuRAD06-2 Performance Characterization of a Polarisation Agile Wideband AESA

Christoph Fischer, Sönke Appel, William Gautier, Wilhelm Grüner, Airbus DS Electronics and Border Security

EuMC41-2 Clinical Use of a Waveguide Hyperthermia System for Superficial Tumors with Deep Infiltration

Petra Kok, Gerard van Stam, Jan Sijbrands, Akke Bakker, Willemijn Kolff, Geertjan van Tienhoven, Maarten Hulshof, Johannes Crezee, Academic Medical Center

EuRAD04-2 Analysis of Multipath and DOA Detection Using a Fully Polarimetric Automotive Radar

Tristan Visentin¹, Jürgen Hasch¹, Thomas Zwick², ¹Robert Bosch GmbH, ²Karlsruhe Institute of Technology (KIT)

09:10 - 09:30

EuMC/EuRAD05-3 X-Band Antenna Module for Advanced Navigational Phased Array Radar

Stefan Radziejewski, Nils Hansen, Jan-Phillip Mohncke, Arne F. Jacob, Technische Universität Hamburg-Harburg

EuMC/EuRAD06-3 Over 15-Gb/s MIMO Wireless Transmission Using Ultra Wideband Antennas in SHF Band

Noriaki Kaneda, Nokia Corp.

EuMC41-3 Non-Contact Radiative Temperature Measurement of an Object in a Closed Cavity

Dawei Xu^{1,2}, ¹Hochschule Ruhr West, ²University of Duisburg-Essen

EuRAD04-3 Polarimetric RCS Analysis of Traffic Objects

Hasan Iqbal, Frank Bögelsack, Christian Waldschmidt, Ulm University

09:30 - 09:50

EuMC/EuRAD05-4 SiGe BiCMOS X-Band Transceiver-Chip for Phased-Array Systems

Peter Lohmiller, Rolf Reber, Patrick Schuh, Martin Oppermann, Sébastien Chartier, HENSOLDT

EuMC/EuRAD06-4 A Double-Arch Positioner for Bistatic RCS Measurements with Four Degrees of Freedom

Matthias Röding¹, Gerd Sommerkorn¹, Stephan Häfner¹, Alexander Ihlow¹, Snezhana Jovanoska², Reiner Thomä¹, ¹Ilmenau University of Technology, ²Fraunhofer Institute for Communication, Information Processing and Ergonomics

EuMC41-4 Hyperthermia of Deep Seated Pelvic Tumors with a Phased Array of Eight Versus Four 70 MHz Waveguides

Hans Crezee, Gerard van Stam, Jan Sijbrands, Sabine Oldenburg, E. Debby Geijzen, Maarten Hulshof, Petra Kok, Academic Medical Center

EuRAD04-4 Polarimetric RCS Measurements of Selected Two-Wheeled Vehicles for Automotive Radar

Tristan Visentin¹, Jürgen Hasch¹, Thomas Zwick², ¹Robert Bosch GmbH, ²Karlsruhe Institute of Technology (KIT)

09:50 - 10:10

EuMC/EuRAD05-5 Ultra-high Resolution Airborne Experiments with a New Ka-Band SAR Sensor

Gabriel El-Arnauti, Olaf Saalman, Andreas R. Brenner, Fraunhofer FHR

EuMC41-5 Microwave Tomography Assisted by Radar Imaging

Yoshihiko Kuwahara, Yuki Ono, Shizuoka University

EuRAD04-5 Radar Reflectivity and Motion Characteristics of Pedestrians at 300 GHz

Emidio Marchetti¹, Rui Du^{1,2}, Fatemeh Norouzian¹, Edward Hoare¹, Thuy-Yung Tran³, Mikhail Cherniakov¹, Marina Gashinova¹, ¹University of Birmingham, ²Northwestern Polytechnical University, ³Jaguar Land Rover



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BERTOLD-BRECHT-STRASSE 2 90471

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- 8 minutes on U1 or U11 to Messe

Rooms from

Prepay €100.00 RO

Flexible €110.00 RO

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NH Hotel Nuremberg City - ★★★★★

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Pillenreuther Str. 1 90459

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Prepay €142.00 B&B

Flexible €149.00 RO

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- 8 minutes on U1 or U11 to Messe

Rooms from

Prepay €71.00 RO

Flexible €79.00 RO

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- Short walk to Hauptbahnhof Central Station
- 8 minutes on U1 or U11 to Messe
-

Rooms from

Flexible €84.00 RO

Notes: **Prepay** = Room rate will be charged at the time of booking, to the credit card used to guarantee the reservation, after this the room is non-refundable.

Flexible = Room can be cancelled or amended up until a few days before arrival, individual policy will be stated on the booking confirmation

RO = Room rate does not include breakfast but breakfast is available at the hotel.

B&B = Room rate includes breakfast.

All rates quoted include VAT at the current rate.

Prag	Istanbul	Oslo	Kopenhagen	
<p>EuMC42 Numerical Modelling of Guided-Wave Structures Chair: Maurizio Bozzi, University of Pavia Co-Chair: Peter Zwamborn, TNO Defense, Safety and Security</p>	<p>EuMC43 Advanced Dielectric Resonator Filters Chair: Richard Snyder, RS Microwave Co-Chair: Ian Hunter, University of Leeds</p>	<p>EuMC44 Dielectric Material Characterisation Chair: Thomas Zwick, Karlsruhe Institute of Technology (KIT) Co-Chair: Ke Wu, Ecole Polytechnique de Montreal</p>	<p>EuRAD05 Localisation and Tracking Chair: Manuel Rosa-Zurera, University of Alcalá Co-Chair: Willem A. Hol, Thales Nederland B.V.</p>	
<p>EuMC42-1 Extension of the BI-RME Method to the Analysis of Piecewise-Homogeneous Waveguide Components Including Arbitrarily Shaped Building Blocks Simone Battistutta, Maurizio Bozzi, Marco Bressan, Luca Perregini, University of Pavia</p>	<p>EuMC43-1 Design of a Novel Type of Narrow Band BPFs using High-Q M-PhC Resonators Chun-Ping Chen, Shun Kikawa, Daisuke Tetsuda, Tetsuo Anada, Shigeki Takeda, Kangawa University</p>	<p>EuMC44-1 Complex Permittivity Measurements of Curing Epoxy Resin in Glass Fibre Reinforced Composite Jannis Groh, Melanie Lipka, Jan Schür, Martin Vossiek, Institute of Microwaves and Photonics, Friedrich-Alexander-Universität Erlangen-Nürnberg</p>	<p>EuRAD05-1 Indoor Tracking of Multiple Persons with a 77 GHz MIMO FMCW Radar Nicolas Knudde¹, Baptist Vandersmissen¹, Karthick Parashar², Ivo Couckuyt¹, Azarakhsh Jalalvand¹, André Bourdoux², Wesley De Neve¹, Tom Dhaene¹, ¹Ghent University, ²IMEC</p>	08:30 - 08:50
<p>EuMC42-2 Eigenvalues Approach for the Analysis of Plasmon Propagation on a Graphene Layer Luca Pierantoni, Tullio Rozzi, Davide Mencarelli, Matteo Stocchi, Università Politecnica delle Marche</p>	<p>EuMC43-2 Dual-Mode Dual-Band Conductor-Loaded Dielectric Resonator Filters Mustafa S. Bakr^{1,2,3}, Saad W. O. Luhaib^{2,4}, Ian Hunter², Wolfgang Bösch¹, ¹Graz University of Technology, ²University of Leeds, ³University of Technology, ⁴University of Mosul</p>	<p>EuMC44-2 Monitoring Changes in Microwave Absorption of Ti64 Powder During Microwave Sintering Samuel Hefford, Nyle Parker, Jonathan Lees, Adrian Porch, Cardiff University</p>	<p>EuRAD05-2 Monopulse Technique with Vertigo Array Rainer Maria Rossi, Luca Piattella, Ivan Russo, Elettronica SpA</p>	08:50 - 09:10
<p>EuMC42-3 Transient Electromagnetic-Thermal Simulation of Debye Media Using Alternating-Direction-Implicit Method Liang Chen, Min Tang, Qiangqiang Feng, Jun-Fa Mao, Shanghai Jiao Tong University</p>	<p>EuMC43-3 Pseudo-Elliptic Inline DR Filters Using Nonresonating Modes Payman Rezaee, Michael Höft, University of Kiel</p>	<p>EuMC44-3 Industrial Scale Microwave Applicator for High Temperature Alkaline Hydrolysis of PET Vasileios Ramopoulos, Karlsruhe Institute of Technology (KIT)</p>	<p>EuRAD05-3 Recursive Cramer-Rao Bounds of Doppler-Based Localisation in Short-Range Radar Thomas Mittermaier, Uwe Siart, Thomas F. Eibert, Technical University of Munich</p>	09:10 - 09:30
<p>EuMC42-4 A Mode for Predicting Passive Intermodulation Distortion in Microstrip Lines Yun He¹, Qi Wang¹, Wanzhao Cui¹, Chunliang Liu², ¹National Key Laboratory of Science and Technology on Space Microwave, China Academy of Space Technology (Xi'an), ²School of Electronics and Information Engineering,</p>	<p>EuMC43-4 Tunable Quad-Mode Dielectric Resonator Filter Christian Orlob, Spinner GmbH</p>	<p>EuMC44-4 Ellipsometry Based on Millimeter Wave Radar Measurements Jan Barowski, Ilona Rolfes, Ruhr-Universität Bochum</p>	<p>EuRAD05-4 Super-Resolution Algorithm for Joint Range-Azimuth-Doppler Estimation in Automotive Radars Yalın Gürçan, Delft University of Technology</p>	09:30 - 09:50
<p>EuMC42-5 Electromagnetic Field Simulation of MMICs Including RF Probe Tips Daniel Mueller¹, Jochen Schäfer¹, Daniel Geenen¹, Hermann Massler², Axel Tessmann², Arnulf Leuther², Thomas Zwick¹, Ingmar Kallfass³, ¹Karlsruhe Institute of Technology (KIT), ²Fraunhofer Institute for Applied Solid State Physics (IAF), ³University of Stuttgart</p>	<p>EuMC43-5 Micro-Additive Fabrication of 38 GHz Resonators and Filters Francois David¹, Claire Dalmay¹, Matthieu Chatras¹, Ludovic Carpentier², Luc Lapierre², Pierre Blondy¹, ¹XLIM Research Institute, University of Limoges, Limoges, France, ²CNES</p>	<p>EuMC44-5 Micromachined Cavity Resonator Sensors for On Chip Material Characterisation in the 220-330 GHz band Dragos Dancila¹, Bernhard Beuerle², Umer Shah², Anders Rydberg¹, Joachim Oberhammer², ¹Uppsala University, ²KTH Royal Institute of Technology</p>	<p>EuRAD05-5 Suppression of False Targets from Active Defense Radar Sensors Petr Ourednik, Premysl Hudec, Czech Technical University in Prague</p>	09:50 - 10:10

EuMC/EuRAD07 | EuMC/EuRAD Interactive Session

Chair: Jan Barowski, Ruhr-University Bochum

Co-Chair: Ilona Rolfes, Ruhr-University Bochum

10:00 - 11:40

The ePosters are on display from 10:00 - 11:40

The authors are present for discussion from 10:00 - 11:40



Exhibition Hall	Exhibition Hall	Exhibition Hall	Exhibition Hall
<p>EuMC/EuRAD07-1 Reflectarray with Split Ring Resonators at 83.5 GHz</p> <p>Jonathan Mayer, Jerzy Kowalewski, Marc Vieweger, Joerg Eisenbeis, Tobias Mahler, Thomas Zwick, Karlsruhe Institute of Technology (KIT)</p>	<p>EuMC/EuRAD07-6 High-Sensitivity HTS Multi-Channel Receiver Front-End for 900 MHz Band Mobile Base Station</p> <p>Tamio Kawaguchi, Hiroaki Ikeuchi, Hiroyuki Kayano, Yuichi Sawahara, Noritsugu Shiokawa, Toshiba Corporation</p>	<p>EuMC/EuRAD07-10 Modified 0.6-50 GHz Ultra-Wideband Double-Ridged Horn Antenna Design for Parameters Improvement</p> <p>Pavel Kuroptev, Vladimir Levvyakov, Alexey Fateev, Tomsk State University of Control Systems and Radioelectronics</p>	<p>EuMC/EuRAD07-14 Polarization Optimization of Compact Antenna Arrays for Direction of Arrival Estimation</p> <p>Mariana Pralon¹, Matthias Hein¹, Reiner Thomä¹, Leandro Pralon², Gabriel Beltrao², Bruno Pompeo², Giovanni DelGallo³, Markus Landmann², ¹Technische Universität Ilmenau, ²Brazilian Army Technological Center, ³Fraunhofer Institute for Integrated Circuits</p>
<p>EuMC/EuRAD07-2 Circularly Polarized Conical Dielectric Resonator Antenna for X-Band Applications: An Experimental Study</p> <p>Sounik Kiran Kumar Dash, Taimoor Khan, Mandovi Borthakur, National Institute of Technology Silchar, India</p>	<p>EuMC/EuRAD07-7 Orotron Intracavity Millimeter-Wave Spectroscopy of Weakly Bound Complexes Containing Molecular Hydrogen</p> <p>Leonid Surin, Institute of Spectroscopy of Russian Academy of Sciences</p>	<p>EuMC/EuRAD07-11 Design of a 2-Bit Unit-Cell for Electronically Reconfigurable Transmitarrays at Ka-Band</p> <p>Fatimata Tata Diaby, Antonio Clemente, CEA - LETI</p>	<p>EuMC/EuRAD07-15 Fast Direction Finding System with Four Dipole Antennas for IoT Applications</p> <p>Soo-Ji Lee¹, Dong-Jin Lee², Seung-Tae Khang³, Ghoo Kim³, Jong-Sang Yu³, Jong-Won Yu³, ¹Agency for Defense Development, Republic of Korea, ²Korea Institute of Nuclear Safety, ³Korea Advanced Institute of Science and Technology</p>
<p>EuMC/EuRAD07-3 Optimization of Broadband Smooth Wall Microwave Horn Antennas</p> <p>Burkhard Plaum, Universität Stuttgart</p>	<p>EuMC/EuRAD07-8 Circularly Polarized Duplex Antenna with High Port-to-Port Isolation</p> <p>Peisheng Zhang, Zeming Xie, Xianjing Lin, South China University of Technology</p>	<p>EuMC/EuRAD07-12 Probing Concept for an Antenna Array for 60 GHz Band</p> <p>Zunnurain Ahmad, Jan Hesselbarth, University of Stuttgart</p>	<p>EuMC/EuRAD07-16 Damper-to-Damper Path Loss Characterization for Intra-Vehicular Wireless Sensor Networks</p> <p>Carlos A. M. Costa Junior¹, Hao Gao¹, Thibault Le Polain², Rainier van Dommele¹, Bart Smolders¹, Miguel Dheans³, Peter Baltus¹, ¹Eindhoven University of Technology - TU/e, ²Tenneco</p>
<p>EuMC/EuRAD07-4 Printed Planar Double Inverted-F Antenna with Large Frequency Reconfigurability Range</p> <p>Jean Marie Floch, Ben Trad Imen, IETR</p>	<p>EuMC/EuRAD07-9 Novel TM₀ Surface Wave Launcher for Integrated Planar Leaky Wave Antennas</p> <p>Jochen Schäfer, Heiko Gulan, Benjamin Göttel, Thomas Zwick, Karlsruher Institut für Technologie</p>	<p>EuMC/EuRAD07-13 Microwave Receiving System for Antenna Measurement Using Optical Devices up to 40 GHz</p> <p>Satoru Kurokawa¹, Masanobu Hirose¹, Tsutomu Mitui², Shintaro Arata², ¹National Institute of Advanced Industrial Science and Technology, ²Koden Electronics Company</p>	<p>EuMC/EuRAD07-17 Convolutional Neural Network for Human Micro-Doppler Classification</p> <p>Yue Lang¹, Chunping Hou¹, Yang Yang¹, Danyang Huang¹, Yuan He², ¹Tianjin University, ²National University of Defense Technology</p>
<p>EuMC/EuRAD07-5 Multiport Model of Hertzian Dipoles Coupled in the Near-Field</p> <p>Johannes Russer¹, Michael Haider¹, Michel Ivrlac¹, Sidina Wane², Damienne Bajon², Peter Russer¹, Joseph Nosske¹, ¹Technische Universität München, ²NXP Semiconductors, ³ISAE</p>			

THURSDAY



Hongkong

EuMC/EuRAD08

Modelling and Synthesis of Array Antennas

Chair: Jochen Dederer, HENSOLDT
Co-Chair: Boris Levitas, Geozondas



Kiev

EuMC/EuRAD09

Radar Signal Sources

Chair: Nils Pohl, Ruhr University Bochum
Co-Chair: Marion Filleböck, HENSOLDT



Riga

EuMC45

Biomedical Sensing and Dielectric Characterisation

Chair: Bart Nauwelaers, KU Leuven University
Co-Chair: André Vander Vorst, European Microwave Association



St. Petersburg

EuRAD06

Automotive Radar 2

Chair: Albert Huizing, TNO
Co-Chair: Robert Palmer, Oklahoma University

EuMC/EuRAD08-1 Applying Antenna Synthesis Methods on a Path Based MIMO Channel Model for Verification

Tobias Mahler, Thibault Deletoille, Johannes Frey, Jerzy Kowalewski, Thomas Zwick, Karlsruhe Institute of Technology (KIT)

EuMC/EuRAD09-1 Modeling of Range Accuracy for a Radar System Driven by a Noisy Phase-Locked Loop

Frank Herzel¹, Herman Ng¹, Dietmar Kissinger^{1,2},
¹IHP, ²Technische Universität Berlin

EuMC45-1 Wearable Sensors Based on Modulated Frequency Selective Surfaces

Stefano Milici, Antonio Lázaro Guillén, Javier Lorenzo Galera, Ramón María Villarino, David Girbau Sala, Universitat Rovira i Virgili (URV)

EuRAD06-1 Industrial Session Keynote Multistatic Automotive Radar Networks with Software Enabled Phase Coherency

Peter Gulden¹, Michael Gottinger², Symeo GmbH,
²Friedrich-Alexander University Erlangen-Nürnberg

10:50 - 11:10

EuMC/EuRAD08-2 Pattern Recovery of a Beam-Tilting Phased Array Antenna on a Doubly Wedge-Deformed Surface

Giulia Mansutti¹, Francesco Rigobello¹, M. Saeed Khan^{1,2}, Antonio-Daniele Capobianco¹, ¹University of Padova, ²COMSATS Institute of IT

EuMC/EuRAD09-2 Optoelectronic Waveforms Generation: PCSS Characterization and Genetic Algorithm

Gwenaél Reineix, Xlim

EuMC45-2 Broadband Dielectric Spectroscopy Measurements of Liquids Combining Interdigital Capacitor and Coplanar Waveguide

Xiue Bao, Ilija Ocket, Juncheng Bao, Robert Puers, Bart Nauwelaers, KU Leuven University

EuRAD06-2 Automotive MIMO Radar Angle Estimation in the Presence of Multipath

Florian Engels, Continental AG

11:10 - 11:30

EuMC/EuRAD08-3 Effects of Finite Aperture and Random Phase Errors for a Space Debris Radar Antenna Array

Giuseppe Siciliano¹, Marco Pasion¹, Luca Perreggrini¹, Magdalena Mendijur², Piernario Besso², ¹University of Pavia, ²European Space Operations Center (ESOC)

EuMC/EuRAD09-3 A Software-Defined and Filter-Free 0-26.5 GHz Ultra-Wideband RF Transmitter Enabled by Photonics

Daniel Onori^{1,2}, Filippo Scotti², Francesco Laghezza², Antonella Bogoni^{1,2}, Paolo Ghelfi²,
¹Sant'Anna School of Advanced Studies, ²CNIT

EuMC45-3 Grounded Coplanar Waveguide-Based 0.5-50 GHz Sensor for Dielectric Spectroscopy

Ondrej Krivosudský, Daniel Havelka, Michal Cífra, Institute of Photonics and Electronics, Czech Academy of Sciences

EuRAD06-3 A Convolutional Neural Network Approach to Parking Monitoring in Urban Radar Sensing

Javier Martinez Garcia¹, Dominik Zoeke², Martin Vossiek¹, ¹FAU Erlangen-Nuremberg, ²Siemens AG

11:30 - 11:50

EuMC/EuRAD08-4 An Alternative Design Approach for Multi-Feed Spatial Power-Combining Reflectarray Antenna

Tse-Tong Chia¹, Felicia Ying-Fei Tai², Kelly Xinjie Siah², ¹Temasek Laboratories@National University of Singapore, ²NUS High School of Math and Science, ³Raffles Institution

EuMC/EuRAD09-4 A Generalised Brownian Motion Model of RF Spectral Dispersion due to Phase Noise

Kashif Siddiq^{1,2}, ¹Navtech Radar Ltd., ²University of Bath

EuMC45-4 Characterization of Dielectric Anisotropy of Small Samples from Plant Fresh and Dry Biomass by Microwave Resonance Method

Plamen Dankov, Sofia University, St. Kliment Ohridski

EuRAD06-4 Automotive Radar Interference Mitigation Using a Sparse Sampling Approach

Jonathan Bechter, Fabian Roos, Mahfuzur Rahman, Christian Waldschmidt, Ulm University

11:50 - 12:10

EuMC/EuRAD08-5 Accurate Modelling and Experimental Validation of a Large Antenna Array in Ka-Band

Benoit Lesur^{1,2}, Marc Thevenot², Eric Arnaud², Thierry Monediere², Christophe Melle¹, David Chaimbault¹, Alain Karas¹, ¹Zodiac Data Systems, ²XLIM Research Institute - UMR CNRS 7252

EuMC45-5 Dielectric Measurements of Mangoes from 0.5 GHz to 20 GHz Using a Custom Open-Ended Coaxial Probe

Harshitha Thippur Shivamurthy, Marco Spirito, Iliaria Maticena, Delft University of Technology

EuRAD06-5 Multi-Target Reflection Point Model of Cyclists for Automotive Radar

Martin Stolz¹, Eugen Schubert¹, Frank Meinel¹, Martin Kunert¹, Wolfgang Menzel², ¹Robert Bosch GmbH, ²University Ulm

12:10 - 12:30

THURSDAY

	Prag	Istanbul	Oslo	Kopenhagen
	<p>EuMC46 Numerical Modelling of Radiating Structures Chair: Hervé Aubert, LAAS-CNRS Co-Chair: Alessandro Galli, Sapienza University of Rome</p>	<p>EuMC47 Compact and Advanced Implementations of Waveguide Filters Chair: Vicente Enrique Boria Esbert, Universitat Politècnica de Valencia Co-Chair: Cristiano Tomassoni, University of Perugia</p>	<p>EuMC48 Wireless Technologies Chair: Lutfi Albasha, American University of Sharjah Co-Chair: Zhou Du, Nokia Bell Labs</p>	<p>EuRAD07 MIMO Radars and Waveforms Chair: Alexander Yarovoy, Microwave Sensing, Signals and Systems (MS3) Co-Chair: Laurent Ferro-Famil, University of Rennes 1</p>
10:50 - 11:10	<p>EuMC46-1 Industrial Session Keynote Multi-Scale Electromagnetic Simulation from Component to System Level Timo Euler, CST - Computer Simulation Technology AG</p>	<p>EuMC47-1 Industrial Session Keynote Overview of Passive Filter Technologies for Satellite Payloads Jean Parlebas, Tesat-Spacecom GmbH</p>	<p>EuMC48-1 A Novel and Low Complexity Approach for Calibration and Characterization of a Millimeter Wave Phased-Array Transceiver-Antenna Module Mehdi Salehi, Mohammad-Reza NezhadAhmadi, Safieddin Safavi-Naeini, University of Waterloo</p>	<p>EuRAD07-1 A Novel Interference Mitigation Technique for MIMO OFDM Radar Using Compressed Sensing Benjamin Nuss, Thomas Zwirk, Karlsruhe Institute of Technology (KIT)</p>
11:10 - 11:30	<p>EuMC46-2 A New Class of Nondiffracting Pulses Based on Focusing Leaky Waves Walter Fuscaldo^{1,2}, Davide Comite¹, Alessandro Boesso¹, Paolo Baccarelli¹, Paolo Burghignoli¹, Alessandro Galli¹, ¹University of Rome Sapienza, ²University of Rennes 1</p>	<p>EuMC47-2 On-Board Miniaturized L-Band Input Filter Based On TM-Mode Dielectric Resonator for MSS Applications Luca Pelliccia¹, Fabrizio Cacciamani¹, Roberto Sorrentino¹, Francesco Vitulli¹, Walter Steffè², Franco Diaferia², Elio Picchione², Petronilo M. Iglesias³, Andrew Jones⁴, ¹RF Microtech s.r.l., ²Thales Alenia Space Italia, ³ESA ESTEC, ⁴ESA ECSAT</p>	<p>EuMC48-2 A Fully-Printed, BST MIM Varactor for Low ISM-Band Matching Networks up to 1000 W Daniel Kienemund¹, Thomas Fink², Mike Abrecht², Walter Bigler², Joachim Binder², Rolf Jakoby¹, Holger Maune¹, ¹TU Darmstadt, ²COMET AG, ³Karlsruhe Institute of Technology (KIT)</p>	<p>EuRAD07-2 MIMO Radar System Using Orthogonal Complementary Codes with Doppler Offset Kenta Iwasa, Takaaki Kishigami, Hidekuni Yomo, Akihiko Matsuoka, Junji Satou, Panasonic Corporation</p>
11:30 - 11:50	<p>EuMC46-3 Shape Optimizations of Metallic Sheets for Improved Near-Zone Scattering, Reflection, and Focusing Characteristics Askin Altınoklu, Ozgur Ergul, Middle East Technical University</p>	<p>EuMC47-3 Compact Broadband Waveguide Filter with Wide Spurious-Free Range Based on Mixed TM and Compline Resonators Cristiano Tomassoni¹, Luca Pelliccia², Fabrizio Cacciamani², Paolo Vallerotonda², Roberto Sorrentino², Jaione Galdeano³, Christoph Ernst³, ¹University of Perugia, ²RF Microtech s.r.l., ³ESA ESTEC</p>	<p>EuMC48-3 On mm-Wave Quasi-Linear Over-The-Air Modulated Measurements and Coupling Effects Jon Martens, Anritsu</p>	<p>EuRAD07-3 Effects and Compensation of Backscatter Phase Distortion in Switched MIMO Radars Dominic Berges^{1,2}, Dominik Zoeke², ¹Technical University of Munich, ²Siemens AG</p>
11:50 - 12:10	<p>EuMC46-4 A Criterion for Radar Antenna Design to Enhance Efficacy of Polarimetric Entropy in Moving Target Discrimination Je-Ruei Bai, Liang-Yu Ou Yang, Shih-Yuan Chen, National Taiwan University</p>	<p>EuMC47-4 Enhancing the Performance of Stepped Impedance Resonator Filters in Rectangular Waveguide Joaquin Valencia Sullca, Marco Guglielmi, Santiago Cogollos, Joaquin Vague, Vicente Enrique Boria Esbert, Technical University of Valencia</p>	<p>EuMC48-4 Measurement of Complex Transfer Function of Analog Transmit-Receive Frontends for Terahertz Wireless Communications Iulia Dan¹, Shoichi Shiba², Parisa Harati¹, Seyyid Dilek¹, Enoc Roselló¹, Ingmar Kallfass¹, ¹Universität Stuttgart, ²Fujitsu Laboratories LTD.</p>	<p>EuRAD07-4 MIMO Arrays Versus Conventional Thin Arrays for 2D and 3D Radar Applications Jan Mietzner, Airbus DS Electronics and Border Security</p>
12:10 - 12:30	<p>EuMC46-5 Scanning Microwave Microscopy of Aluminum CMOS Interconnect Lines Buried in Oxide and Water Xin Jin¹, Kuanchen Xiong¹, James C. M. Hwang¹, Marco Farina², Roderick Marstell¹, Nicholas C. Strandwitz¹, Alexander Göritz², Matthias Wietstruck³, Mehmet Kaynak³, ¹Lehigh University, ²Università Politecnica delle Marche, ³IHP Microelectronics</p>	<p>EuMC47-5 Compact Doublet Structure for Quasi-Elliptical Filters Using Stereolithographic 3D Printing Cristiano Tomassoni, Giuseppe Venanzoni, Marco Dionigi, Roberto Sorrentino, University of Perugia</p>	<p>EuMC48-5 Co-Design of Millimeter-Wave Polymer Fiber and Antenna System for Full Duplex Communication Mohadig Widha Rousstia, TE Connectivity Nederland B.V.</p>	<p>EuRAD07-5 Range Sidelobes Attenuation of Pseudorandom Waveforms for Civil Radars Francesco De Palo, Gaspare Galati, University of Rome Tor Vergata</p>



Tokio

EuMW02

EuMW/EuMC Closing Session

Chair: Arne Jacob, EuMW 2017 General Chair

Co-Chair: Matthias Hein, EuMC 2017 Chair

13:50

Panel discussion: "Fully automated driving. Enabled by microwaves. What else?"

Setting the Scene
 Statements of Panelists
 Questions & Answers

Panelists:

- Automotive Radar: Jürgen Dickmann, Daimler AG
- Chip Technology: Ralf Bornefeld, Automotive Division, Infineon Technologies AG
- Optical Sensors: Erich Smidt, Velodyne Europe GmbH
- Satellite Navigation: Tomaso Grossi, TomTom
- Mobile Communications: Ralf Irmer, Vodafone GmbH
- Automotive Cyber Security: Michael Müller, Argus Cyber Security
- Test and Evaluation of Autonomous Vehicles: Udo Wehner, IAV GmbH
- Regulation: Francois Guichard, UN Secretary at UNECE

Moderator: Ulrich Bobinger, TV Editor and Moderator
 Organisers: Holger Meinel and Matthias Hein

Autonomous driving without human driver is on everybody's lips. The charming vision of enhanced safety, smooth traffic flow, and beneficial use of traveling times comes along with burning questions like: How can the dynamic environment be detected 100% comprehensively and reliably? What about the legal issues? What are the opportunities for new use cases and business cases? Which wireless technology is most important? Which research challenges remain to be solved? This panel discussion offers answers to these and other questions, led by a TV-experienced moderator with pertinent scientific background. A fine selection of eight experts in the field guarantees a comprehensive and, at the same time, entertaining coverage of this extremely timely and relevant topic.

15:10

Awards Ceremony

Michal Mrozowski, EuMW 2017 Awards Chair

- EuMC Microwave Prize**
- EuMC Young Engineer Prizes**
- Student Challenge Prize**
- Student Design Competition Prize**

15:30

Closing Remarks

EuMW 2017: Arne Jacob, General Chair
 EuMW 2018: Magdalena Salazar Palma, General Chair

15:50

End of Session

13:50 - 15:50

THURSDAY



Kiew

St. Petersburg

EuRAD08

MIMO Radar Systems

Chair: Reinhard Feger, Johannes Kepler University Linz
Co-Chair: Winfried Mayer, Endress+Hauser GmbH+Co. KG

EuRAD09

Automotive Radar 3

Chair: Mateusz Malanowski, Warsaw University of Technology
Co-Chair: Mateo Burgos-Garcia, Universidad Politécnica de Madrid

16:10 - 16:30

EuRAD08-1
Scalable MIMO Radar Utilizing Delta-Sigma Modulation-Based Frequency-Division Multiplexing Technique

Herman Ng¹, Wael Ahmad¹, Dietmar Kissinger^{1,2},
¹IHP, ²Technische Universität Berlin

EuRAD09-1
Industrial Session Keynote
Automotive Testing by Microwave Imaging - A Rethinking

Sherif Ahmed, Tobias Koepfel, Rohde & Schwarz GmbH & Co. KG

16:30 - 16:50

EuRAD08-2
A Compact 120 GHz SiGe:C Based 2 x 8 FMCW MIMO Radar Sensor for Robot Navigation in Low Visibility Environments

Simon Kueppers¹, Harun Cetinkaya¹, Nils Pohl²,
¹Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR, ²Ruhr University Bochum

EuRAD09-2
The Influence of the Water-Covered Dielectric Radome on 77 GHz Automotive Radar Signals

Nannan Chen, Rossiza Gourouva, Oleg Krasnov, Alexander Yarovoy, Delft University of Technology

16:50 - 17:10

EuRAD08-3
Panel Design of a MIMO Imaging Radar at W-Band for Space Applications

Jochen Moll¹, Bernd Hills¹, Amit Shrestha¹, Andre Ehlert¹, Maruf Hossain¹, Karsten Thum², Martin Vossiek², Michael Hrobak³, Wolfgang Heinrich³, Marion Resch⁴, Jürgen Bosse⁴,
¹Goethe University Frankfurt am Main, ²Friedrich-Alexander University Erlangen-Nürnberg, ³Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, ⁴Robo-Technology GmbH

EuRAD09-3
A 76 to 81GHz Packaged Transceiver for Automotive Radar with FMCW Modulator and ADC

Francesco Belfiore, Antonino Calcagno, Giampiero Borgonovo, Mariella Castro, Alessandro Pisasale, Massimo Platania, Marco Vinciguerra, Caterina Schiro¹, Gesualdo Alessi, Amedeo Salomon Michelin¹, Salvatore Leonardi, Stefania Gagliano, Francesco Bartolotta, Pietro Lizzio, Salvatore Scaccianoce, STMicroelectronics

17:10 - 17:30

EuRAD08-4
Compact 3D MIMO Radar – Antenna Array Design and Experimental Results

Jan Mietzner¹, Steffen Lutz¹, Christian Weckerle¹, Bernhard Hofstaetter¹, Enric Miralles², Alexander Ganis², Thomas Multerer², Juergen Puchinger¹, Ulrich Prechtel², Volker Ziegler², Askold Meusling³,
¹Airbus DS Electronics and Border Security, ²Airbus Group Innovations, ³Airbus Defence & Space

EuRAD09-4
Highly Scalable Radar Target Simulator for Autonomous Driving Test Beds

Andreas Gruber¹, Michael Ernst Gadringer¹, Helmut Schreiber¹, Dominik Amschl¹, Wolfgang Bösch¹, Steffen Metzner², Horst Pflüg²,
¹Graz University of Technology, ²AVL List GmbH

17:30 - 17:50

EuRAD08-5
Investigation of Fractal MIMO Concepts for Radar Imaging of Bulk Solids

Christoph Dahl, Michael Vogt, Ilona Rolfes, Ruhr-University Bochum

EuRAD09-5
A Low Cost TLPR Target Generator Basing on a Dielectric Waveguide Concept

Christoph Baer, Christian Schulz, Ruhr-Universität Bochum



Oslo

Kopenhagen

EuMC/EuRAD10

Special Session: Radar Technology and System Applications in Central Europe

Chair: Kostyantyn Lukin, IRE NASU
Co-Chair: Jerzy Michalski, SpaceForest

EuRAD10

Classification and Recognition

Chair: Willem A. Hol, Thales Nederland B.V.
Co-Chair: Maria Pilar Jarabo-Amores, University of Alcalá

EuMC/EuRAD10-1
Passive Radar Research in Poland

Krzysztof Kulpa, Mateusz Malanowski, Marcin Baczyk, Damian Gromek, Maciej Wielgo, Warsaw University of Technology

EuRAD10-1
Target Classification Using Passive Radar ISAR Imagery

Maria Pilar Jarabo-Amores¹, Elisa Giusti², Manuel Rosa-Zurera¹, Alessio Bacci², Amerigo Capria², David Mata-Moya¹, ¹University of Alcalá, ²RaSS Center – CNIT

16:10 - 16:30

EuMC/EuRAD10-2
Quantum Radar and Noise Radar Concepts

Kostyantyn Lukin, IRE NASU

EuRAD10-2
Object Recognition Radar System for Partially Reconstructed Target Image

Dilyan Damyanov, Universität Duisburg-Essen

16:30 - 16:50

EuMC/EuRAD10-3
Feasibility of Air Target Detection Using Pulsar FSR Net

Hristo Kabakchiev¹, Vera Behar², Ivan Garvanov³, Dorina Kabakchieva⁴, Avgust Kabakchiev¹, Hermann Rohling⁵, Mark Bentum⁶, Jorge Fernandes⁷, ¹Sofia University "St. Kliment Ohridski", ²Institute of Information and Communication Technologies at the Bulgarian Academy of Sciences, ³University of Library Studies and Information Technologies, ⁴University of National and World Economy, ⁵Technische Universität Hamburg-Harburg, ⁶University of Twente, ⁷INESC-ID

EuRAD10-3
Gesture Recognition with a Low Power FMCW Radar and a Deep Convolutional Neural Network

B. Dekker¹, Sebastiaan Jacobs¹, A.S. Kossen¹, M.C. Kruithof¹, Albert Huizing¹, M. Geurts², ¹TNO, ²NXP Semiconductors

16:50 - 17:10

EuMC/EuRAD10-4
Fully Autonomous Tracking and Data Transmission System for Sounding Rocket

Przemyslaw Kant, Adrian Szwaba, Jerzy Michalski, SpaceForest

EuRAD10-4
Multi-Target Human Gait Classification Using LSTM Recurrent Neural Networks Applied to Micro-Doppler

Geerten Klarenbeek¹, Ronny Harmanny², Lorenzo Cifola², ¹Utrecht University, ²Thales Nederland B.V.

17:10 - 17:30

EuMC/EuRAD10-5
Applications of Microwaves in Medicine and Biology

Jan Vrba, Czech Technical University in Prague

EuRAD10-5
Spectrum Estimation by Multiple Asynchronous Channels

Mario LaManna¹, Pietro Monsurro², Giuseppe Scotti², Pasquale Tommasino², Alessandro Trifiletti², ¹Evoelectronics, ²Sapienza University of Rome

17:30 - 17:50



Kiew

St. Petersburg

EuRAD11

Remote Sensing and Surveillance

Chair: Stefan Stanko, Fraunhofer FHR
Co-Chair: Mayazzurra Ruggiano, Thales Nederland B.V.

EuRAD12

Radar Applications 1

Chair: Krzysztof Kulpa, Warsaw University of Technology
Co-Chair: Stephen Harman, QinetiQ

08:30 - 08:50

EuRAD11-1
DBFSAR: An Airborne Very High-Resolution Digital Beamforming SAR System

Andreas Reigber, German Aerospace Center (DLR)

EuRAD12-1
Nearfield Imaging Probe for Contactless Assessment of Burned Skin

Daniel Oppelt¹, Tim Pfahler¹, Felix Distler¹, Johannes Ringel¹, Ole Goertz², Martin Vossiek¹,
¹Institute of Microwaves and Photonics, University of Erlangen and Nuernberg, ²Martin-Luther-Hospital Berlin

08:50 - 09:10

EuRAD11-2
A HRWS SAR System Design with Multi-Beam Imaging Capabilities

Javier del Castillo, Marwan Younis, Gerhard Krieger, German Aerospace Center (DLR)

EuRAD12-2
Material Characteristics of Concretes During the Dehydration Process in Furnaces

Andries Küter, Sabine Güttgemann, Jasmin Steinbrecher, Christian Krebs, Ralf Brauns, Dirk Nüßler, Fraunhofer FHR

09:10 - 09:30

EuRAD11-3
DVB-T Based Passive Radar Performance Sensitivity with Respect to Channel Availability

Nerea del Rey Maestre, José Luis Bárcena-Humanes, Javier Rosado Sanz, Pedro Gomez del Hoyo, David Mata-Moya, University of Alcalá

EuRAD12-3
Joint Doppler and DOA Estimation Using 2D MUSIC in Presence of Range Migration

Shengzhi Xu, Alexander Yarovoy, Microwave Sensing, Signals and Systems (MS3)

09:30 - 09:50

EuRAD11-4
A Machine Learning Framework for Performance Prediction of an Air Surveillance System

Juha Jylhä¹, Marja Ruotsalainen¹, Ville Väisänen¹, Kai Virtanen², Mikko Harju², Minna Väilä¹,
¹Tampere University of Technology, ²Aalto University

EuRAD12-4
A Novel Estimation Technique of the Permittivity and the Effective Thickness of Dielectric Materials for Wideband Radar Systems

Benedikt Friederich, University of Duisburg-Essen

09:50 - 10:10

EuRAD11-5
SETHI - New Performances

Remi Baque, ONERA

EuRAD12-5
Transmission Through Uniform Layer of Ice at Low-THz Frequencies

Fatemeh Norouzian, Rui Du, Emidio Marchetti, Marina Gashinova, Edward Hoare, Costas Constantinou, Peter Gardner, Mikhail Chemiakov, University of Birmingham

EuRAD13 | EuRAD Interactive Session

Chair: Christian Schulz, Ruhr-Universität Bochum
 Co-Chair: Nils Pohl, Ruhr University Bochum

10:00 - 11:40

The ePosters are on display from 10:00 - 11:40

The authors are present for discussion from 10:00 - 11:40



Conference Centre	Conference Centre	Conference Centre	Conference Centre
<p>EuRAD13-1 An S-Band Portable Radar Demonstrator Stefano Turso, Andrej Konforta, Thomas Bertuch, Peter Knott, Fraunhofer FHR</p>	<p>EuRAD13-6 Compression of Phase-Shift Keyed Signals by Means of the Mismatched Sidelobe-Free Filter with Application to Coherent Pulse Radar Leonid Fridman, Eugeniy Sinitin, Valentin Perelomov, Sergei Myasnikov, German Ershov, JSC VNIIRA</p>	<p>EuRAD13-10 Synthesis of ISAR Decoys with Controllable Position on a Moving Platform in SSJ Scenarios Xiaoyi Pan, Zhaoyu Gu, Jingke Zhang, Shaoqi Dai, State Key Laboratory of Complex Electromagnetic Environment Effects on Electronics and Information System (CEMEE)</p>	<p>EuRAD13-13 Enabling Sea Clutter Power Model in Surface Duct Environment Peipei Wei¹, Xiaoyan Du¹, Jianhui Liu², ¹National Digital Switching System Engineering & Technology R&D Center (NDSC), ²Aarhus University</p>
<p>EuRAD13-2 Integrated Target Detection Hardware Unit for Automotive Radar Applications Farhan Bin Khalid, Dian Nugraha, Andre Roger, Romain Ygnace, Infineon Technologies AG</p>	<p>EuRAD13-7 Hybrid Architecture of a Compact, Low-Cost and Gain Compensated Delay Line Switchable From 1 m to 250 m for Automotive Radar Target Simulator Fabien Arzur¹, Marc Le Roy¹, Gerard Tanne¹, Andre Perennec¹, Nicolas Bordais², ¹Lab-STICC UBO, MOM Group, ²ZF TRW</p>	<p>EuRAD13-11 Ground Moving Target Classification Based on Micro-Doppler Signature Using Novel Spectral Information Features Ammar Mesloub¹, Karim Abed-Meraim², Adel Belouchrani³, ¹Ecole Militaire Polytechnique, ²Université d'Orléans, ³Ecole Nationale Polytechnique</p>	<p>EuRAD13-14 Adaptive Kalman Filter for Tracking of Fast Accelerating Targets Premysl Hudec, Czech Technical University in Prague</p>
<p>EuRAD13-3 Millimeter-Wave Gaussian Beam Shaping and Steering Phased Array Antenna Christian Koenen, Uwe Siart, Thomas F. Eibert, Technical University of Munich</p>	<p>EuRAD13-8 Wide-Band Interference Mitigation Algorithm for SAR Based on Time-Varying Filtering and Sparse Recovery Lu Xingyu, Nanjing University of Science and Technology</p>	<p>EuRAD13-12 Analysis of Sea Clutter Self-Similarity Under Influence of Moving Target Ningbo Liu¹, Hao Ding¹, Shuliang Wen², Jian Guan¹, You He¹, ¹NAAU, ²No.23 Institute of the Second Academy, China Aerospace Science and Industry Corporation</p>	<p>EuRAD13-15 Impact of the Radar Frequency on the Detection of Raindrops Philipp A. Scharf, Jonathan Schrad, Hubert Mantz, Thomas Walter, Hochschule Ulm</p>
<p>EuRAD13-4 Noise Matching in Coupled Antennas Paulus Krueger, North-West University</p>	<p>EuRAD13-9 Building Edge Delineation Using InSAR and Lidar Data Umur Kathree, Jaco de Witt, Willie Nel, Council for Scientific and Industrial Research</p>	<p>EuRAD13-16 Full SMT Low Cost X-Band Multichannel T/R-Module Marion Filleböck, Airbus DS Electronics and Border Security</p>	



Kiew

St. Petersburg

EuRAD14

Short-Range Radar Applications

Chair: Reinhold Herschel, Fraunhofer FHR
Co-Chair: Axel Brockmeier, HENSOLDT

EuRAD15

Radar Applications 2

Chair: Darren Coe, QinetiQ
Co-Chair: Laura Anitori, TNO

10:50 - 11:10

**EuRAD14-1
Development of Ground Penetrating Radar Using 48 Channel Impulse Radar Array**

Jihoon Kwon¹, Nojun Kwak¹, Dongwon Yang², Yeosun Yoon³, ¹Seoul National University, ²Agency for Defense Development, ³Hanwha Systems

**EuRAD15-1
Investigation on Circular Polarization for 76 GHz Helicopter Collision Avoidance Radar to Improve Detection Performance of High-Voltage Power Lines**

Shunichi Futatsumori¹, Capucine Amielh², Kazuyuki Morioka¹, Akiko Kohmura¹, Norihiko Miyazaki¹, Naruto Yonemoto¹, ¹Electronic Navigation Research Institute, ²Ecole Nationale de l'Aviation Civile

11:10 - 11:30

**EuRAD14-2
Time-Domain Correlation Radar for Fluid Surface Velocity Estimation Using a 77 GHz Sensor Platform**

Marc A. Mutschler¹, Christian Erhart¹, Philipp A. Scharf¹, Johannes Iberle¹, Johannes Burgardt¹, Hubert Mantz², Thomas Walter¹, Christian Waldschmidt², ¹University of Applied Sciences Ulm, ²University of Ulm

**EuRAD15-2
Low-Cost Jamming System Against Small Drones Using a 3D MIMO Radar Based Tracking**

Thomas Multerer¹, Alexander Ganis¹, Ulrich Prechtel¹, Enric Miralles¹, Askold Meusling², Jan Mietzner³, Martin Vossiek⁴, Mirko Loghi⁵, Volker Ziegler¹, ¹Airbus Group Innovations, ²Airbus Defence & Space, ³Airbus DS Electronics and Border Security, ⁴Friedrich-Alexander-University Erlangen, ⁵University of Udine

11:30 - 11:50

**EuRAD14-3
Optimized Fractional-N PLL for FMCW Radar Indoor Positioning Applications**

Mohammed El-Shennawy, Belal Al-Qudsi, Niko Joram, Frank Ellinger, TU-Dresden

**EuRAD15-3
Surface Reconstruction Using Thinned Random Arrays in mm-Wave FMCW SAR Imaging**

Dennis Pohle, Jan Barowski, Jochen Jebramcik, Ilona Rolfes, Ruhr-University Bochum

11:50 - 12:10

**EuRAD14-4
An Enhanced Algorithm for 2D Indoor Localisation on Single Anchor RSSI-based Positioning Systems**

Marco Passafiume^{1,2}, Stefano Maddio¹, Giovanni Collodi¹, Alessandro Cidronali¹, ¹University of Florence, ²MIDRA Consortium

**EuRAD15-4
2D and 3D-ISAR Images of a Small Quadcopter**

Massimiliano Pieraccini, Neda Rojhani, Lapo Miccinesi, University of Florence

12:10 - 12:30

**EuRAD14-5
Mixer Assisted Interferometric Six-Port System for Accurate Distance Measurements**

Stefan Lindner¹, Fabian Lurz¹, Sarah Linz¹, Robert Weigel¹, Alexander Koelpin², ¹FAU Erlangen-Nuremberg, ²BTU Cottbus - Senftenberg

**EuRAD15-5
RotoSAR for Monitoring Bridges**

Lapo Miccinesi, Massimiliano Pieraccini, University of Florence



St. Petersburg

EuRAD16**EuRAD Closing Session**

Chair: Nils Pohl, EuRAD 2017 TPC Chair

Co-Chairs: Martin Vossiek, EuRAD 2017 Chair, and Peter Knott, EuRAD 2017 Secretary

12:20 - 13:50**Buffet Lunch****13:50 - 14:30****Radar Systems: a New Emerging Market for Consumer and Industrial Applications**

Ludger Verweyen, Senior Director RF Mobile, Infineon Technologies AG

Internet retailers are now targeting to ship goods within 30 minutes via the air to the customer, using drones. The idea of replacing the ground delivery service for consumer business by unmanned vehicles could only be conceived by disruptive changes in radar systems in size, weight and power consumption, and their tremendous cost reduction.

Only 20 years ago, radar systems were bulky, heavy and manually assembled with primary use in defense applications. The vision of autonomous cruise control in automotive applications enforced the development of integrated mmW-circuits initially on compound semiconductors and later on silicon, resulting in smaller system form factors at less expensive overall costs. Awkward assembly technologies with cavities on expensive RF PCB materials were required to mount the dies on a board with minimum RF performance impact of the bondwires. The growth into higher volumes only became possible by using industry standard plastic packages for multi-channel radar front-ends, with the only remaining RF interface towards the antennas and the IF as analog or digital signal. In a next development step on system level, the standard packages were also assembled on FR4 as low cost PCB material together with the DSP and other components.

With the evolution of higher monolithic integration and the implementation into industry standard packages, costs, size, weight and power consumption of radar components were significantly reduced. Radar sensors became competitive to other sensor technologies, such as passive infrared sensors (PIR), but provided more sophisticated sensing to industrial applications and now also to consumer applications. In street lighting systems, the light can be turned on and off, dependent on a pedestrian approaching or departing, and with even more sophisticated signal processing, the radar system can distinguish between an animal or a human being and then keep the lights off. In gauge level systems, radar sensors can do the job in even more adverse chemical environment. More and more potential of the sensor capabilities can only be exploited with adequate data processing and algorithms, being a new field for further research activities.

In the presentation, we will show new use cases of radar systems, compare them with competing sensor technologies and identify future requirements to the technical capabilities.

14:30 - 14:50**EuRAD Awards Ceremony**

Peter Knott, EuRAD 2017 Secretary

Michal Mrozowski, EuMW 2017 Awards Chair

**EuRAD Best Paper Award
EuRAD Young Engineer Prize****14:50 - 15:00****Closing of EuRAD 2017**

Martin Vossiek, EuRAD 2017 Chair

Invitation to EuRAD 2018

Mateo Burgos Garcia, EuRAD 2018 Chair

13:50 - 15:30

Welcome from the Workshop and Short Courses Chair

We are pleased to be able to offer a wide ranging workshop and short course programme covering topics of all three conferences throughout the entire week.

A total of 43 workshops and short courses cover many topics being relevant and of interest to the whole microwave community. Current key applications are covered like 5G communications, automotive radar and satellite communications. A large number of workshops address technological topics like GaN, CMOS and SiGe as well as THz-technologies. Fundamental knowledge is provided in short courses on circuit design, radar fundamentals and assembly and interconnect technology. The hot topics like automotive radar, power amplifiers and THz are covered by a series of workshops.

We are very grateful to all the organisers, presenters and authors of workshop and short course materials for their hard work and dedication before and during the conference. Each workshop and short course is individually endorsed by one or two of the conferences making up EuMW. However, they are available and

accessible to any scientist or engineer wishing to gain a broader perspective on microwave and RF systems and devices, or to learn about a new specialism within our broad field.

Due to the large number of workshops and short courses, the programme fills the entire week. Workshops that focus on topics relevant for EuMIC mainly take place from Sunday to Tuesday. On Thursday and Friday we present most of the workshops endorsed by EuRAD. Throughout the whole week EuMC workshops take place.

Slides for the workshops and short courses will be provided electronically at the conference on a separate USB stick. No hard copies of the slides will be provided. There will also be a facility for workshop and short course delegates to download the slides approximately two weeks before the conference. Instructions for the download process will be provided after your registration.

Finally, I would like to thank the whole workshop team for its dedication and hard work in the last months, in particular Tobias Chaloun, Jonathan Bechter and Johannes Schlichenmaier.



Christian Waldschmidt
2017 Workshops and Short Courses Chair

WORKSHOPS AND SHORT COURSES - SUNDAY

Duration: 08:30 - 17:50

Room: Hongkong

WS-01

Microwave Photonics: An Enabling Technology for 5G?

Organisers:

Stavros Iezekiel, University of Cyprus

Abstract

5G technology will be especially demanding in several end-user requirements, such as latency, massive machine-to-machine communication, spectral efficiency, energy consumption, and data rates. In order to meet these requirements a number of key enabling technologies, such as mm-waves and MIMO will be required. The aim of this workshop is to demonstrate how microwave photonics can be used to realise supporting infrastructure such as mm-wave radio-over-fibre.



Programme

08:30 - 09:20

Introduction to Photonics in 5G

John Mitchell, UCL (University College London), UK

09:20 - 10:10

Photonics-Based Advanced Heterogeneous Wireless Network for Dense User Environments

Hiroshi Murata, Osaka University, Japan

10:10 - 10:50

Break

10:50 - 11:40

Advanced Photonics Infrastructure for 5G Hot Spot and Heterogeneous 3G/4G/5G Networks

Andreas Stöhr, University of Duisburg-Essen, Germany

11:40 - 12:30

Waveform Transport Technology for Millimeter-Wave Radio Communication Systems

Atsushi Kanno, NICT, Tokyo, Japan

12:30 - 13:50

Break

13:50 - 14:40

Integrated Microwave Photonics

Frederic van Dijk, III-V Lab, Palaiseau, France

14:40 - 15:30

Generic Photonic Integration Technologies for Light Engines Aiming to Seamless Convergence of Wired to Wireless

Guillermo Carpintero, UC3M (Universidad Carlos III de Madrid), Spain

15:30 - 16:10

Break

16:10 - 17:00

Future Prospects for Microwave Photonics in 5G

Idelfonso Tafur Monroy, DTU (Technical University of Denmark), Denmark

17:00 - 17:20

Round-table Discussion and Wrap-up

Duration: 08:30 - 17:50

Room: Kiew

WS-02

Advances in GaN Device Technology for Millimeter-wave Applications

Organisers:

Kazuya Yamamoto, Mitsubishi Electric Corp, Japan
Kenjiro Nishikawa, Kagoshima University, Japan

Abstract

Millimetre-wave and sub-millimetre-wave applications, such as satellite communications, radar systems, high-speed wireless communications, and newly developed mobile 5G system, have demanded high power and high efficiency devices. GaN device is still a main player for the above frequencies and applications. This workshop will introduce the recent progress in GaN technology in millimetre-wave applications. This workshop will provide the bridge between a system/circuit designer and a device engineer. The workshop will start discussing the required performances for recent millimetre-wave applications including 5G system. After that, the workshop will cover the recent developed GaN devices for millimetre-wave and sub-millimetre-wave operation, device simulation, device modelling, and PA design techniques. This proposed workshop is endorsed by IEEE MTT-S TC-7.



Programme

08:30 - 09:10

Millimeter-Wave Applications and Their Requirements for PAs and Power Devices

James J. Komiak, BAE Systems, USA

09:10 - 09:50

Power Devices and PAs for 5G Systems

Hiroshi Okazaki, NTT DOCOMO INC, Japan

10:10 - 10:50

Break

10:50 - 11:30

GaN-HEMT Technology for High Power Millimeter-Wave Amplifier

Kazukiyo Joshin, Fujitsu Labs, Japan

11:30 - 12:10

GaN High Electron Mobility Transistors for Sub-Millimeter Wave Applications

Tomás Palacios, MIT, USA

12:30 - 13:50

Break

13:50 - 14:30

InAlGa/GaN HEMT for W-Band Applications

Dong Xu, BAE Systems, USA

14:30 - 15:10

GaN High Electron Mobility Transistor Simulations with Full Wave and Hot Electron Effects

Matt Grupen, Air Force Research Laboratory, USA

15:30 - 16:10

Break

16:10 - 16:50

Modelling of Dispersive Millimeter-Wave GaN HEMT Devices for High Power Amplifier Design

Oliver Ambacher, Fraunhofer IAF, Germany

16:50 - 17:30

GaN Millimeter-Wave Power Amplifier Design

Charles Campbell, QORVO Inc., USA

WORKSHOPS AND SHORT COURSES - SUNDAY

Duration: 08:30 - 17:50

Room: Riga

WS-03

Wireless 100Gb/s and Beyond: Progress in Ultra-fast Wireless Communications

Organisers:

Rolf Kraemer, IHP GmbH and Brandenburg Technical University Cottbus-Senftenberg, Germany

Abstract

This workshop addresses recent progress in ultra-fast wireless communications. It will be organised along the technical chain of involved elements of a innovative communication system. Starting from questions of antenna technologies, wireless frontends for frequencies up to 240 GHz and baseband processing algorithms and technologies the workshop will also include topics of ultra-fast protocols and forward error correction. Also questions of important trade-offs between analog- and digital-processing as well as hardware-software-implementation will be addressed. Questions of different MIMO systems including massive MIMO will be included. The workshop is based on recent results of the German priority program on "wireless 100G/s and beyond"



Programme

- 08:30 - 09:00** *Challenges and Potential Solutions for Wireless 100Gb/s Communication Systems*
Rolf Kraemer, IHP GmbH and Brandenburg Technical University Cottbus-Senftenberg, Germany
- 09:00 - 09:35** *Optimisation of 100 Gb/s Near Field Wireless Transmitters Under Consideration of Power Limits*
Gerd Ascheid, RWTH Aachen, Germany
- 09:35 - 10:10** *Development of Novel System and Component Architectures for Future Innovative 100 Gbit/s Communication Systems*
Martin Vossiek, Friedrich-Alexander-University Erlangen-Nuremberg, Germany
- 10:10 - 10:50** *Break*
- 10:50 - 11:40** *Maximum Spectral Efficiency by Parallel Multiple-Input Multiple-Output Transfer Using High Density 3D Antenna Topology*
Gerhard P. Fettweis, Technical University Dresden, Germany
- 11:40 - 12:30** *Mixed-Mode Baseband for 100 Gbit/s Wireless Communications*
Christoph Scheytt, University Paderborn, Germany
- 12:30 - 13:50** *Break*
- 13:50 - 14:40** *A 10-1000 GHz Wireless Measurement System with 50 GHz Bandwidth*
Andreas Czulwik, University of Duisburg-Essen, Germany
- 14:40 - 15:30** *Fully Integrated Dual-Polarized Antenna Array with Ultra-Wideband Single-Chip CMOS Receiver*
Friedel Gerfers, Technical University Berlin, Germany
- 15:30 - 16:10** *Break*
- 16:10 - 16:35** *Fully Integrated Radio Front-End Module for Wireless 100 Gbps Communications*
Thomas Zwick, Karlsruhe Institute of Technology, Germany
- 16:35 - 17:00** *On-Chip Integrated Distributed Amplifier and Antenna Systems*
Dirk Plettemeier, Technical University Dresden, Germany
- 17:00 - 17:25** *Ultra Wideband Communications Based on Massive MIMO and Multi-Mode Antennas Suitable for Mobile Handheld Devices*
Dirk Manteuffel, University of Hannover, Germany
- 17:25 - 17:50** *Multicore NIC for Highest Data Rates*
Jörg Nolte, Brandenburg Technical University Cottbus-Senftenberg, Germany

WORKSHOPS AND SHORT COURSES - SUNDAY

Duration: 08:30 - 17:50

Room: St. Petersburg

WS-04

Equipment and Antennas for Satellite Communication

Organisers:

Jean Parlebas, Tesat, Germany

Michael Schneider, Airbus, Germany

Abstract

The continuously increasing need for capacity and flexibility results in a wide range of new developments for satellite communication. Components and equipment for higher frequencies, for example Q- and V-band have been developed as higher frequency bands provide a wider bandwidth and so data capacity can be increased. Additionally to RF performance, mass and cost are of increasing importance. Therefore also new manufacturing methods for cheap and lightweight waveguide components and antennas are required. Power handling and thermal aspects have to be considered, too. The equipment must be safe against multipaction and corona, but in space also the dissipation power is a challenging task. To minimise the dissipation power, amplifiers with a high efficiency are needed.

Both, telecommunication satellites and data downlink systems for observation satellites, have to deal with very high capacity needs. In order to use the available frequency spectrum as efficient as possible, new technologies like flexible antennas, flexible payload, on-board data processing or MIMO have to be used. Antennas, payload and data processing cannot be considered separately from each other. For the new requirements integrated solutions are necessary. Of course not only the space segment but also ground stations and user terminals have to be adapted to these new needs. Especially for nomad or mobile users, satellite communication is of high importance.

Objective of this workshop is to address this wide range of modern concepts and hardware for satellite communication.



Programme

08:30 - 08:40

Welcome and Introduction

08:40 - 09:10

State-of-the-Art Approaches to RF Breakdown Analysis and Their Impact on Applicable Margins

Carlos Vicente, Aurorasat, Spain

09:10 - 09:40

Advanced Techniques of Feed Horn Antenna Design for Modern Communication Satellites

Aitor Martinez Agoues, Anteral, Spain

09:40 - 10:10

Efficient Techniques for Complex Filter and Multiplexer Design with 3D FEM

Adam Lamecki, Gdansk University of Technology, Poland

10:10 - 10:50

Break

10:50 - 11:15

Design and Manufacturing of Waveguide Components Using ALM

Michael Kilian, Airbus, Germany

11:15 - 11:40

Concepts for Multi-Mode Dielectric Resonators

Michael Höft, University Kiel, Germany

11:40 - 12:05

Realisations of Flexible Waveguide Filters

Christian Arnold, Tesat-Spacecom, Germany

12:05 - 12:30

Component Development for Commercial Q/V Band Payloads

Jim Sowers, SSL, USA

12:30 - 13:50

Break

13:50 - 14:15

Cost Efficient Data Downlink Subsystems on Low Earth Orbit Observation Satellites

Patrick Thiemer, Tesat-Spacecom, Germany

14:15 - 14:40

Onboard Signal Pre-Distortion for High Throughput Satellites: Algorithms and Application Examples

Ovais Usman, Munich University of the Bundeswehr, Germany

14:40 - 15:05

On-Board Processing for Future Satellite Constellations

Rainer Wansch, Fraunhofer ISS, Germany

15:05 - 15:30

Space Developments at IMST: Ground Segment and Payload

Rens Baggen, IMST, Germany

15:30 - 16:10

Break

16:10 - 16:40

Active Antennas Activities at Space Engineering for Space and Ground Applications

Piero Gabellini, Space Engineering, Italy

16:40 - 17:10

Satellite Data Downlink Antennas

Joakim Johansson, Ruag, Sweden

17:10 - 17:40

Future Land Mobile Satellite Communication Terminals at Ku- and Ka-Band

Ferdinando Tiezzi, Viasat, Switzerland

WORKSHOPS AND SHORT COURSES - SUNDAY

Duration: 08:30 - 17:50

Room: Krakau

WS-05

Microwave and THz Devices and Circuits Based on Graphene

Organisers:

Herbert Zirath, Chalmers University, Sweden
Co-organiser Renato Negra, RWTH, Aachen, Germany.

Abstract

The Graphene Flagship project is a European initiative on the exploration of Graphene and related 2D-materials. It started in 2013 and consist of 156 partners with a total budget of 1B Euro, over 10 years. A part of the project is directed towards new high frequency electronic devices and circuits for applications from low GHz to THz. In this workshop different partners in the flagship will present recent results on devices and circuits for various applications such as flexible electronics, communication and imaging.

Programme

- 08:30 - 09:00** *Growth of Graphene on Different Substrates*
Włodzimierz Strupinski, ITME, Poland
- 09:00 - 09:30** *Nonlinear Modelling of Graphene Transistors*
David Jiménez, Universitat Autònoma de Barcelona, Spain
- 09:30 - 10:10** *New Graphene Devices for Flexible High Frequency Electronics and Related Circuits*
W. Wei, IEMN, University of Lille, Sciences and Technologies, France
- 10:10 - 10:50** *Break*
- 10:50 - 11:40** *Frequency Mixers for W-Band (70-110 GHz) Based on a 250 nm Graphene FET MMIC-Process on SiC-Substrate*
O Habibpour, Chalmers University, Sweden



- 11:40 - 12:30** *THz Power Detectors Fabricated on Si and Flexible Substrates*
X Yang, Chalmers University, Sweden
- 12:30 - 13:50** *Break*
- 13:50 - 14:50** *Presentation of the European Graphene Flagship Programme*
Jari Kinaret, Chalmers University, Sweden
- 14:50 - 15:30** *New Graphene Based Devices and Circuits on Glass and Flexible Substrates*
Daniel Neumaier, AMO GmbH, Germany
- 15:30 - 16:10** *Break*
- 16:10 - 17:00** *Micro- and Millimetre-Wave Receiver Frontends and Other Circuits Based on Graphene Devices*
Renato Negra, RWTH Aachen University, Germany
- 17:00 - 17:50** *Development of Inverters, Oscillators, and Memory Cells Based on Graphene FETs*
Roman Sordan, Polytechnic University of Milan, Italy

Duration: 08:30 - 17:50

Room: Prag

WS-06

Integration of III-V Nanowire Semiconductors for Next Generation High Performance CMOS SOC Technologies, and Competitive Solutions

Organisers:

Lars-Erik Wernersson, Lund University, Sweden
Didier Belot, CEA-LETI, France

Abstract

III-V nanowires are attractive for scaled transistors at future electronics nodes. The advantageous transport properties of III-V materials, combined with the improved electrostatic control of nanowire structures, allows for aggressive scaling of the gate length. In addition, the reduced dimension eases the path for integration of III-V materials on a Si platform, reducing cost and saving on scarce minerals. The introduction of a gate dielectric reduces the leakage current and assists in further scaling of III-V MOSFET channel lengths below the current limitations of III-V HEMT technologies. Currently the III-V nMOSFETs have demonstrated very high Ion for digital applications as well as very high gm. Objective of this workshop is to underline initiatives which aims at exploiting the transistor benefits in the millimetre wave application area. We will focus on key circuits including both LNAs and PAs. Co-integration of III-V technology with Si CMOS as well as all-III-V CMOS technology is considered. In this workshop, we will discuss the benefits of the III-V nanowire technology and compare to other available technologies. We will demonstrate very high performance on the transistor level and present the most promising approaches to exploit the transistor properties at the circuit level. The workshop will start with an overview of the state of art, and initiatives targeting III-V integration in Si technologies, followed by a presentation focussing on trends in RF and mmW applications which are demanding new developments for high performance devices. The workshop will also provide a complete overview from materials, through devices to full circuit design and circuit evaluation. Presentations from "best in class" European researchers active in the area of III-V materials, devices and circuits, will provide a European Perspective on the current state of the



art in III-V devices for RF and mmW applications. At the end of the day, a round table discussion will close the workshop, in order to well define which technology can answer to which application.

Programme

- 08:30 - 08:55** *Introduction*
Lars-Erik Wernersson, University of Lund, Sweden
- 08:55 - 09:20** *Application Trends and Technology Needs*
Sven Mattisson, Ericsson, Sweden
- 09:20 - 10:10** *Material for III-V Nanowires*
Iain Thayne, University of Glasgow, UK
- 10:10 - 10:50** *Break*
- 10:50 - 11:40** *III-V Materials and Devices for RF and mm-Wave Research*
Nadine Collaert, IMEC, Belgium
- 11:40 - 12:30** *Devices and Modeling for RF and mm-Wave*
Michael Schröter, University of Dresden, Germany
- 12:30 - 13:50** *Break*
- 13:50 - 14:40** *Devices and Modeling*
Erik Lind, University of Lund, Sweden
- 14:40 - 15:30** *III-V CMOS Co-Integration*
Veeresh Deshpande, IBM, Switzerland
- 15:30 - 16:10** *Break*
- 16:10 - 16:50** *III-V and Si Circuits for RF and mm-Wave*
Herbert Zirath, Chalmers University, Sweden
- 16:50 - 17:30** *III-V CMOS Circuit for RF and mm-Wave*
Thomas Merkle, Fraunhofer, Germany
- 17:30 - 17:50** *Round Table Discussion and Conclusion*
Moderator: Didier Belot, LETI, France

WORKSHOPS AND SHORT COURSES - SUNDAY

Duration: 08:30 - 17:50

Room: Budapest

WS-07

High-Q RF MEMS Devices and Multiphysical Cross-layer Circuit Design

Organisers:

Uwe Stehr, TU Ilmenau, Germany

Matthias Hein, TU Ilmenau, Germany

Abstract

Micro-electromechanical systems (MEMS) have found their way to a multitude of applications in automotive or medical systems or consumer electronics. Due to their electro-mechanical functionalities, in many cases, MEMS offer solutions superior or unprecedented compared to pure micro-electronic concepts.

In addition, MEMS devices, circuits, and systems operating at radio frequencies (RF) represent an extremely promising area of research. RF-MEMS offer the potential to overcome serious restrictions of their micro-electronic counterparts such as parasitic effects, non-linearities, susceptibility to high operating voltages, or steady-state power consumption. Micro-electro-mechanical devices enable very compact high-Q filters and low-phase noise reference oscillators. Combined with distributed transmission line technology, compact tuneable and reconfigurable filters and phase shifters can be composed.

In order to ultimately exploit the inherent advantages of combined microelectronic and micro-electro-mechanical functionalities, advanced modelling and design strategies have been developed, aiming towards a unified design approach at device, circuit, and system levels.

Accordingly, this workshop presents an expert panel on advanced high-Q RF MEMS devices and multiphysical cross-layer circuit design for a multitude of circuit applications, including but also reaching well beyond MEMS switches. The workshop addresses young as well as advanced engineering scientists working in the fascinating field of RF-MEMS research.



Programme

08:30 - 08:40

Welcome and Workshop Overview

08:40 - 09:20

Modelling and Implementation of High Q and High Electromechanical Coupling MEMS Resonators Based on Lithium Niobate Thin Films

Songbin Gong, University of Illinois at Urbana Champaign, USA

09:20 - 10:00

Engineering High Q CMOS-Compatible Aluminum Nitride on Silicon MEMS Resonators

Joshua E.-Y. Lee, City University Hong Kong, Hong Kong

10:00 - 10:10

Discussion

10:10 - 10:50

Break

10:50 - 11:35

RF MEMS-Based Q-Preserving Tuning

Héctor J. De Los Santos, NanoMEMS Research, USA

11:35 - 12:20

Multiphysical MEMS and CMOS Co-Simulation Approach Based on a Silicon-Ceramic Composite Substrate

Sebastian Gropp, Johannes Stegner, Uwe Stehr, ITU Ilmenau, Germany

12:20 - 12:30

Discussion

12:30 - 13:50

Break

13:50 - 14:35

Coventor's Tools for Design and Simulation of RF MEMS Resonators

Arnaud Parent, Coventor, France

14:35 - 15:20

Design Flow for High Volume CMOS-Integrated RF-MEMS

Arthur Morris, WiSpry, USA

15:20 - 15:30

Discussion

15:30 - 16:10

Break

16:10 - 16:45

Zero-Level Packaged Switches and Switched Capacitors for Reconfigurable RF and Microwave Circuits

Pierre Blondy, XLIM, Université de Limoges, France

16:45 - 17:20

RF MEMS Switch Modelling by using Artificial Neuronal Networks (ANN)

Larissa Vietzorreck, Zlatica Marinković, Tomislav Ćirić, Olivera Pronić-Rančić, Vera Marković, TU Munich, Germany

17:20 - 17:50

Non-Linearity in Surface Acoustic Wave Devices for Wireless Communications at 2 GHz Frequency - From Wafer Measurements to PCB Simulation

Vikrant Chauhan; Amelie Hagelauer, Robert Weigel, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

WORKSHOPS AND SHORT COURSES - SUNDAY

Duration: 08:30 - 17:50

Room: Istanbul

WS-08

High Efficiency Power Amplifiers and Smart Transmitters

Organisers:

Georg Böck, TU Berlin, Germany

Renato Negra, RWTH Aachen, Germany

Abstract

A wide range of advanced transmitter architectures which exploit the characteristics of highly efficient power amplifiers for wireless application has been the focus of international research over the past two decades. This full-day workshop combines international academic specialists to outline the most recent activities, achievements and future possibilities in this area. The talks span from circuit design to system level and introduce both progresses in the design of multiband Doherty and highly efficient power amplifiers, as well as their application in digital-centric flexible transmitter architectures. Special emphasis is on transmitters beyond the state-of-the-art technology of envelop tracking. The principles of pulse shaping, outphasing and active load-pulling transmitter architectures will be introduced and their potential will be illustrated through practical implementations and measurement results. An emphasis on critical issues and limitations in realising these amplifiers and systems will be given.

47TH EUROPEAN MICROWAVE CONFERENCE 2017



Programme

- 08:30 - 09:20** *Advanced GaN Based MMIC Power Amplifiers for Backhaul Radio Links*
Paolo Colantonio, University of Rome "Tor Vergata", Rome, Italy
- 09:20 - 10:10** *Frequency Reconfigurable Transmitter Technology*
Kevin Morris, University of Bristol, Bristol, UK
- 10:10 - 10:50** **Break**
- 10:50 - 11:40** *Linear and Efficient mm-Wave Transmitters for 5G Base Station Applications*
Mustafa Özen, Christian Fager, Chalmers University, Sweden
- 11:40 - 12:30** *Linear GaN Transmitter for Ku-Band VSAT*
Daniel Maassen, Felix Rautschke, Georg Böck, Berlin University of Technology, Germany
- 12:30 - 13:50** **Break**
- 13:50 - 14:40** *Self-Contained Power Amplifiers for 5G Mobile Communications*
Eric Kerherve, Boris Moret, University of Bordeaux, France
Vincent Knopik, STMicroelectronics, France
- 14:40 - 15:30** *Highly Efficient Broad- and Multiband PA Concepts for Modern RF Transmitters*
Anh Nghiem, Renato Negra, RWTH Aachen, Germany
- 15:30 - 16:10** **Break**
- 16:10 - 17:00** *Dynamic Supply Modulation for Broadband Signals*
Zoya Popovic, University of Colorado, USA
- 17:00 - 17:50** *Multilevel Outphasing Transmitters in Standard CMOS*
Renato Negra, RWTH Aachen, Germany

Duration: 08:30 - 17:50

Room: Oslo

WS-09

5G – From Concepts to Circuits

Organisers:

Rüdiger Quay, Fraunhofer IAF, Freiburg, Germany

Dietmar Kissinger, IHP, Frankfurt (Oder), Germany

Abstract

The ever rising demand of high data-traffic pushes the deployment of 5G cellular systems in 2020. 5G communication is a unifying connectivity concept for the next decade empowering new user experiences, connecting new industries and devices, enabling new services and delivering new levels of efficiency. These 5G communication systems demand high data rates up to 10 Gbps and high device density for Internet of Things.

This workshop will focus on key technologies paving the way to 5G connectivity. These include concepts and solutions for RF MIMO and millimetre-wave RF or hybrid beamforming, in combination with terminal CMOS frontend integration, a very dense base-station deployment, and flexible wireless backhaul networks.

Another critical aspect for 5G mobile and backhaul systems is the demand for a new-generation of broadband linear power amplifiers with high efficiency at high PAPR, supporting higher order modulation schemes. Therefore, this workshop further addresses 5G transmitter innovations at RF and millimetre-wave bands and delivering high linear power with wide-bandwidth and high efficiency at highly reduced form factors and cost.

47TH EUROPEAN MICROWAVE CONFERENCE 2017



Programme

- 08:30 - 09:20** *CMOS Front-Ends for 28 GHz 5G Terminals*
K. Entesari, Texas A&M, College Station, USA
- 09:20 - 10:10** *28 GHz RF Solution for Phased-Array-Systems*
U. Rüdtenklau, Infineon Technologies, Germany
- 10:10 - 10:50** **Break**
- 10:50 - 11:40** *Integrated Transceiver Modules with Phased-Array and Beam-Switching Antennas for Millimeter-Wave Access and Backhaul in 5G Mobile Networks*
C. Dehos, L. Dussopt, L. Marnat, CEA-LETI, France
- 11:40 - 12:30** *Flexible Millimetre-Wave Massive Beamforming Array Circuits for 5G Access and Backhaul Solutions*
A. Malignaggi, M. Ko, D. Kissinger, IHP, Germany
- 12:30 - 13:50** **Break**
- 13:50 - 14:40** *Challenges and Innovations in Transmitters of 5G MIMO Systems*
S. Pires, Ampleon, The Netherlands
- 14:40 - 15:30** *Power Amplifiers and IC Modules for 5G MIMO*
S. Krause, Fraunhofer IAF, Germany
- 15:30 - 16:10** **Break**
- 16:10 - 17:00** *Digital Intensive Transmitters for 5G*
L. de Vreede, TU Delft, The Netherlands
- 17:00 - 17:50** *Characterization of 5G MIMO SDR Transmitters*
N. Borges Carvalho, Universidade de Aveiro, Portugal

WORKSHOPS AND SHORT COURSES - SUNDAY

Duration: 08:30 - 17:50

Room: Copenhagen

WS-10

Fan-out Wafer Level and 3D Packaging Technologies for RF and mm-Wave Applications: Available Technologies and Applications from Industry

Organisers:

Tanja Braun, Fraunhofer IZM, Germany

Mehmet Kaynak, IHP, Germany

Abstract

In recent years, significant efforts have been devoted on heterogeneous integration technologies. Cost and reliability issues delayed the availability and easy access of these technologies. However, there has been a wide use of these technologies for consumer electronics in these days. Specifically, FOWLP technologies providing very low parasitics and high level of integration became the key technology for both low and high volume applications.

In parallel, latest developments on both highly scaled CMOS and SiGe BiCMOS technologies allow the circuits to operate at mm-wave and sub-THz frequencies. Successful circuit demonstrations up to 500 GHz paved the way for new applications at mm wave frequencies. However, packaging of these circuits with very low parasitics and low form factor seem to be the main challenge these days. In this workshop, the technology and application aspects of 3D/FOWLP technologies will be discussed. The available technologies will be presented by research institutes and industrial foundries. The successful packaged circuit examples will also be presented with some future need of the industry. Lastly, Multi-Project-Wafer (MPW) access of different available technologies for research and prototyping will also be discussed.



Programme

08:30 - 09:15

Advanced Packaging Solutions for RF Applications

Tanja Braun, Fraunhofer IZM, Germany

09:15 - 10:00

Fan Out Wafer Level System in Package

Eoin O'Toole, Nanium, Portugal

10:10 - 10:50

Break

10:50 - 11:35

Advances in High Frequency and mm-Wave Packaging

Klaus Pressel, Maciej Wojnowski, Infineon, Germany

11:35 - 12:20

Si based Interposer and Packaging Technologies for mm-Wave and THz Systems

Mehmet Kaynak, IHP, Germany

12:30 - 13:50

Break

13:50 - 14:35

Packaging for Low-Cost Millimeter-Wave Sensors

Jürgen Hasch, Robert Bosch GmbH, Germany

14:35 - 15:20

Requirements, Design Flow and Use of FOWLP Technology in High Performance Mixed Signal ASICs for Test and Measurement Applications

Gerhard Kahmen, Rohde & Schwarz, Germany

15:30 - 16:10

Break

16:10 - 16:55

RF Design of Advanced System-Integration Platforms and Integrated Antennas for Emerging Wireless Applications

Ivan Ndip, Fraunhofer IZM, Germany

16:55 - 17:40

3D Integration and Packaging Techniques for Telecom and Sensing Applications

Tauno Vähä-Heikkilä, VTT, Finland

Duration: 08:30 - 17:50

Room: Stockholm

WS-11

Chipless RFID Systems, Technology and Applications

Organisers:

Ferran Martín, CIMITEC, Universitat Autònoma de Barcelona, Spain

Nemai Karmakar, Monash University, Australia

Smail Tedjini, Université Grenoble-Alpes, France

Abstract

Chipless radio frequency identification (chipless-RFID) is an emerging disruptive wireless technology for identification, tracking and sensing. A chipless RFID tag does not contain an application specific integrated circuit (ASIC), hence the reader does all signal processing to read the tag. Chipless RFID tags are low-cost passive microwave/millimetre wave circuits where the information is stored in printable resonators and delay lines and typically implemented in flexible substrates such as polymers and papers, like optical barcodes. In recent years, chipless RFID sensors that combine functional/smart materials and chipless RFID technology have been developed. This workshop reports the most recent advances in chipless RFID tag design, reader architecture, signal processing, chipless RFID sensors and their various emerging applications. This workshop also includes the review of the state-of-the-art chipless RFID with a particular focus on the future trends, novel and advanced technologies for identification and sensing devices design with 3D-printing and carbon nano-tube (CNT), novel encoding schemes and strategies such as high-impedance surfaces, synchronous tags, and alphabets, and emerging applications such as the Internet of things (IoT), 5G communications, autonomous vehicles, smart wearable systems, security and authentication.

Programme

08:30 - 09:20

Chipless RFID: EM Barcodes of the New Millennium
Nemai Karmakar, Monash University, Australia



09:20 - 10:10

Chipless RFID System: Modelling, Medium Access Control (MAC), Ranging and Signaling

Mohamed El-Hadidy, Duisburg-Essen University, Germany

10:10 - 10:50

Break

10:50 - 11:40

Inkjet-/3D-Printed Chipless RFID-Enabled Wireless Platforms for IoT and Smart Skin Applications

Manos T. Tentzeris, Georgia Institute of Technology, USA

11:40 - 12:30

Chipless RFID Tags and Sensors Realised with High Impedance Surfaces

Simone Genovesi, Filippo Costa, Michele Borgese, Alessio Dicandia, Agostino Monorchio and Giuliano Manara, Università di Pisa, Italy

12:30 - 13:50

Break

13:50 - 14:40

Printed Chipless RFID Sensors for Smart Wearable IoT Applications

Lirong Zheng^{1,2}, Zhuo Zou¹, Yiqiang Zhan¹, Yongfeng Mei¹, Yi Feng², Qiang Chen², Hannu Tenhunen², ¹Fudan University, China, ²KTH - Royal Institute of Technology, Sweden

14:40 - 15:30

Chipless RFID Systems with High Data Capacity for Security and Authentication Applications

Cristian Herrojo, Javier Mata-Contreras, Ferran Paredes, Ferran Martín, CIMITEC, Universitat Autònoma de Barcelona, Spain

15:30 - 16:10

Break

16:10 - 17:00

Chipless RFID Tags Based on Alphabets

Smail Tedjini, Université Grenoble-Alpes, France

17:00 - 17:30

Discussion and Concluding Remarks

WORKSHOPS AND SHORT COURSES - SUNDAY

Duration: 08:30 - 12:30

Room: Seoul

WS-12

Newest Trends in OTA Performance Testing for Automotive and 5G

Organisers:

Wim Kotterman, TU Ilmenau, Germany

Abstract

With the recent standardisation by 3GPP and CTIA of Over-the-Air testing of 3G/4G mobile User Equipment, a logical development in OTA testing is concentrating on 5G mobile. However, the advent of autonomous and/or cooperative driving and the importance of V2X for traffic safety and optimised traffic flow, open up completely new themes for OTA testing.

Complex, and hazardous, situations cannot reproducibly be enacted in real life, which calls for virtual environments for testing, like virtual electro-magnetic environments for mobile comms and virtual drive tests for automotive. In these virtual environments, sensor data beyond RF communications have to be included too, e.g., radar and visual clues. Shared with 5G is the problem posed by the introduction of integrated radio-heads, i.e., separating antennas from RF equipment becomes impossible, especially at millimetre wave frequencies. Then, access to the internal functions of the equipment can only be gained Over-the-Air. This workshop presents visions and initiatives, from academia, research institutes, and industry throughout Europe on these topics.



Programme

- 08:30 - 08:55** *Understanding the Critical Role of OTA Testing to the Success of mm-Wave 5G*
Malcolm Robertson, Keysight, USA
- 08:55 - 09:20** *Over-the-Air Automotive Antenna Measurements*
Aleksis Anterow, Orbit/FR, Germany
- 09:20 - 09:45** *Test Tracks in the Automated Driving Era: Testing Wireless Communication for Cooperative Intelligent Transport Applications*
Erik Ström, Chalmers University, Sweden
- 09:45 - 10:10** *Antenna Measurements and Wave Propagation in the Virtual Road for Future Mobility Applications*
Christian Bornkessel, TU Ilmenau, Germany
- 10:10 - 10:50** *Break*
- 10:50 - 11:10** *Measurements with an Over-the-Air Multi-Probe Setup for Cars*
Taimoor Abbas, Volvo Car, Sweden
- 11:10 - 11:30** *V2X Channel Modelling: Requirements, Standards, and Gap Analysis*
Mate Boban, Huawei ERC, Germany
- 11:30 - 11:50** *Virtual Radar Drive - Simulation of the Automotive Radar Channel Including Interference*
Mario Pauli, Karlsruhe Institute of Technology, Germany
- 11:50 - 12:10** *Over the Air Testing of 802.11p Links*
Jürgen Kunisch, IMST, Germany
- 12:10 - 12:30** *Wireless Cable – The Future of OTA Testing for V2X Systems and ITS*
Christopher Schirmer, Fraunhofer IIS, Germany

Duration: 08:30 - 17:50

Room: Shanghai

WS-13

Advanced RF and Microwave Circuit Technologies

Organisers:

Dmitry Kholodnyak, St. Petersburg Electrotechnical University, Russia
Matthias Hein, TU Ilmenau, Germany

Abstract

Wireless connectivity shapes our daily life. RF and microwave frontends are indispensable core elements of every wireless sensor, mobile communication or navigation device, or signal processor. Key enablers are compact size, high functional density, high level of integration, high frequency selectivity, electronic reconfigurability, high energy efficiency, and low power consumption.

This workshop aims at presenting latest research on advanced RF and microwave circuit technologies in the area of metamaterials, multi-band filters, and advanced substrate and device technologies. The contributions will be provided by renowned experts from all over the world, covering relevant applications reaching from radio-frequency identification over antennas up to millimetre wave systems. The workshop addresses young engineers seeking in-depth information as well as experienced researchers wishing to update their advanced background knowledge.



Programme

- 08.30 - 08.40** *Welcome, Overview, and Introduction*
- 08:40 - 09:25** *Broadband Interconnects and Miniaturized Components in Substrate Integrated Waveguide (SIW) Technology*
Maurizio Bozzi, University of Pavia, Italy
- 09:25 - 10:10** *Unique Silicon-Ceramic Substrate Technology for Advanced RF Applications*
Jens Müller, TU Ilmenau, Germany
- 10:10 - 10:50** *Break*
- 10:50 - 11:40** *RF/Microwave Circuits, Sensors and RFID Systems based on Metamaterial Concepts*
Ferran Martin, Universtat Autònoma de Barcelona, Spain
- 11:40 - 12:30** *Dirac Cone Metamaterials for Propagation Control*
Atsushi Sanada, Osaka University, Japan
- 12:30 - 13:50** *Break*
- 13:50 - 14:40** *Recent Advance in Planar RF Filter Technologies*
Jiasheng Hong, Jia Ni, Zhou Zhou, Heriot-Watt University, Edinburgh, UK
- 14:40 - 15:30** *Practical Aspects of Multilayer Planar Design for the Implementation of Multi-Band Filters*
Riana Geschke, University of Cape Town, South Africa
- 15:30 - 16:10** *Break*
- 16:10 - 16:55** *Dual-Mode Frequency Tunable Planar Filter Design with Capacitive Coupling Technique*
Kenjiro Nishikawa, Kagoshima University, Japan
- 16:55 - 17:40** *Advanced Millimetre-Wave Systems and Packaging*
Michael Schlechtweg, Fraunhofer Institute for Applied Solid State Physics, Germany
- 17:40 - 17:50** *Discussion and Conclusion*

WORKSHOPS AND SHORT COURSES - SUNDAY

Duration: 08:30 - 12:30

Room: Neu Delhi

WS-14

Modelling, Identification and Suppression of Parasitic Modes in On-Wafer Measurements

Organisers:

Chong Li, National Physical Laboratory, UK
Franz-Josef Schmückle, Ferdinand-Braun-Institut, Germany

Abstract

Since being first introduced more than thirty years ago, microwave on-wafer probes and the related on-wafer measurements have made significant advances. For example, the most recent development of probes makes on-wafer measurement possible at terahertz frequencies and in nanoscale at microwave frequencies. The evolution of on-wafer technology has truly contributed to the development of semiconductor industry. Although it has become a prerequisite to scientific research and industry, on-wafer measurement still has many problems that have not been solved, or even properly identified - for example the higher order modes generated when probing devices during probe calibration and actual device measurement. Other parasitic modes may result from substrates and surrounding circuits. Nevertheless the parasitic modes have significant effect on the accuracy of measurement, especially at higher frequencies such as millimetre wave frequencies and above.

This workshop will review the challenges of on-wafer measurements including some of the recent progress on modelling, identification and suppression of parasitic modes in on-wafer measurements by a range of experts from different research institutes and industries. It is expected that by the end of the workshop all participants will have better understanding about parasitic modes and will have learned how to identify and suppress higher-order modes so that they can make more accurate and reliable on-wafer measurements. The agenda of the workshop is as follows.



Programme

- 08:30 - 9:00** *On the Importance and Difficulties of Planar On-Wafer Measurements at Submillimeter Frequencies*
Roger Lozar, Fraunhofer Institut for Applied Solid State Physics, Germany
- 09:00 - 09:30** *Minimising Sources of Errors in Wafer-Level Measurements at Sub-mm Wave Frequencies: What we've learned so far*
Andrej Rumiantsev, MPI Corporation, Taiwan
- 09:30 - 10:10** *Reduction of Parasitic Effects in On-Wafer Measurements: How can we improve calibration structures and what about the probes?*
Franz-Josef Schmückle, Ralf Doerner, Ferdinand-Braun-Institut, Germany
- 10:10 - 10:50** *Break*
- 10:50 - 11:20** *Millimeter-Wave On-Wafer Measurements: Calibration using Commercial Standards and Actual Measurements*
Chong Li, National Physical Laboratory, UK
- 11:20 - 11:50** *Suppression of Parasitic Mode Effects in On-Wafer Measurements via Crosstalk Correction*
Uwe Arz, Physikalisch-Technische Bundesanstalt, Germany
- 11:50 - 12:20** *Analysis of Parasitic Modes and Probe Level Crosstalk in (Sub-) mm-Wave Calibrations*
Marco Spirito, TU Delft, The Netherlands
- 12:20 - 12:30** *Panel Session: What have we learned and what are the future opportunities and challenges?*
All speakers

WORKSHOPS AND SHORT COURSES - SUNDAY

Duration: 13:50 - 17:50

Room: Neu Delhi

WS-15

The Basics of Traveling Wave Tube Amplifiers

Organisers:

Roberto Dionisio, European Space Agency, The Netherlands
Claudio Paoloni, Lancaster University, UK

Abstract

Advanced RF/microwave applications demand power amplifiers with ever greater linear power in conjunction with high efficiency and bandwidth at a low cost. As a result, power amplifiers are considered as the most critical and expensive components in an RF-front module, like satellite communication systems and transponders, RADAR transmitters, EMC tester, jammers, etc.

So far solid state electronics is not able to respond to this quest, especially when tens of Watts in the millimetre wave range are required. Travelling wave tube amplifiers (TWTs) are predicted to remain the only solution for high frequency, wide band and high power amplification in the next future. However, TWTs are "obscure" components for the vast majority of microwave designers.

This workshop on The Basics of Travelling Wave Tube Amplifiers is conceived to give the attendees understanding of the latest state-of-the-art TWTAs operation with focus on high frequency space applications. It will start providing a summary of the main applications and related requirements impacting the amplifier design and will then address the basic principles of operation of the main functional building blocks with focus on slow wave structures.

Then, to facilitate the comprehension of these blocks, the course will present a practical perspective of the application of available design tools. The attendees will be invited to an interactive discussion on all the steps comprising the design of a TWT from the synthesis of the requirements up to the performance verification.



Programme

13:50 - 14:00

Welcome

14:00 - 14:30

Microwave Tubes, a Key Element in the Modern World of Communications

Ernst Bosch, Thales Electronic Systems GmbH, Germany

14:30 - 15:00

TWT Basic Operation Principles and Building Blocks

Rosario Martorana, Finmeccanica, Italy

15:00 - 15:30

Slow-Wave Structures for Micro- and Millimeter-Waves

Claudio Paoloni, Lancaster University, UK

15:30 - 16:10

Break

16:10 - 16:55

Materials and Techniques in TWT Manufacturing

Roberto Dionisio, ESA ESTEC, The Netherlands

16:55 - 17:40

Traveling Wave Tube Design with Simulation

Monika Balk, CST AG, Germany

17:40 - 17:50

Open Discussion and Concluding Remarks

Duration: 13:50 - 17:50

Room: Seoul

SS-01

Multibeam Antennas and Beamforming Networks

Organisers:

Piero Angeletti, European Space Agency, The Netherlands
Giovanni Toso, European Space Agency, The Netherlands

Abstract

Multi-Beam Antennas (MBAs) find application in several fields including wireless and satellite communications, RADARs for electronic surveillance and remote sensing, science (e.g. radio telescopes), RF navigation systems, etc.

Beam-Forming Networks (BFNs) play an essential role in any antenna system relaying on a set of radiating elements to generate a beam.

Depending mainly on the antenna mission (i.e. operational frequency, pattern requirements, transmitting and/or receiving functionality, number of beams to be generated, etc.) different MBA architectures may be selected: from antenna systems completely based on independent feeds illuminating a number of reflectors, to hybrid systems based on both arrays and reflectors, from phased arrays to lens antennas.

The trade-off on the antenna solution largely involves the BFN interconnectivity and flexibility requirements, with a wide range of applicable BFN architectures with different complexity and performance.

The objective of the course is to present design principles and state-of-the-art in MBAs and BFNs.



Programme

13:50 - 14:40

Fundamentals of Multibeam Antennas

Piero Angeletti, European Space Agency, The Netherlands

14:40 - 15:30

Multibeam Antenna Architectures - Part 1

Giovanni Toso, European Space Agency, The Netherlands

15:30 - 16:10

Break

16:10 - 16:50

Multibeam Antenna Architectures - Part 2

Giovanni Toso, European Space Agency, The Netherlands

16:50 - 17:30

Beamforming Networks

Piero Angeletti, European Space Agency, The Netherlands

17:30 - 17:50

Applications of Multibeam Antennas

Piero Angeletti, European Space Agency, The Netherlands

WORKSHOPS AND SHORT COURSES - MONDAY

Duration: 08:30 - 17:50

Room: Krakau

WM-01

Current and Future Use of Spectrum by PMSE - 4th PMSE Workshop at EuMW

Organisers:

Georg Fischer, University of Erlangen-Nurnberg, Germany
Matthias Fehr, Co-President APWPT, Germany

Abstract

PMSE (Program Making and Special Events) equipment has become, in particular, a fundamental element of our daily cultural life and wireless systems for audio, video and effect control are now essential tools for modern content production. They are employed in journalistic news coverage, sports events, theatres, by educational and cultural institutions, trade fairs, film productions, live music events, conference centres, churches, sports clubs, etc.

PMSE is facing dramatic changes in its spectrum allocations worldwide and its coordination with other wireless services. On the other hand PMSE use and requirements regarding link availability, latency and quality are ever increasing. New techniques for spectrum management and transmission schemes are discussed in standardisation and regulation to meet these challenges.

In this workshop we would like to discuss with the participants the various types of PMSE applications, their spectrum use and impact of currently foreseeable changes in Radio Spectrum allocations. What decisions need to be taken at both a European and national level?

PMSE's current status and its future outlook is discussed.

Studies on new spectra for compensation of lost spectrum at UHF will be presented. The driving forces behind increase of communications and fundamental limitations to consider from information theory perspective are discussed.

New technologies for PMSE, i.e. 5G technology, were studied in industry and standards to ensure a high availability and low latency of PMSE links in the future. We discuss the advantages and possible limitations of such new PMSE technologies.

In the following we will also have a look at the socioeconomic benefit generated by the cultural and creative industry relying on PMSE. The workshop will contain several panel rounds to allow for interactive discussion with the audience.

A warm welcome to join our discussions!



Programme

- 08:30 - 08:45** *Welcome and Brief Introduction into the Workshop*
Alan March, APWPT, UK
- 08:45 - 09:30** *Short Introduction to PMSE and the related Economic Value of the Culture and Creative Industry*
Norbert Hilbich, APWPT, Germany
- 09:30 - 10:10** *Outcome of International Working Groups and Consequences for PMSE - Result of Spectrum Activities of ETSI, CEPT and ITU-R for Audio and Video PMSE*
Matthias Fehr, APWPT, Germany
- 10:10 - 10:50** *Break*
- 10:50 - 11:45** *5G Technology as the Subject of Research for a Possible Use for PMSE - The Publicly Funded Research Project PMSE-xG*
Andreas Wilzeck, wiseSense GmbH, Germany
- 11:45 - 12:30** *Output of Measurements of the PMSE Live Spectrum Use - Update 2017*
Matthias Fehr, DKE AK731.0.8 (DIN/VDE), Germany
- 12:30 - 13:50** *Break*
- 13:50 - 14:30** *PMSE in Events of the Content and Event Production*
Daniel Künzi, Technology and Production Center Switzerland AG, Switzerland
- 14:30 - 15:10** *Analysis of Changes in PMSE Spectrum and Transmission Technology - Our Prediction for PMSE, Operated Under Changed Conditions - Update 2017*
Georg Fischer, University Nurnberg-Erlangen, Germany
- 15:10 - 15:30** *User-Friendly Strategies to Improve the Usage of Radio Spectrum and a Continuous Improvement Process*
Hubert Eckart, Deutsche Theatertechnische Gesellschaft, Germany
- 15:30 - 16:10** *Break*
- 16:10 - 16:50** *Elements for a Long-Term Strategy on Spectrum Requirements for Wireless PMSE Applications by Consideration of the Work of RSPG*
Franz Ziegelwanger, Radio Spectrum Policy Group of European Commission, Belgium
- 16:50 - 17:35** *Users of PMSE are Affected by a Changing World - Discussions of the Impact on Cultural and Creative Segments, Approaches and the Necessary Required Support*
Moderation: Stella Morabito, SEINEP, France
- 17:35 - 17:45** *Closing Remarks*
Alan March, APWPT, UK

WORKSHOPS AND SHORT COURSES - MONDAY

Duration: 08:30 - 17:50

Room: Prag

WM-02

Electromagnetic Sensors for Life Science Applications

Organisers

Christian Damm, University of Ulm, Germany
Norbert Klein, London Imperial College, UK

Abstract

This workshop will present medical applications based on electromagnetic sensors from the molecular to the cellular and tissue level. The characteristic interaction between electromagnetic waves in the micro-, mm- wave and Terahertz region and single molecules, separated cells or tissues promises manifold applications and is discussed in great detail. The applications range from integrated Lab-on-Chip solutions with a broad range of applications up to very specific detection of single pathogens in a well-defined lab environment.

Among the addressed applications is the detection of tumors using different approaches and even the combination of detection and treatment within a single theranostic device, the analysis of breath gas, general dielectric spectroscopy in different frequency ranges and from the molecular to cellular samples. Furthermore, the detection of African Trypanosomiasis and blood sugar analysis are presented as very specific application with great importance to the society on the way to cost effective point-of-care applications.



Programme

08:30 - 09:15

Integrated Lab-on-Chip Terahertz Spectroscopy Platform in BiCMOS Technology

Dietmar Kissinger, Defu Wang, Mesut Inac, Canan Baristiran Kaynak, Matthias Wietstruck, Mehmet Kaynak, Bernd Tillack, IHP, Frankfurt/Oder, Germany

09:15 - 10:00

Integrated Microstructures for Marker Free Detection of Conformal Changes of Membrane Proteins using Plasmon-Enhanced THz Spectroscopy

Maximilian Bettenhausen¹, Subhajit Guha², Marcin Kazmierczak², Julia Flesch³, Chang You³, Thomas Schröder², Jacob Piehler³, Bernd Witzigmann¹, ¹University of Kassel, Germany, ²IHP, Frankfurt/Oder, Germany, ³University of Osnabrueck, Germany

10:10 - 10:50

Break

10:50 - 11:35

Ultra-Sensitive Marker-Free Biomolecular THz Detection for Tumor Analysis

Christian Weisenstein¹, Dominik Schaar², Heiko Schäfer-Eberwein¹, Anja K. Bosserhoff¹, Peter Haring Bolívar¹, ¹Institute of High Frequency and Quantum Electronics HQE, University of Siegen, Germany, ²Friedrich-Alexander-University Erlangen-Nürnberg, Germany

11:35 - 12:20

Highly Sensitive and Highly Selective Breath Gas Sensor Based on mm-Wave Molecular Spectroscopy

Heinz-Wilhelm Hübers¹, Nick Rothbart¹, Klaus Schmalz², Johannes Borngräber², Dietmar Kissinger², ¹HU Berlin, Germany and DLR, Berlin-Adlershof, Germany, ²IHP, Frankfurt/Oder, Germany

12:30 - 13:50

Break

13:50 - 14:20

Microwave Sensors and Actuators for Blood Glucose Measurements and Rapid Bacteria Identification

Adrian Porch, Cardiff University, UK

14:20 - 14:50

Microwave Dielectric Spectroscopy as an Analytic Technique for Reproducible Cell and Molecule Sensing

Katia Grenier, David Dubuc, National Scientific Research Center, France

14:50 - 15:20

Lab-on-Chip Microwave-to-Terahertz Single Cell Detection: Towards Liquid Biopsy

Norbert Klein, Clare Watts, Stephen M. Hanham, Imperial College London, UK

15:30 - 16:10

Break

16:10 - 16:40

Synchronizing Broadband Dielectric Spectroscopy with Fluorescence Microscopy for Biological Material Characterisation

Ilja Ocket, Bart Nauwelaers, IMEC, Belgium

16:40 - 17:10

Dual Mode Microwave Applicator for Diagnosis and Thermal Ablation Treatment of Organic Tissue

Carolin Reimann¹, Margarita Puentes¹, Thomas Vogl², Rolf Jakoby¹, ¹TU Darmstadt, Germany, ²Goethe University, Frankfurt am Main, Germany

17:10 - 17:40

Electromagnetic mm-Wave and THz Sensors for the Detection of African Trypanosomiasis using RNA Aptamer Derivatized Surfaces

Mario Müh¹, Matthias Maasch¹, H. Ulrich Göringer², Christian Damm¹, ¹University of Ulm, Germany ²TU Darmstadt, Germany

17:40 - 17:50

Podium Discussion Between All Presenters and the Audience

Chaired and guided by Christian Damm, Norbert Klein

WORKSHOPS AND SHORT COURSES - MONDAY

Duration: 08:30 - 17:50

Room: Budapest

WM-03

Far-field and Near-field Techniques for Wireless Energy Transfer

Organisers:

Alessandra Costanzo, University of Bologna, Italy,
Nuno Borges Carvalho, IT Aveiro, Portugal

Abstract

Providing energy without wires has undoubtedly achieved a tremendous interest in the last period. In many different environments, such as industrial plants, smart ambients and transportations, different needs are emerging with respect to either the operating frequency or the power level involved or the EM mechanism to be exploited, namely far-field or near-field. This full-day workshop is aimed at providing an overview of the most recent results in this area.

In the first part theoretical aspects for the circuit-level and system-level design of a re-charging system are analysed in the near-field and both capacitive and inductive coupling are considered. Then a walk through all the aspects of designing, realising and testing rectifying antennas (rectennas) will be followed to exploit far-field for recharging.

In the second part a number of application-driven systems adopting 3D structures for recharging mobile and implantable devices are presented. From the technological point of view, Inkjet printing and 3D printing are analysed as low cost, high performance technologies for RF electronics. Furthermore, additive manufacturing is considered as a platform for heterogeneous integration of complex circuit structures, including metals, dielectrics and semiconductors and packages. 3D printed microwave antenna array structures and lenses, with application to wireless power transfer and energy harvesting will be presented and implanted electronic systems will be addressed.

Finally signals solutions for minimising the power needed for sensor operations are considered and proofs-of-concept are provided.

Lecturers presentations will be alternated with periods of open discussions to engage the audience and to discuss next exploitable research areas in this field.



Programme

08:30 - 08:35

Welcome

A. Costanzo, N. Carvalho

08:35 - 09:20

Resonant Inductive WPT: Possible Operative Regimes

G. Monti, M. Mongiardo, F. Mastri, A. Costanzo, M. Dionigi, L. Tarricone, R. Sorrentino, University of Salento, Italy

09:20 - 10:05

Rigorous Description of Capacitive Wireless Power Transfer Chain

Jan Kracek, Milan Svanda, Milos Mazanek, Jan Machac, Czech Technical University in Prague, Czech Republic

10:10 - 10:50

Break

10:50 - 11:30

Rectenna Realization: A Practical Step by Step Approach

H. Visser, TNO, The Netherlands

11:30 - 12:10

Inkjet and 3D Printed Circuits for Wireless Power Transfer, Energy Harvesting, Communication and Sensing

Apostolos Georgiadis, Ana Collado, Herriot-Watt University, UK
Manos Tentzeris, Georgia Tech, USA

12:10 - 12:20

Discussion

12:30 - 13:50

Break

13:50 - 14:35

THz Rectennas: Rectification Prospects and Challenges

M. Shanawani, D. Masotti, A. Costanzo, University of Bologna, Italy

14:35 - 15:20

Cooperative Hybrid and Ambient Power Harvesting for Future Wireless System Applications

Ke Wu, Simon Hemour, and Xiaoqiang Gu, Polytechnic Montreal, Canada

15:30 - 16:10

Break

16:10 - 16:50

Harmonic RFID: A Way to Exploit Each Drop of Available Energy to Wirelessly Interrogate a Sensor Tag

Luca Roselli, Federico Alimenti, Paolo Mezzanotte, Giulia Orecchini, Valentina Palazzi, Luca Roselli, University of Perugia, Italy

16:50 - 17:30

Wireless Power Transmitters on Demand

N. Carvalho, Daniel Belo, Ricardo Correia, Nuno Borges Carvalho, IT Aveiro, Portugal

17:30 - 17:50

Open Discussion and Concluding Remarks

WORKSHOPS AND SHORT COURSES - MONDAY

Duration: 08:30 - 12:30

Room: Istanbul

WM-04

High Power RF- and Microwave Amplifiers and Generators

Organisers:

Georg Böck, TU Berlin, Germany

Abstract

This half-day workshop presents topical development trends in the field of very high power signal generation and amplification. Starting from tube based microwave power generation new transistors using Si-, GaAs- and GaN-Technology are more and more taking over former tube dominated areas like broadcast, radar, jamming and industrial applications. Pros and Cons of tubes and solid-state devices will be discussed. The talks span from device level to circuit design and system level considerations. It will discuss also efficiency enhancement concepts of high power broadband transmitters for analog and digital broadcast services. Another topic will review high power RF generators in the kilowatt range with operating frequencies up to 100 MHz for plasma applications. Essential requirements for these generators are high efficiency and extreme ruggedness including the ability of temporarily withstanding 100% reflected power. This workshop will discuss several amplifier- and power-combining topologies suitable for the realisation of those amplifiers with highly reflective loads. Moreover, insights with respect to product qualification, lifetime testing and industrialized, cost effective high volume production will be outlined.



Programme

08:30 - 09:20

Can Solid State Devices Replace Tubes in the Near Future?

Marcel Mallah, Fricke und Mallah Microwave Technology GmbH, Germany

09:40 - 10:10

High Power RF-Generators for Plasma Excitation

Daniel Gruner, COMET AG, Plasma Control Technologies, Switzerland

10:10 - 10:50

Break

10:50 - 11:40

Bandwidth isn't Everything - Efficiency Rules the World

Lothar Schenk, Rohde & Schwarz, Germany

11:40 - 12:30

High Power Broadband Amplifiers for EMC Applications

Florian Ohnimus, Rohde & Schwarz, Germany

Duration: 13:50 - 17:50

Room: Istanbul

WM-05

Connecting to MMIC at Millimeter-Waves

Organisers:

Jan Hesselbarth, University of Stuttgart, Germany

Abstract

Advances in high-speed integrated circuit technologies led to various new applications for millimetre-wave systems in communication and radar. Besides requiring fast active elements, millimetre-wave systems make heavy demands on assembly precision, materials and technologies, all needed for low loss connections from the MMIC to the operating environment. This workshop will highlight advances and limitations of various techniques available to route millimetre-wave signals to/from MMIC. Presentations will include different aspects of bonding technologies, such as wire-bonds, ribbon bonds, flip-chip bonds, as well as direct connections between the MMIC and non-planar waveguides. In addition, packaging of millimetre-wave chips is discussed. In a first presentation, flip-chip interconnects operating up to 500 GHz are presented by the FBH institute, Berlin. Thereafter, performance of advanced wire-bonds at millimetre-waves and the characteristics of CMOS on-chip antennas are discussed by Tel Aviv University. Next, Fraunhofer IAF, Freiburg, discusses low-loss on-chip transmission lines and shows novel concepts to couple chips directly to the rectangular waveguide fundamental mode by means of on-chip field probes. In the second half of the workshop, Northrop Grumman brings more aspects of direct coupling from on-chip dipoles to rectangular waveguide, including waveguides made by DRIE. Then, Infineon presents concept and advanced features of the embedded wafer level ball grid array (eWLB) package for millimetre-wave applications. Finally, University of Stuttgart discusses coupling from chip to dielectric or metallic waveguide by means of on-chip resonators.



Programme

13:50 - 14:23

Flip-Chip Interconnects for DC to 500 GHz

Michael Hrobak, Ralf Doerner, Franz-Josef Schmueckle, Nils Weimann, Siddhartha Sinha, Sirinpa Monayakul, Viktor Krozer, Wolfgang Heinrich, Ferdinand-Braun-Institut, Germany

14:23 - 14:56

Interfacing CMOS Circuits to Waveguides and Free Space in the 60-600GHz Range

Eran Socher, Tel Aviv University, Israel

14:56 - 15:30

Novel Concepts for On-Chip Interconnects and Waveguide Packaging Enabling Advanced Multifunction ICs up to 1 THz

Michael Schlechtweg, Fraunhofer IAF, Germany

15:30 - 16:10

Break

16:10 - 16:43

Submillimetre Wave InP HEMT Packaging

Bill Deal, Kevin Leong, Northrop Grumman Corp., USA

16:43 - 17:16

Packaging Trends for mm-Wave Radar and Communication Systems

Maciej Wojnowski, Vadim Issakov, Infineon Technologies, Germany

17:16 - 17:50

Coupling of Metal and Dielectric Waveguides to Integrated Circuits

Jan Hesselbarth, University of Stuttgart, Germany

WORKSHOPS AND SHORT COURSES - MONDAY

Duration: 08:30 - 12:30

Room: Oslo

WM-06 THz Electronics Technology for Communications and Sensing

Organisers:

Peter Gardner, The University of Birmingham, UK
Marina Gashinova, The University of Birmingham, UK

Abstract

THz electronics opens up the spectrum from a few hundred GHz to about 1 THz, enabling high resolution sensing and high bandwidth communications. These will generate true mass market applications. Micromachining technologies applied to waveguiding structures and travelling wave tubes, and continual advances in semiconductor devices, are enabling the extension of mm-wave circuits upwards in frequency. Important applications are emerging, for example: high resolution imaging radar for autonomous platforms, and the development of high data rate wireless communications, which will continue to be vitally important well beyond 5G and the Internet of Things. This workshop explores several aspects of THz electronics. Part 1 will focus on technology, showing how guided wave structures, interconnects, antennas and active circuits are realised and integrated on semiconductor substrates and micromachined waveguiding structures. The extension of TWTA technology into THz bands and the technology and application of resonant tunnelling diodes are also covered as examples of emerging active components. Part 2 considers applications in low THz radar and wireless communications, and concludes with discussion of the low THz measurement challenges.



Programme

08:30 - 08:40

Introduction

Peter Gardner, University of Birmingham, UK

08:40 - 09:05

THz-MICs Interconnect and Integrated Antenna Technology on GaN on Low-Resistivity Silicon Substrates
Khaled Elgaid, University of Glasgow, UK

09:05 - 09:25

Micromachined THz Waveguiding Structures and Filters
Mike Lancaster, Xiaobang Shang, Cheng Guo, University of Birmingham, UK

09:25 - 09:50

Broadband Gyrotron Travelling Wave Amplifiers for Communication and Spectroscopic Applications
Wenlong He, C. R. Donaldson, L. Zhang, P. McElhinney, H. Yin, J. R. Garner, K. Ronald, A. W. Cross, A. D. R. Phelps, University of Strathclyde, UK

09:50 - 10:10

Resonant Tunnelling Diode Terahertz Sources for Broadband Wireless Communications
Edward Wasige, University of Glasgow, UK

10:10 - 10:50

Break

10:50 - 10:55

Introduction to Part 2

Peter Gardner, University of Birmingham, UK

10:55 - 11:20

Low-THz Medium Range Radar
Marina Gashinova, University of Birmingham, UK

11:20 - 11:45

Wireless Communications Towards the 300 GHz
Claudio Paoloni, Lancaster University, UK

11:45 - 12:10

Measurement Challenges in THz Electronics
Nick Ridler, National Physical Laboratory, UK

12:10 - 12:30

General Discussion and Closing Remarks
Marina Gashinova, University of Birmingham, UK

Duration: 08:30 - 12:30

Room: Copenhagen

WM-07 mm-Wave Antenna Measurement Techniques and Facilities Planning

Organisers:

Tinus Stander, University of Pretoria, South Africa
Bart Smolders, Eindhoven University of Technology, The Netherlands

Abstract

With the proliferation of communications and remote sensing applications in the mm-wave (30 - 300 GHz) band, there is an increased need for reliable test facilities and test methods for various antennas in this frequency band. Although the theory and principles of measurement are quite similar to those of microwave antennas, the techniques and facilities setup pose unique challenges that require innovative solutions.

This workshop brings together presenters with practical, hands-on experience in mm-wave antenna measurement to discuss how they overcame some of these challenges. These include the design of test facilities for on-chip mm-wave antennas, nearfield scanning techniques, practical cost-saving measures, and industrialised test solutions. The workshop concludes with a panel discussion on the future challenges in mm-wave antenna measurements.



Programme

08:30 - 08:40

Welcome and Introduction

Tinus Stander, UP, South Africa

08:40 - 09:25

Far-Field Measurements of On-Chip Antennas
Bart Smolders, Ad Reniers, Sander Geluk, Qiang Liu, Eindhoven University of Technology (TU/e), The Netherlands

09:25 - 10:10

Integrated Antenna Measurements Using a Robotic Arm
Linus Böhm, Ulm University, Germany

10:10 - 10:50

Break

10:50 - 11:35

Low-Cost Approaches to mm-Wave Antenna Measurements

Tinus Stander, UP, South Africa

11:35 - 12:20

mm-Wave and Sub-THz Antenna Measurements: From Academic to Industrial Test Solutions

Cyril Luxey Univ. Nice, France
Frederic Ganesello, ST Microelectronics, France
Guillaume Ducournau, IEMN, France

12:20 - 12:30

Future Challenges in mm-Wave Antenna Measurements
Panel discussion

WORKSHOPS AND SHORT COURSES - MONDAY

Duration: 08:30 - 17:50

Room: Stockholm

WM-08

Novel Fabrication Technologies for Sub-Millimeter Wave to THz Applications

Organisers:

Petronilo Martín-Iglesias, European Space Agency (ESA), The Netherlands
Ivan Arregui, Microwave Components Group (MCG), Public University of Navarre (UPNA), Spain

Abstract

As space and terrestrial applications at submillimetre-wave and THz frequencies are evolving, there is a need for new technology solutions providing increasing frequencies, larger bandwidths, reconfigurability, low-weight and size, and product uniformity and volume manufacturability. Advanced radiometre and radar imaging systems have already proven the benefits of novel technologies, including silicon micromachining, and other applications are now closely following. The new demands at these very high frequencies are currently tried to be met by recent development in high-precision milling, additive manufacturing strategies or micromachining processes with photolithographic technology. Within the latter approach, the currently most promising fabrication techniques are silicon deep reactive ion etching (DRIE) and thick-film polymer molds (for instance using SU-8) for forming high performance sub-THz waveguides. Improved fabrication and metal coating processes for components/systems including tunable elements using also MEMS technology will be explored in this workshop. The target will be the manufacturing of components / complete systems at submillimetre-wave and THz frequencies for a wide range of possible applications. The fundamentals as well as the latest results will be reviewed, making the workshop adequate both for the specialist and the newcomer.

The contents of this workshop are coordinated with the workshop proposal "Fundamentals and Engineering Considerations of THz Technologies: from Devices to Applications" to provide to the conference attendees a broad and complementing experience of workshops on THz technology without redundant content, with the focus of our workshop being specifically novel fabrication technologies.



Programme

08:30 - 08:40

WS Presentation

08:40 - 09:25

Millimeter-Wave to THz Radiometer Systems for Remote Sensing of the Earth's Atmosphere from Small Satellite Constellations

Steven C. Reising, Colorado State University, USA

09:25 - 10:10

Literature Review and Manufacturing Challenges of Key Components for Millimeter-Wave Radiometers

Miguel A. G. Laso, Public University of Navarre, Spain
Petronilo Martín-Iglesias, European Space Agency, The Netherlands

10:10 - 10:50

Break

10:50 - 11:35

3D-Micromachining with Integrated MEMS Enabling Reconfigurable Submillimeter-Wave and THz Systems

Joachim Oberhammer, KTH, Sweden

11:35 - 12:20

Receiver Technologies for Submillimeter-Wave Remote Sensing

Imran Mehdi, JPL, USA

12:30 - 13:50

Break

13:50 - 14:35

Waveguide Based Millimeter Wave Multipliers Using Novel Matching Structures

Michael Lancaster, The University of Birmingham, UK

14:35 - 15:20

Advances in Fabrication Technologies for Sub-Millimeter Wave and THz Applications at UC Davis

Neville Luhmann, UC Davis, USA

15:30 - 16:10

Break

16:10 - 16:55

Investigation on 3-D Printing Technologies for Millimeter-Wave and THz Applications

Bing Zhang, National University of Singapore, Singapore

16:55 - 17:40

Developing THz Components Using Low-Cost Fabrication Technologies

Zhang-Cheng Hao, Southeast University, China

WORKSHOPS AND SHORT COURSES - TUESDAY

Duration: 08:30 - 17:50

Room: Oslo

WTu-01

Terahertz Technologies: A Device and Application Prospective from Fundamentals to Implementations

Organisers:

Dimitris Pavlidis, Boston University & National Science Foundation, USA
Imran Mehdi, Jet Propulsion Laboratory (JPL), USA

Abstract

THz technology opens up new possibilities for various applications extending among other from sensing and spectroscopy to communications and imaging. While important advances have been made over the last two decades, THz technology can benefit from further developments in the area of devices, circuits and system implementation. This requires understanding of fundamentals, consideration of new device concepts and/or optimisation of their characteristics, hybrid or integrated approaches for circuit realisation and use of the knowledge obtained from such studies for system development. This workshop will bring together experts from various academic, national labs and commercial enterprises to discuss the most recent advances in their respective fields and to provide insight into what the future might hold for exploration of this frequency range. It will focus on a variety of materials such as traditional III-Vs, III-Nitrides, Silicon and Graphene, as well as various device concepts for efficient THz generation and detection. The operation of the components to be discussed is based on plasmonics, photoconductors, plasma waves, photomixing, Resonant Tunneling, Negative Differential Resistance and CMOS. Devices such as Quantum Cascade Lasers and Self-switching Diodes will also be addressed. The Workshop is intended for young scientists and engineers who are interested in learning about this emerging field, as well as individuals with a more advanced understanding of related concepts. The topics addressed include fundamental and engineering considerations together with the latest results in Terahertz technology.

47TH EUROPEAN CONFERENCE MICROWAVE 2017



Programme

- 08:30 - 09:05** *THz Applications and Upcoming Space Missions*
Imran Mehdi, Jet Propulsion Laboratory, USA
- 09:05 - 09:40** *Fundamentals and Latest Results on Nitride-Based Two- and Three-Terminal Devices for Frequencies Extending to THz*
Dimitris Pavlidis, Boston University, USA
- 09:40 - 10:10** *Planar Nanodiodes for THz Detection and Mixing*
Javier Mateos, University of Salamanca, Spain
- 10:10 - 10:50** *Break*
- 10:50 - 11:20** *THz Oscillators using Resonant Tunneling Diodes and Their Functions for Various Applications*
Masahiro Asada and Safumi Suzuki, Tokyo Institute of Technology, Japan
- 11:20 - 11:55** *Rare-Earth-Doped GaAs THz Sources Driven at 1550 nm*
Elliott R. Brown, J.R. Middendorf, J.S. Cetnar, Wright State University, USA
- 11:55 - 12:30** *THz Field Effect Transistor Detector Arrays for Postal Security Imaging Applications*
Wojciech Knap, D. But, A. El Fatimy, P. Buzatu, O. Klimenko, N. Diakonova, Charles Coulomb Laboratory, Montpellier University & CNRS, Montpellier, France
- 12:30 - 13:50** *Break*
- 13:50 - 14:20** *Graphene-Based THz Optoelectronics Devices*
Berardi Sensale-Rodriguez, University of Utah, USA
- 14:20 - 14:55** *High Performance THz Radiation Sources Based on Plasmonic Photoconductors*
Mona Jarrahi, UCLA, USA
- 14:55 - 15:30** *Photomixing mW THz Sources*
Guillaume Ducournau, P. Latzel, F. Pavanello, E. Peytavit, M. Zaknourne, J.-F. Lampin, IEMN, France
- 15:30 - 16:10** *Break*
- 16:10 - 16:40** *Silicon-Based mm-Wave and THz Transceivers and On-chip Antennas*
Aydin Babakhani, Rice University, USA
- 16:40 - 17:15** *THz Integrated Electronics Using Silicon Technologies*
Ruonan Han, MIT, USA
- 17:15 - 17:50** *Quantum Cascade Laser Based THz Signal Generation and Treatment*
Manijeh Razeghi, Northwestern University, USA

WORKSHOPS AND SHORT COURSES - WEDNESDAY

Duration: 13:50 - 17:50

Room: Oslo

WW-01

Technologies and Circuits for Advanced Automotive Radar and Related Applications

Organisers:

Rudolf Lachner, Infineon, Germany
André Bourdoux, IMEC, Belgium

Abstract

In automotive radar we saw a rapid transition from GAAs based mm-Wave frontends to SiGe bipolar or BiCMOS solutions in the past 5 years which made radar affordable for almost everyone and opened the way for broad application of radar based ADAS even in the low- and mid-end car segments.

Autonomous driving will further push market penetration and number of radar sensors per car, which will in turn increase the cost pressure on the whole supply chain. One way to cope with that challenge will on the semiconductor side certainly lead to increased usage of pure CMOS "mmW-systems-on-chip" (MMSoCs instead of MMICs) for certain high-volume radar applications.

The workshop will give a comprehensive overview of most recent developments in Silicon-based semiconductor technologies, MMIC design and mm-Wave packaging technologies.



Programme

13:50 - 14:30

Radar Sensor Networks and Technologies
Ralf Reuter, NXP, Germany

14:30 - 15:00

A Fully Integrated 79-GHz CMOS Radar Chipset using Coded Pulse Compression and Adaptive Array
Michiaki Matsuo, Panasonic, Japan

15:00 - 15:30

A Package Co-Design Methodology for mm-Wave System-on-Chip Transitions
Vito Gianini, Uhnder, USA

15:30 - 16:10

Break

16:10 - 16:50

CMOS mm-Wave Integrated Circuit Design Techniques for Automotive Radar
Zhihua Wang, Tsinghua University, China

16:50 - 17:20

Designing Fully Integrated mm-Wave RFIC Modules with Printed Planar Antenna Arrays
Michael Gordon, SiBEAM, USA

17:20 - 17:50

Comparison of mm-Wave Properties of Different CMOS and SiGe Technology Nodes Used in Radar Systems
Vadim Issakov, Infineon Technologies, Germany

Duration: 08:30 - 12:30

Room: Neu Delhi

WW-02

Millimetre Wave Radar Sensor Design in Nanoscale RF-CMOS Technologies

Organisers:

Sorin P. Voinigescu, University of Toronto, Toronto, Canada

Abstract

This workshop will focus of the performance and reliability requirements of nanoscale RF CMOS technologies and the associated circuit topologies, design methodologies and system architectures suitable for future mm-wave automotive, gesture control, and ambient sensors. The workshop will discuss the PDSOI, FDSOI, and FinFET CMOS technology options and their performance, as well as provide examples of automotive radar, gesture control, and mm-wave RF ID transceivers in nanoscale CMOS technologies. The differences and similarities between SiGe BiCMOS and pure CMOS implementations will be covered as well as the roadmap for future advanced node RF performance.



**EuMIC
2017**



Programme

08:30 - 08:40

Introduction
S. P. Voinigescu, University of Toronto, Canada

08:40 - 09:25

Silicon FDSOI and FinFETs for mm-Wave Applications
D. Hareme, GlobalFoundries, Germany

09:25 - 10:10

Advanced CMOS for Millimetre-Wave Circuit Design
K. Yau, Broadcom, USA

10:10 - 10:50

Break

10:50 - 11:35

Technology-Related Circuit Design Challenges for High-End mm-Wave Radar Based Sensors
S. Trotta, Infineon Technologies, Germany

11:35 - 12:20

Meeting the Requirements of Future Automotive Radar Sensors with Advanced Nanoscale CMOS Technologies
M. Elkhoully, Robert Bosch GmbH, Germany

12:20 - 12:30

Ultra-Low-Power Millimetre-Wave Active Reflectors and Doppler Sensors: CMOS vs. SiGe BiCMOS
S.P. Voinigescu, University of Toronto, Canada

WORKSHOPS AND SHORT COURSES - WEDNESDAY

Duration: 13:50 - 17:50

Room: Neu Delhi

WW-03

Recent Advancements in Wide-Band and Efficient GaN Power Amplifiers

Organisers:

Kamal K. Samanta, Sony Europe, UK
Bumman Kim, Pohang University of Science and Technology (POSTECH), Korea

Abstract

Ever rising demand of high data-traffic, speed and resolution demand microwave linear power amplifiers (PA) with ever greater bandwidth and efficiency, yet at a low cost. As a result, PAs are considered as the most critical component in a RF front-end module. The new generation power systems, such as wireless transmitter, 5G cellular and radars (EW), require the latest state-of-the-art semiconductors, circuit topology, and integration technology to deliver optimum performance. The attractive material properties of GaN make GaN-HEMT a superior candidate to meet these demands. But GaN PAs are thermally limited much below the capability of the devices, which demands efficient and novel design techniques, thermal management, biasing and integration techniques. Broadband linear PAs with high efficiency at high PAPR, supporting higher order modulation, is a critical component for a 5G mobile and backhaul system. The effect of trapping/memory on a device performance raise several technical challenges to address.

This very timely workshop will highlight the recent important advancements in GaN PA circuits design and linearisation to system implementation. Most importantly, it will aware the participants on the critical issues with design hints, technology challenges and the latest state-of-the-art developments in terms of bandwidth, linearity, and efficiency. Further, the workshop will present PAs with circuit topologies including Doherty, outphasing, harmonic tuning, and envelope-tracking for enhanced performance at back-off power, and for enabling advanced industrial applications. The speakers are the leading contributors in both industrial and academic sectors.



Programme

13:50 - 14:00

Welcome

14:00 - 14:45

Harmonic Assisted Broadband Doherty Power Amplifier

Fadhel M. Ghannouchi, University of Calgary, Canada
Wenhua Chen, Tsinghua University, China

14:45 - 15:30

GaN MMIC High-Efficiency PAs Above X-Band

Zoya Popovic, University of Colorado at Boulder, USA

15:30 - 16:10

Break

16:10 - 16:40

5 G Challenges and Potential PA Architectural Solutions

Kamal Samanta, Chris Clifton, Sony Europe, UK

16:40 - 17:10

Multiband GaN Doherty Power Amplifiers

Renato Negra, X. Anh Nghiem, RWTH Aachen University, Germany

17:10 - 17:40

Recent Development for Linear Amplification Based on GaN Technology

Didier Floriot, United Monolithic Semiconductors, France

17:40 - 17:50

Discussion

Duration: 08:30 - 12:30

Room: Oslo

SW-01

Modulation Schemes and Interference of Automotive Radars

Organisers:

Christian Waldschmidt, Ulm University, Germany
Thomas Zwick, Karlsruhe Institute of Technology, Germany

Abstract

In recent years automotive radar research came into the focus of many researchers as well as industry worldwide. While the number of sold units dramatically increased in the last ten years the integration level of automotive radar devices was increased together with the complexity in hardware and software. It can be expected that in the next generation of automotive radars more complex modulation schemes will be implemented. At the same time, interferences between radars will become a very important effect to be considered due to the vastly increasing market penetration rate of the systems on our roads. The short course starts with an introduction to the most promising candidates for future automotive radar modulation schemes: chirp sequence, OFDM (orthogonal frequency division multiplexing), and PN (pseudo-noise). Thereby the interference mechanisms will be explained as well. Afterwards, an overview of current investigations on the occurrence and the effects of interference on automotive radar functions is given. Recent approaches for interference mitigation are presented and discussed.



Programme

08:30 - 08:50

Chirp-Sequence Radar - Functionality, Resolution, and Ambiguity

Fabian Roos, Christian Waldschmidt, Ulm University, Germany

08:50 - 09:30

OFDM for Automotive Radar Applications

Benjamin Nuß, Thomas Zwick, Karlsruhe Institute of Technology, Germany

09:30 - 10:10

Mutual Interference Analysis of PMCW and FMCW Radars

Wim van Thillo, IMEC, The Netherlands

10:10 - 10:50

Break

10:50 - 11:20

Mutual and Incumbent Frequency User Interference Thread for Automotive Radar Systems – A General Overview and Useful Mitigation Techniques

Martin Kunert, Robert Bosch GmbH, Germany

11:20 - 11:40

Automotive Radar Interference Scenario Simulations

Mario Pauli, Thomas Zwick, Karlsruhe Institute of Technology, Germany

11:40 - 12:30

Interference Mitigation in Time, Frequency and Angular Domain

Jonathan Bechter, Christian Waldschmidt, Ulm University, Germany

WORKSHOPS AND SHORT COURSES - THURSDAY

Duration: 13:50 - 17:50

Room: Shanghai

WTh-01

Resource-efficient Localization in Wireless Sensor Networks

Organisers:

Alexander Koelpin, BTU Cottbus - Senftenberg, Germany

Thorsten Nowak, University of Erlangen-Nuremberg, Germany

Abstract

Nowadays, wireless sensor networks (WSNs) have become omnipresent. Process automation, asset tracking and wildlife monitoring are just a few examples to name. In many applications among energy-awareness, also location information is a core feature, today. Position information along with sensor data offers new opportunities in data analysis. Contrary requirements of localisation and low-power nodes bring up new challenges as accuracy is linked to the energy budget. This workshop will deliver an insight into modern WSN positioning techniques. Besides a general overview on localisation in WSNs, classical fingerprinting and received signal strength indicator (RSSI) as well as high resolution techniques are addressed. This includes theoretical basics localisation algorithms, sensor node and network design. In addition, practical challenges in applications are addressed. Fingerprinting and RSSI-based direction of arrival (DOA) are a promising approach in low-power networks and discussed in detail including propagation effects. Furthermore, high-resolution positioning is covered including phase-based DOA estimation and ranging based on UWB as well as frequency hopping signals. All named localisation techniques will be discussed for real world examples illustrating the practical relevance of the workshop content.



Programme

- 13:50 - 14:10** *Wildlife Tracking: Localization in Resources Limited Heterogeneous Wireless Sensor Networks*
Markus Hartmann, Thorsten Nowak, University of Erlangen-Nuremberg, Germany
- 14:10 - 14:30** *Sensor Node Design for Animal Tracking in Resources Limited Wireless Sensor Networks*
Niklas Duda, Alexander Koelpin, University of Erlangen-Nuremberg, Germany
- 14:30 - 15:00** *Everlasting Sensor Nodes: Energy Efficiency and Hybridization for Wireless Localization Networks*
Christoph Götzte, Erik Mademann, Zigpos, Germany
- 15:00 - 15:30** *Indoor Radio Localization Using Interpolated Fingerprint Maps*
Reinhard Müllner, indoo.rs, Austria
- 15:30 - 16:10** *Break*
- 16:10 - 16:40** *SmartHome Low Power Wireless Sensor Network with Localization Functionality*
Felix Pflaum, Alexander Koelpin, University of Erlangen-Nuremberg, Germany
- 16:40 - 17:10** *Indoor Localization Methods Using Sub-5- μ W UHF Wake-Up Receivers*
Heinrich Milosiu, Fraunhofer Institute for Integrated Circuits IIS, Germany
- 17:10 - 17:40** *Energy Harvesting and UWB Techniques for Centimeter Level Accuracy Localization of Passive Tags in Space Applications*
Davide Dardari, University of Bologna, Italy

WORKSHOPS AND SHORT COURSES - THURSDAY

Duration: 08:30 - 17:50

Room: Neu Delhi

WTh-02

Short Range mm-Wave Imaging Systems

Organisers:

Sherif S. Ahmed, Rohde & Schwarz, Germany

Lorenz-Peter Schmidt, University Erlangen-Nurnberg, Germany

Abstract

Millimetre-wave (mmW) imaging is extending its footprint rapidly to serve new applications. Solutions for security screening as well as industrial demands are evolving in the market space. A huge burden caused by the needed integration complexity is vanishing nowadays thanks to the cost reduction by various semiconductor miniaturisations, e.g. SiGe and CMOS, as well as the ever-increasing computation capacities of digital units, e.g. GPUs and FPGAs.

Short-range imaging is specifically interesting for high-resolution demanding applications. Security screening for instance is among them, where a few millimetre of resolution is essential for threat detection. In addition, object illumination is optimal at short ranges. In achieving this, image formation is very challenging due to the antennas wide looking angles involved. Many advanced image formation algorithms adapted for short range imagery are also evolving from academia. Consequently, vast realisation possibilities for short-range mmW imaging systems are becoming available.

In this workshop, talks from industry as well as research institutes are presented to highlight the state-of-the-art in this domain, and to offer an attractive overview for newcomers into mmW imaging technologies.



Programme

08:30 - 08:40

Workshop Introduction

Chairs

08:40 - 09:25

Fully Polarimetric Short-Range Imaging Radar

Julian Adametz, University Erlangen-Nurnberg, Germany

09:25 - 10:10

Computational Frequency-Diverse Microwave Imaging Using Coded Metasurface Apertures

Okan Yurduseven, Duke University, USA

10:10 - 10:50

Break

10:50 - 11:30

Microwave Imaging Using Rotating Linear Antenna Arrays

Jianping Wang, Pascal Aubry, Alexander Yarovoy, Delft University of Technology, The Netherlands

11:30 - 12:10

High Resolution Automotive Radar - From a Simple Dipstick to a 4D Image-Like Scene Representation

Martin Kunert, Robert Bosch GmbH, Germany

12:10 - 12:30

Discussion on Synergies Between Security and Automotive mm-Wave Imaging

12:30 - 13:50

Break

13:50 - 14:30

Calibration Concepts for Multistatic Short Range Imaging Radar

Frank Gumbmann, Rohde & Schwarz, Germany

14:30 - 15:10

Millimeter-Wave Radar Image Reconstruction in Heterogeneous Media

I. Ullmann, University Erlangen-Nurnberg, Germany

15:10 - 15:30

Progress in the Preparation of the ANSI 42.59 Standard for Measuring the Imaging Performance of Active Millimeter-Wave Systems for Security Screening of Humans

Sherif Ahmed, Rohde & Schwarz, Germany

15:30 - 16:10

Break

16:10 - 16:40

Fully Electronic Microwave Imaging - Systems and Modules

Andreas Schiessl, Rohde & Schwarz, Germany

16:40 - 17:10

Advanced SiGe Circuits for High Resolution mm-Wave Radar Measurements and Imaging

Nils Pohl, Fraunhofer FHR, Germany

17:10 - 17:40

Next-Generation Silicon-Based mm-Wave Imaging: From Promise to Product?

Wim Van Thillo, IMEC, Belgium

17:40 - 17:50

Discussion on New Trends and Applications for mm-Wave Imaging Technologies

WORKSHOPS AND SHORT COURSES - THURSDAY

Duration: 08:30 - 17:50

Room: Singapur

WTh-03

Integrated Circuits for High Datarate THz-Communication

Organisers:

Herbert Zirath, Chalmers University, Sweden

Ingmar Kallfass, University of Stuttgart, Germany

Abstract

Due to the constant demand for higher data rate in mobile networks, new frequency bands above 100 GHz are attracting increasing interest due to the practically unlimited available bandwidth. Wireless datacom applications such as wireless backhaul data transfer for the next generations of mobile communication systems, wireless communication in datacentres, wireless download kiosks, high resolution video transfer with low latency are some examples of future use of new frequency bands above 100 GHz. On the other hand, frequency bands have to be first allocated, and standards have to be developed before these higher frequency bands will become of commercial interest. Today, the E-band (71-76, 81-86, 92-95 GHz) is employed increasingly in the networks, allowing multi Gbps data rate. In a near future however, the E-band will be crowded, and novel, higher frequency bands can to be employed as well. With newly developed RFIC-processes, it is now possible to design multifunctional integrated circuits, realising a full 'frontend on a chip' at frequencies well beyond 100 GHz. Recent results from ongoing projects are reported in this workshop with focus on the circuit design and packaging. Critical building blocks such as LNA, PA, VCOs, modulators and demodulators, frequency multipliers, power detectors and mixers will be reported realised in SiGe BiCMOS, CMOS, InP DHBT and GaAs mHEMT/pHEMT RFIC-technologies. Multifunction front-end circuits such as complete receive and transmit RFICs will be reported as well, demonstrating bitrates up to and beyond 40 Gbps.



Programme

- 8:30 - 9:10** *0.24 THz BiCMOS Transmit/Receive Circuits for Short-Range Ultra-High Speed Communication*
M. H. Eissa, IHP GmbH, Germany
- 9:10 - 9:50** *Broadband Communication at 240GHz in Silicon Technologies - From Circuits to System Implementation*
Ulrich Pfeiffer, University of Wuppertal, Germany
- 09:50 - 10:10** *200GHz BiCMOS Frontends for Energy-Efficient 50Gbps Wireless Communications (Part 1)*
C. Carta, Technical University of Dresden, Germany
- 10:10 - 10:50** *Break*
- 10:50 - 11:10** *200GHz BiCMOS Frontends for Energy-Efficient 50Gbps Wireless Communications (Part 2)*
C. Carta, Technical University of Dresden, Germany
- 11:10 - 11:50** *Radio Front-End Architectures and Circuits for Emerging Wireless Applications*
F. Dielacher, Infineon Technologies, Germany
- 11:50 - 12:30** *A D-band InP DHBT-Based Chipset for Point-to-Point High Data Rate Communication*
Herbert Zirath, Chalmers University of Technology, Sweden
- 12:30 - 13:50** *Break*
- 14:00 - 14:40** *5G Wireless Backhaul Applications and Technologies for Frequencies Above 100 GHz, D-Band (130 to 175 GHz) and J-Band*
R. Lombardi, Huawei, Italy
- 14:40 - 15:20** *Millimetre Wave and THz Circuitry Design Techniques Based on InP and CMOS*
Y. Kawano, Fujitsu Laboratories, Japan
- 15:20 - 15:40** *THz Communications for the Future Terabit Connectivity Applications (Part 1)*
H.J. Song, POSTECH, Korea
- 15:30 - 16:10** *Break*
- 16:10 - 16:30** *THz Communications for the Future Terabit Connectivity Applications (Part 2)*
H.J. Song, POSTECH, Korea
- 16:30 - 17:10** *THz Communications using Photonics*
G. Ducournau, IEMN Lille, France
- 17:10 - 17:50** *300 GHz Wireless Communication Frontend Based on a Highly Integrated GaAs mHEMT Chip Set*
I. Kallfass, University of Stuttgart, Germany

WORKSHOPS AND SHORT COURSES - FRIDAY

Duration: 08:30 - 17:50

Room: Riga

WF-01

Present and Future Perspectives of Passive Radar

Organisers:

Reiner Thomä, TU Ilmenau, Germany

Pierfrancesco Lombardo, University of Rome La Sapienza, Italy

Abstract

Passive Radar (also known as Passive Coherent Location, PCL) uses ambient radio signals (transmitter of opportunity) to illuminate the target environment. This makes it resilient against detection and ubiquitous in application. As PCL is per se bi/multistatic, its performance heavily depends on the availability of multiple illuminators and/or observers and requires multiple sensor data fusion. While conventional radio transmitters (FM, TV and DAB/DVB) have been used so far, the availability of new radio services offers unprecedented opportunities for PCL. These include new satellite services and wireless systems. Whereas usage of GSM for PCL was already proposed, the new 4G mobile radio system concepts like LTE, and even more the envisaged 5G standard (still in preparation) will offer entirely new features that have not yet been fully explored. Interesting new features will be attributed, e.g. to new waveforms, scalable radio interfaces, flexible radio resource allocation, multiple antenna technologies, new frequencies, etc. On the other hand, cheap yet powerful software defined radio platforms are available. Moreover, ultra-light personal air platforms are becoming popular, as well as inexpensive unmanned flying platforms. These targets are not easily detected by conventional radar. Similarly the planned introduction of autonomous driving would require a large amount of radar sensing for road traffic control and safety.

Passive radar seems to be an approach to establish ubiquitous radar services based on pervasive illumination. Thus, PCL can be considered a green technology that does not need (resp. waste) scarce frequency resources. Radio services from satellite via cellular down to WiFi can be exploited for a variety of applications on different scales from remote sensing down to road traffic management and private security.

The aim of the workshop is to start from the state-of-the-art and move towards the future perspectives of PCL in the light of new and upcoming radio services, ubiquitous mobile platforms, and emerging application needs.



Programme

- 08:30 - 09:00** *Passive Radar on Fixed and Mobile Platforms Exploiting Digital Broadcast Signals*
Heiner Kuschel, FHG/FHR, Germany
- 09:00 - 09:30** *FM/DAB/DVB-T Multiband Multistatic Passive Radar System – Design Considerations and Lessons Learnt*
Michael Edrich, HENSOLDT Sensors GmbH, Germany
- 09:30 - 10:00** *Data Association in Multistatic Passive Radar Systems*
Martina Brötje, Wolfgang Koch, FHG/FKIE, Germany
- 10:10 - 10:50** *Break*
- 10:50 - 11:20** *WiFi-Based Passive Radar for Short Range Surveillance: Detecting and Locating Air Targets, Surface Vehicles and Human Beings*
Fabiola Colone, Pierfrancesco Lombardo, University of Rome La Sapienza, Italy
- 11:20 - 11:50** *GSM Passive Coherent Location: Signal Processing and Applications*
Reda Zemmari, Wolfgang Koch, FHG/FKIE, Germany
- 11:50 - 12:20** *Perspectives of Cooperative PCL in Next Generation Mobile Radio*
Reiner Thomä, TU Ilmenau, Germany
- 12:30 - 13:50** *Break*
- 13:50 - 14:20** *Passive Forward Scatter Radar*
Marina Gashinova, Mike Cherniakov, University of Birmingham, UK
- 14:20 - 14:50** *Passive Radar in Automotive Context - Requirements and Approaches*
Hans-Ludwig Bloecher, Daimler AG, Germany
- 14:50 - 15:20** *Passive Radars on Mobile Platforms - New Changes and New Benefits*
Krzysztof Kulpa, Warsaw University of Technology, Poland
- 15:30 - 16:10** *Break*
- 16:10 - 16:40** *Passive Imaging Using SAR and ISAR Technology*
Piotr Samczynski, Mateusz Malanowski, Warsaw University of Technology, Poland
- 16:40 - 17:10** *GNSS-Based Passive Radar*
Mike Antoniou, University of Birmingham, UK,
Debora Pastina, University of Rome La Sapienza, Italy
- 17:10 - 17:40** *Passive Radar at ZESS – From HITCHHIKER to ASTRA*
Otmar Loffeld, University of Siegen, Germany

WORKSHOPS AND SHORT COURSES - FRIDAY

Duration: 08:30 - 12:30

Room: Prag

WF-02

Wearable Antennas and Smart Textiles

Organisers:

Holger H. Meinel, Independent consultant, Germany
Anne Schwarz-Pfeiffer, HS Niederrhein, Germany

Abstract

Smart textiles are under research and development for about a decade now. The EU-programme called Flex-Stretch fostered the general application from early on. Today knitted electronic components for sensors, the circuitry, capacitors and antennas can be seamlessly integrated into garments. A wide range of specialised yarns, being available today, allows very specific applications, e.g. LED integration (for professional decoration), RFID integration (for manufacturing and product monitoring), sensors and controller integration, mostly in the medical area (for industrial stress sensor system and hospital bed linen).

These days Internet-of-Things (IoT) as well as applications in the agro-food area need flexible wireless systems, i.e. textile integrated and wearable antennas are needed especially.

With this WS engineers from the RF-side as well as textile engineers should exchange their knowledge for the better of both disciplines.



Programme

08:30 - 09:00

Substrate Integrated Waveguide (SIW) Technology for Wearable Applications and the Internet of Things (IoT)
Maurizio Bozzi, University of Pavia, Italy

09:00 - 09:30

Wearable Antennas Using Conductive Fabrics
Alessandra Constanzo, University of Bologna, Italy

09:30 - 10:00

Textile Sensors, Actuators and More...
Anne Schwarz-Pfeiffer, HS Niederrhein, Germany

10:10 - 10:50

Break

10:50 - 11:20

Wearable Antennas for Data- and Power Transfer
Laura Corchia, Giuseppina Monti and Luciano Tarricone, University of Salento, Italy

11:20 - 11:50

Materials for Smart Textiles
Kay Ulrich and Sabine Gimpel, TITV - Textilforschungsinstitut Thüringen Vogtland e.V., Germany

11:50 - 12:20

Smart Textiles: From Prototype to Commercial Product
Lieva van Langenhove, Ghent University, Belgium

Duration: 08:30 - 12:30

Room: Istanbul

WF-03

Highly Integrated mm-Wave Systems for Emerging Industrial and Consumer Radar-Based Applications

Organisers:

Vadim Issakov, Infineon Technologies AG, Germany
Uwe Rueddenklau, Infineon Technologies AG, Germany

Abstract

The amount of the radar-based consumer applications is dramatically increasing. Starting from a simple motion detector for lighting control and door openers, up to a sophisticated MIMO sensor technology for traffic monitoring or presence detection in railway stations, radar is used to enhance comfort and safety in our daily life. Advancement of novel radar algorithms and techniques in combination with ever increasing processing capabilities offer an opportunity for a vast amount of novel radar sensing applications that can be explored. Advanced silicon-based semiconductor technologies enable high level of integration with digital baseband, whilst providing excellent characteristics at mm-wave frequencies. Hence, this workshop discusses recent developments in the implementation and application of highly-integrated mm-wave radar systems for emerging industrial and consumer applications.

Seven speakers will present various aspects of mm-wave radar systems from highly integrated chipsets, novel algorithms, advanced signal processing techniques to emerging radar-based applications. First, micro-Doppler effect in radar is discussed and its opportunities for emerging industrial and consumer applications are considered. Next, cutting edge application of radar-based material and object classification is presented. Further, advanced signal processing techniques are discussed for micro-Doppler signature recognition of radar-based thru-wall indoor human monitoring. Next, machine learning for micro-Doppler pattern recognition of perceptive cyber-physical IoT systems based on 140 GHz radar sensors is discussed. Thereafter, novel radar concept based on interferometry is discussed. The next talk addresses high volume low-cost 24GHz highly-integrated Doppler radar and a MIMO radar for traffic monitoring. Finally, highly-integrated 60GHz radar chipset and a demonstrator using micro-Doppler effect for gesture recognition is presented.



Programme

08:30 - 09:05

Highly Integrated Micro-Doppler Radar Sensors for Emerging Applications
Victor C. Chen, Ancortek Inc, USA

09:05 - 09:35

Radar Based Interaction for Ubiquitous User Interfaces
Hui-Shyong Yeo, Gergely Flamich, Patrick Schrempf, David Harris-Birtill, Aaron Quigley University of St. Andrews, UK

09:35 - 10:10

Signal Processing and Time-Frequency Analysis of Radar Data for Indoor Human Monitoring
Abdelhak M. Zoubir, Ann-Kathrin Seifert, TU Darmstadt, Germany

10:10 - 10:50

Break

10:50 - 11:15

Silicon Radars and Smart Algorithms: A Unique Combination for Disruptive Innovation in Perceptive IoT Systems
Wim van Thillo, IMEC, Belgium

11:15 - 11:40

Microwave Interferometry for Industrial Applications
Alexander Kölpin, University of Erlangen-Nuremberg, Germany

11:40 - 12:05

Low-Cost Advanced 24GHz Radar Systems for High-Volume Applications
Thilo Lenhard, InnoSenT GmbH, Germany

12:05 - 12:30

Next Generation mm-Wave Radar-Based Gesture Sensors
Jaime Lien, Google ATAP, USA, Saverio Trotta, Reinhard Jungmaier, Vadim Issakov, Infineon Technologies AG, Germany

WORKSHOPS AND SHORT COURSES - FRIDAY

Duration: 08:30 - 12:30

Room: Oslo



WF-04

Active Electronically Scanned Array (AESA) Systems – Status and Trends

Organisers:

Helmut Wilden, Fraunhofer FHR, Germany
Frank E. van Vliet, TNO, The Netherlands

Abstract

The technology of active electronically scanned arrays (AESA) has proven indispensable for advanced defence and space application. Its importance is also increasing for communication systems, in particular for future 5G cellular networks. The outstanding antenna performance, flexible scan strategies and adaptive pattern control are prerequisites for highest situational awareness as well as for tomorrow's communication requirements. The integration of GaN RF power technology, mixed-signal devices based on SiGe/BiCMOS, and continuous increase of processing power will foster the use of wideband and multi-band antenna systems for multi-functional systems.

This workshop will present a mix of defence, space and communication array systems by leading international industries and research laboratories, providing technological cross-fertilisation over these different application domains.

The different contributions will present a mix between technological possibilities (including GaN, SiGe and processing solutions), architectural aspects (including super resolution with element-based receive signals, CW-radar operation, shared apertures ultrahigh bandwidth and adaptive beamforming) as well as cost (including development, manufacturing and life-cycle cost).

Programme

08:30 - 09:00

Space-Borne AESA Systems: Architectures, Technologies and Applications

Grzegorz Adamiuk, Martin Stangl, Airbus DS, Germany

09:00 - 09:30

All Silicon Phased Arrays: The Convergence of Technology, Applications and Architecture

Ian Gresham, Dave Corman, Anokiwave, USA

09:30 - 10:00

The German Experimental Space Surveillance and Tracking Radar

Helmut Wilden, Fraunhofer FHR, Germany

10:00 - 10:10

Discussion

10:10 - 10:50

Break

10:50 - 11:20

Recent Advances in AESA Radar

Simon van den Berg, Thales, The Netherlands

11:20 - 11:50

Active Antennas and Array Systems in 5G Mobile Communication Services

Florian Pivit, Nokia Bell Labs, Ireland

11:50 - 12:20

Broadband Multi-Functional AESA Front-Ends

M. Brandfass, Airbus DS Electronics and Border Security, Germany

12:20 - 12:30

Conclusions

Duration: 08:30 - 17:50

Room: Copenhagen

WF-05

The Internet of Space, a New Satellite Communication Technique

Organisers:

Ingo Wolff, IMST GmbH, Germany

Abstract

Satellite communication is facing disruptive changes in communication applications, used technologies and production methods to meet the upcoming requirements for globally accessible Low Earth Orbit (LEO) satellite systems. They will have hundreds or even thousands of small satellites in an orbit of about 1,000 km height and establish a global internet and communication system which can be accessed from each place on earth using small base stations or even a mobile phone.

In this workshop an overview of the new upcoming satellite systems is given. They need a totally new approach for the satellite construction, the used technologies, production techniques and business models. Onboard processing, still not used very often in satellites, is a must for the new systems. The application of modern highly integrated semiconductor technology to reduce the weight and the replacement of old waveguide technologies of partly large mass by new light weight components is a strong requirement. Miniaturised, reconfigurable, tunable, and easily producible components, circuits, systems and antennas must be designed. These new technologies must meet space requirements but at the same time should be off the shelf products of low price and short production time. Therefore new production strategies and a change in standardisation philosophy are needed. First approaches of technologies meeting these requirements will be discussed in the presentations.

Programme

8:30 - 09:00

The "Internet of Space" and New Applications of LEO-Satellite Systems

Ingo Wolff, IMST GmbH, Germany

09:00 - 09:35

Highly Integrated Satcom Payload Equipment for New Space Systems with a Large Number of Satellites

S. Martin, Tesat-Spacecom GmbH & Co. KG, Germany

09:35 - 10:10

Onboard Processing, Necessity, Tasks and Technologies

R. Wansch, Fraunhofer Institut IIS, Germany

10:10 - 10:50

Break

10:50 - 11:25

250 nm and 130 nm SiGe BiCMOS Design Kits for Space Applications

René F. Scholz, Th. Mausolf, Dietmar Kissinger, Milos Krstic, IHP, Germany

11:25 - 11:55

GaN Semiconductor MMICs for Space Applications

C. Friesicke¹, E. Ture¹, D. Schwantuschke¹, P. Feuerschütz², S. Samis¹, A. F. Jacob¹, R. Quay¹, O. Ambacher¹, ¹Fraunhofer Institut IAF, Germany ²Hamburg University of Technology

11:55 - 12:30

Tunable Microwave Component Technologies for SatCom-Platforms

H. Maune, R. Jakoby, M. Jost, Technical University Darmstadt, Germany

12:30 - 13:50

Break

13:50 - 14:25

Hybrid-Integrated Models in LTCC Technology for Reconfigurable and Lightweight Satellite Payloads

A. Ebert, S. Spira, J. Müller, M. A. Hein, Technical University Ilmenau, Germany

14:25 - 15:00

Satellite Antennas for the Internet of Space

M. Geissler, IMST GmbH, Germany

15:30 - 16:10

Break

16:10 - 16:45

Industrialization of the Satcom Payload

E. Auer, Tesat-Spacecom GmbH & Co. KG, Germany

16:45 - 17:20

High Performance and Low Cost, the Next Generation of Mass Manufacturable Small Satellites Made in Berlin

T. Segert, Berlin Space Technology GmbH, Germany

17:20 - 17:50

Final Discussion



WORKSHOPS AND SHORT COURSES - FRIDAY

Duration: 08:30 - 17:50

Room: Seoul

WF-06

Sub-millimetre Wave and THz imaging for Security

Organisers:

Roger Appleby, InnovaSec, UK
Sherif Ahmed, Rohde & Schwarz, Germany

Abstract

This workshop will showcase the imaging technology and systems being developed in Europe for next generation submillimetre wave safety and security systems. Security screening at airports using millimetre wave technology is now common place and is being adopted in adjacent markets such as loss prevention, crowd screening and mass transport. However improved performance is still needed to meet evolving threats and at the same time greater freedom is demanded by society during screening.

Systems using state of the art passive, active and combined active and passive submillimetre wave systems have been researched and developed to meet these new requirements and will be presented in this workshop. This includes passive systems with large cooled focal planes (~9000 elements), high frequency MMICs and multipliers and a novel 340 GHz homodyne transceiver.

There are currently three projects coming to fruition which have benefited from European funding TERASCREEN (FP7), CONSORTIS(FP7) and TIPSSI(EDA) and they will all present at the workshop along with work from other internationally recognised experts in similar fields.

Programme

08:30 - 08:45	Introduction and Welcome R. Appleby, S. Ahmed, InnovaSec, UK, Rohde & Schwarz, Germany
08:45 - 09:10	Passive Submillimetre-Wave Video Camera for Security Screening E. Heinz, D. Born, G. Zieger, S. Anders, K. Peiselt, T. Krause, A. Krüger, M. Schulz, H.-G. Meyer, Supracon AG, Germany, Leibniz Institute of Photonic Technology e.V., Germany
09:10 - 09:35	Kinetic Inductance Bolometer Technology for Passive Sub-Millimetre Wave Imaging J. Hassel, H. Sipola, A. Timofeev, L. Grönberg, A. Mäyrä, J. Luomahaara, M. Aikio, K. Tappura, A. Rautiainen, M. Leivo, A. Tamminen, A. Luukanen, VTT, Asqella, Finland
09:35 - 10:00	Real Time Video Rate Passive THz Imaging using Aluminium LeKID Detectors K. Wood, QMC Instruments, UK
10:00 - 10:10	Discussion
10:10 - 10:50	Break
10:50 - 11:12	Design of Wide Field-of-View Quasi-Optical Systems for Concealed Object Detection Imagers at Submillimetre Wavelengths N. Lombart, E. Gandini, TU Delft, The Netherlands



11:12 - 11:34	70 nm and 40 nm MHEMT and InP DHB T Processes for mm-Wave and THz Applications M. Renvoisé, R. Cleriti, P. Frijlink, R. Doerner, V. Krozer, E. Limiti, OMMIC, France, Università degli Studi di Roma, Italy, Leibniz Institute of Photonic Technology e.V., Germany, University of Frankfurt/Main, Germany
11:34 - 11:56	90 GHz to 360 GHz Components for TeraSCREEN H. Wang, T. Al-Sawaf, N. Brewster, C. Viegas, M. Oldfield, B. Alderman, M. Hrobak, N. Weimann, V. Krozer, STFC-RAL(UK), Leibniz Institute of Photonic Technology e.V. Germany, University of Frankfurt/Main, Germany, Teratech Components, UK
11:56 - 12:18	Automatic Anomaly Detection in Sub-mm Wave Multi-Mode Body Scanner Systems H. Petersson, M. Axelsson, J. Rydell, V. Deleskog, F. Bissmarck, Swedish Defence Research Agency, Sweden
12:18 - 12:30	Discussion
12:30 - 13:50	Break
13:50 - 14:20	Simulation of an Active 220 GHz Standoff Imager Prototype J. Svedin and T. Bryllert, FOI and WASA, Sweden
14:20 - 14:50	The CONSORTIS Multi-Channel 340 GHz Security Screening Radar D. A. Robertson, D. G. Macfarlane, R. Hunter, S. L. Cassidy, N. Lombart, E. Gandini, T. Bryllert, M. Ferndahl, H. Lindström, J. Tenhunen, H. Vasama, J. Huopana, T. Selkälä, A.-J. Vuotikka, University of St Andrews, UK, TU Delft, The Netherlands, Wasa, Gotmic, Sweden, VTT, Finland
14:50 - 15:20	Terahertz Radar Developments at UPM J. G.I de la Fuente, G. R. Cidre, F. G. Rial, M. R. Torres, Technical University of Madrid, Spain
15:20 - 15:30	Discussion
15:30 - 16:10	Break
16:10 - 16:32	Developing and Testing a Dual Mode Passive/Active Imaging System C. Mann, N. Bowring Digital Barriers, Manchester Metropolitan University, UK
16:32 - 16:54	Active and Passive Imaging Systems for Security Screening in the Millimetre-wave and Terahertz Range R. Herschel, J. C. Iriarte, I. Maestrojuán, D. Platt, Fraunhofer Institute, Germany, Universidad Pública de Navarra, Spain, Acero, Sweden
16:54 - 17:16	Test and Evaluation of the TeraSCREEN Security Screening System M. L. Langford, R. Herschel, S. Madhogaria, D. Platt, S. Volkmann, ICTS, UK, Fraunhofer Institute, Germany, Acero, Sweden, University of Freiburg, Germany
17:16 - 17:38	CONSORTIS System Modeling and Performance R. Appleby, S. Ferguson, H. Petersson, InnovaSec, Queen's University Belfast, UK, FOI, Sweden
17:38 - 17:50	Close

WORKSHOPS AND SHORT COURSES - FRIDAY

Duration: 08:30 - 12:30

Room: Shanghai

WF-07

Future Automotive Radar Systems

Organisers:

Jürgen Dickmann, Daimler AG, Germany
Jürgen Hasch, Robert Bosch GmbH, Germany

Abstract

Highly automated driving has already arrived. However, widespread adaption of fully-autonomous driving is still facing challenges.

This workshop will discuss the introduction of highly automated and autonomous driving from various perspectives, with the focus on radar sensors as important part of the environment perception. It will discuss the advantages and challenges of Radar, especially within a typical Video, Lidar, Radar, and Ultrasonic sensor set.

Questions discussed will be:

- What are the requirements for future automotive Radars?
- Will Radar sensors still be required in the future or replaced by other technologies?
- What are the key advantages of radar sensors for autonomous driving?
- What are some of the upcoming innovations to address existing limitations?

The goal is to arrive at an understanding of what actually needs to be done to keep Radar technology in the main-stream, and provide a look into the future of automotive radar sensor concepts.



Programme

08:30 - 08:55	Automotive Radar Dilemmas Igal Bilik, GM, USA
08:55 - 09:20	Radar Sensors Today and Tomorrow Ingo Weber, BMW, Germany
09:20 - 09:45	Radar for Autonomous Driving – Nice or Necessary? Fredrik Sandblom, Volvo, Sweden
09:45 - 10:10	Radars as a Complementary Sensor for Autonomous Driving Dan McCloskey, Waymo, USA
10:10 - 10:50	Break
10:50 - 11:15	Towards Fully Automated Driving Elena Pancera, Robert Bosch GmbH, Germany
11:15 - 11:40	Radar as Key Sensor for Level 5 Automated Driving Thomas Fechner, Continental, Germany
11:40 - 12:05	Large Scale MIMO Systems for Automotive Radar Ali Murtaza, Uhnder, USA
12:05 - 12:30	SAR in Automotive Radar Andreas Stelzer, JKU Linz, Austria

Duration: 13:50 - 17:50

Room: Shanghai

WF-08

Automotive Radar Measurement Solutions - For End-of-Line Purposes as Well as in Aftersales

Organisers:

Holger H. Meinel, Independent Consultant, Germany

Abstract

Automotive radar at 77 GHz is in production and thus on the road since 1998. However, only recently the production numbers have exploded. In 2015 Mercedes-Benz has reportedly installed more than 2.5 Mio. Radar units (77 & 24 GHz, respectively, in its newly delivered cars). Two of the big 4 – Bosch and Conti – have delivered more than 2 Mio. Radar sets each until today. Valeo presented a 77 GHz radar architecture based on LTCC for mass production at the EuMWeek 2016 in London.

Up-to-now OEMs just sell their cars – and that's it. In the future we will need maintenance facilities at the dealership of the different OEMs. A 77 GHz sensor on the road for 100,000 km and being nearly 10 years old must still be able to perform faultlessly!

Measurement approaches for this purpose (OTA - over-the-air) as well for end-of-line production will be reviewed here.



Programme

13:50 - 14:20	Emblem Measurements at 77 GHz Sherif Ahmed, Tobias Koeppel, Rohde & Schwarz, Germany
14:20 - 14:50	A System for Measurement and Validation of Car Bumpers and Radars Matteo Fioravanti, Loccioni, Italy
14:50 - 15:20	OTA Radar Test for Autonomous Driving Frank Schütte, dSpace, Germany
15:30 - 16:10	Break
16:10 - 16:40	77 GHz Radar Signal Simulator Uhland Goebel, miro.sys GmbH, Germany
16:40 - 17:10	Radar Test System - 24, 77 and 79 GHz Radar Target Simulators Hirosuke Suzuki, KEYCOM, Japan
17:10 - 17:40	How to Measure/Calculate Radar System MTBF? Stefan Schneider, FH Kempten, Germany

WORKSHOPS AND SHORT COURSES - FRIDAY

Duration: 08:30 - 17:50

Room: Budapest

SF-01

Synthetic Aperture Radar (SAR)

Organisers:

Alberto Moreira, German Aerospace Center (DLR), Germany

Abstract

This short course is well suited for engineers and researchers interested in learning theory, techniques, technologies, new concepts, and applications related to synthetic aperture radar (SAR) systems. Today, SAR systems are generating images of the Earth surface with unprecedented resolution and accuracy. Due to their ability to produce high-resolution radar images independent of sunlight illumination and weather conditions, SAR systems have demonstrated their outstanding capabilities for a multitude of applications. Examples are geoscience and climate change research, environmental and Earth system monitoring, 2-D and 3-D mapping, change detection, 4-D mapping (space and time), security-related applications, and planetary exploration.

This short course starts with an overview of the principles, theory and applications of SAR systems. The second lecture will focus on SAR interferometry and will cover the design and system aspects of the mission TanDEM-X, the first radar interferometer in space that employs two satellites operating in a closely controlled formation flight. The third lecture provides an overview of the detection of moving targets with multi-channel SAR systems, including advanced algorithms for motion velocity estimation. The fourth lecture will present several advanced concepts for future spaceborne SAR systems and missions, like digital beamforming, MIMO, and multistatic SAR.



Programme

08:30 - 10:10

SAR Principles, Theory and Applications

Marwan Younis, German Aerospace Center (DLR), Germany

10:10 - 10:50

Break

10:50 - 12:30

SAR Interferometry and TanDEM-X

Paola Rizzoli, German Aerospace Center (DLR), Germany

12:30 - 13:50

Break

13:50 - 15:30

Moving Target Indication (MTI) with SAR

Stefan Baumgartner, German Aerospace Center (DLR), Germany

15:30 - 16:10

Break

16:10 - 17:50

Advanced Spaceborne SAR Concepts

Gerhard Krieger, German Aerospace Center (DLR), Germany

Duration: 08:30 - 12:30

Room: Stockholm

SF-02

Radar Based Detection of Drones

Organisers:

Thomas Zwick, Karlsruhe Institute of Technology, Germany
Jens Klare, Fraunhofer FHR, Germany

Abstract

In recent years drones became a real threat to big events, critical infrastructure, but also simply to everybody's privacy. Since the devices are quite small they cannot be detected by the existing air surveillance radar systems. Therefore, a new technology for the detection of drones is required and several new products have been announced in the last few years. Nevertheless, these technologies are still subject to intensive research which will be presented in this short course. In the first part after an overview over the problem also non-radar based technologies (camera, acoustic) will be presented, but the major part of the workshop is dedicated to radar-based drone detection technologies.



Programme

08:30 - 08:50

Drone - Where do you Fly?

Werner Wiesbeck, Karlsruhe Institute of Technology, Germany

08:50 - 09:20

UAV Detection and Engagement - System Design Concept

Andreas Strecker, Airbus DS Electronics and Border Security GmbH, Germany

09:20 - 09:50

Multisensor Data Fusion for UAV Detection and Localization

Snezhana Jovanoska, Wolfgang Koch, Fraunhofer FKIE, Germany, Jan Goerlich, SAAB MEDAV Technologies, Germany, Reiner Thomä, TU Ilmenau, Germany

09:50 - 10:10

MIMO Radar for UAV Detection

Jens Klare, Oliver Biallawons, Delphine Cerutti Maori, Fraunhofer FHR, Germany

10:10 - 10:50

Break

10:50 - 11:10

Discrimination of UAVs Using Micro-Doppler

Jens Klare, Oliver Biallawons, Fraunhofer FHR, Germany, Lars Fuhrmann, University of Siegen, Germany

11:10 - 11:50

Multistatic OFDM Radar Network for Drone Detection

Benjamin Nuß, Thomas Zwick, Karlsruhe Institute of Technology, Germany

11:50 - 12:30

Detection and Discrimination of Micro-UAS Using Staring Radar

Chris Baker, Ohio State University, USA

WORKSHOPS AND SHORT COURSES - FRIDAY

Duration: 08:30 - 12:30

Room: Neu Delhi

SF-03

Noise Radar Technology

Organisers:

Krzysztof Kulpa, Warsaw University of Technology, Poland
Gaspere Galati, Tor Vergata University, Italy

Abstract

The noise and pseudo-noise radars are under research for several decades. Two decades ago mostly theory has been developed. In the last decade several demonstrators with off-line processing have been constructed. Recently, due to maturity of the concept, radar prototypes are under considerations.

The noise radar has several advantages - there is neither range nor Doppler ambiguities, applied noise signal is very unspecific, and thus difficult to detect and classification and noise radars do not interfere with each other and also with other devices using the same spectrum. As the illumination of the target is rather long, they can be used not only for target detection, but also for imaging and identification. But they have also several drawbacks: they require very high dynamic range of the receivers, advanced algorithms, and high computational power of processing hardware.

The short course will start with fundamentals of noise radar technology, shows how to use this technology in MIMO applications, how to modify noise waveforms to obtain required signal properties in SISO and MIMO radars. In the second part of the short course, the application of the noise radar will be presented and deep discussion on noise versus quantum radar will be provided.



Programme

08:30 - 09:10

Noise Radar Technology - New Challenges

Krzysztof Kulpa, Warsaw University of Technology, Poland

09:10 - 09:40

MIMO Techniques in Noise Radar

Lukasz Maslikowski, Warsaw University of Technology, Poland

09:40 - 10:10

Waveform Design as a Method for Clutter Cancellation

Janusz Kulpa, Warsaw University of Technology, Poland

10:10 - 10:50

Break

10:50 - 11:40

Noise Radar Technology: Motivations, Potential Applications, Ongoing Research

Gaspere Galati, Francesco De Palo, Tor Vergata University, Italy

11:40 - 12:30

Noise Radar, Entanglement Signals and 'Quantum Radar'

Konstantin Lukin, NASU, Ukraine

Keysight Technologies: Hotspots

- Free to attend -

Location: NCC East, Level 2, Room Helsinki



KEYSIGHT HOTSPOTS

Where Technologies and Experts Meet

In today's environment, to reach, or remain at the forefront of fast-paced technology industries, continuous learning is fundamental. Keysight HOTSPOTS are technical seminars that facilitate this learning process by offering the in-depth and up-to-date information relevant to your industry, your current job role and to the role you aspire to.

For more than 75 years Keysight Technologies has been aiding scientists, researchers and engineers to address their measurement challenges with precision and confidence. Keysight's legacy is the original business of Hewlett-Packard founded in 1939, then trading as Agilent's EMG group, and subsequently becoming a fully independent company. Throughout these changes, Keysight has enabled cutting edge electronic products to get to market faster and at a lower cost.

Tuesday 10th October 09:30 – 17:30

Hotspots: RF and Microwave Measurement Insights

From the company that has been a leading innovator in Spectrum and Network measurements for 70 years, please join us for a FREE RF and Microwave Fundamentals Seminar to help improve your understanding of basic RF measurements, including real applications, thus improving your efficiency and effectiveness whether you are in R&D or design & test.

You can see our latest solutions, and expand on the practical knowledge you need to have to perform your day-to-day measurements. Application and product experts from Keysight will be on-hand to give demonstrations and technical presentations around the latest innovations, features and capabilities that enhance the fundamental measurements.

Topic 1: Spectrum Analysis Fundamentals

"Insight into the fundamentals of Spectrum Analysis with Keysight experts"

This presentation is intended to be a beginning tutorial on signal analysis. Vector signal analysis includes but is not restricted to spectrum analysis. It is written for those who are unfamiliar with spectrum analysers and vector signal analysers, and would like a basic understanding of how they work, what you need to know to use them to their fullest potential, and how to make them more effective for particular applications. It is written for new engineers and technicians, therefore a basic understanding of electrical concepts is recommended.

We will begin with an overview of spectrum analysis. In this section, we will define spectrum analysis as well as present a brief introduction to the types of tests that are made with a spectrum and signal analyser. From there, we will learn about spectrum and signal analysers in terms of the hardware inside, what the importance of each component is, and how it all works together. In order to make measurements on a signal analyser and to interpret the results correctly, it is important to understand the characteristics of the analyser. Spectrum and signal analyser specifications will help you determine if a particular instrument will make the measurements you need to make, and how accurate the results will be.

Topic 2: Vector Signal Analysis Fundamentals

"Insight into signal complexity with the 89600 VSA Software"

This presentation continues from previous to delve into Vector Signal Analysis. The 89600 VSA software supports over 75 signal types. We have a track record of being first-to-market for new technologies. Recent examples include both LTE-Advanced and 802.11ac and we continue to lead the market with features and enhancements. For A/D customers, now we offer pulse and FMCW radar analysis along with flexible custom demodulators to enable analysis of non-standard or proprietary signals with industry standard tools.

Topic 3: RF Power Measurement Basics

"Insight into RF Power Measurements with Keysight Experts"

This presentation is a tutorial on RF power measurement which covers the importance, types, and methods of power measurements. It also describes the different types of power sensor technologies – thermistor, thermocouple and diode detector. Last but not least, we describe the advanced measurements used for the latest RF and microwave applications and power measurement uncertainty calculation.

EXHIBITOR WORKSHOPS & SEMINARS

Topic 4: Network Analysis Fundamentals

“Insight into the fundamentals of Network Analysis with Keysight Experts”

This presentation provides a review on RF basics, understanding of S-parametre measurements and the examination of the architectures and calibrations of VNAs.

A vector network analyser (VNA) is a precision measuring tool that tests the electrical performance of high frequency components, in the radio frequency (RF), microwave, and millimetre-wave frequency bands (we will use the generic term RF to apply to all of these frequencies). A VNA is a stimulus-response test system, composed of an RF source and multiple measurement receivers. It is specifically designed to measure the forward and reverse reflection and transmission responses, or S-parameters, of RF components. S-parameters have both a magnitude and a phase component, and they characterise the linear performance of the DUT. While VNAs can also be used for characterising some non-linear behaviour like amplifier gain compression or intermodulation distortion, S-parameters are the primary measurement. The network analyser hardware is optimised for speed, yielding swept measurements that are faster than those obtained from the use of an individual source and an individual receiver like a spectrum analyser. Through calibration, VNAs provide the highest level of accuracy for measuring RF components.

Topic 5: RF Design & Simulation fundamentals

“Insight into RF/MW designs with Keysight Experts”

This session is a tutorial on Design Simulation technology and tools from Keysight EDA EEsof.

We will demonstrate S-parametre simulation, impedance matching, tuning, optimisation and device modelling. X-parameters are introduced and the integration of S-parameters into test/design is explained. Both ADS & Genesys software will be used for demonstration purposes.

Wednesday 11th October 09:30 – 17:30

Hotspots: Materials and Devices Measurement Insights

Understanding the properties of materials (both natural and man-made) is important for a variety of reasons. Materials such as metallic materials, semiconductors, organic materials (such as polymers) and compound semiconductors have provided profound benefits over the last century. New and emerging materials such as oxide semiconductors, carbon nano tubes (CNT) and graphene promise to provide new benefits over the coming century. Keysight Technologies continues to develop and introduce test and measurement equipment to cope with the evolving demands of researchers. This paper gives an overview of the most emerging technologies and what Keysight can offer to solve the most daunting measurement challenges.

Topic 1: Challenges and Solutions for Material Science/ Engineering Testing Application

Material science testing is a challenging task due to the fact that every material is unique in terms of its electrical, optical and structural properties. It is these unique material properties that allow devices and components such as solar cells, sensors, logic devices, memories, interconnect, displays, emitters, packaging materials to perform their specified tasks. In this presentation we will discuss typical electrical measurement methods for a variety of materials and present the test instruments and solutions that Keysight can provide for defining and assembling material testing solutions.

Topic 2: Advanced Testing Solutions for Impedance Measurements

This presentation is aimed to focus on basics impedance measurement and its applications. Also, the correct techniques for making accurate impedance measurements on components such as capacitors, inductors and transformers will be discussed. You will gain an understanding on the reasons for measurement discrepancies, the sources of measurement error and how to compensate for these errors. A discussion on the advantages and disadvantages of the different measurement techniques employed will assist you in selecting the right instrument for your measurement need.

Topic 3: Devices & Material Characterisation from DC to mm-wave & THz

From stealth materials to dielectric substrates, microwave food products to biofuels, accurate characterisation of their electromagnetic properties at microwave and mm-wave frequencies provide engineers with critical information needed for material and circuit design, modelling, research, manufacturing and quality control. In this paper we will overview the classes of methods employed to measure the dielectric properties of solids and liquids and will discuss the criteria one should consider when selecting a measurement technique. The focus will be on those techniques useful for measuring the relative permittivity and loss tangent of dielectric materials, both liquid and solid, over a frequency range that covers 100 MHz to 1.1 THz.

Topic 4: Electrical Characterisation of GaN & SiC devices with the Keysight B1505A

Rapid advances in power device technology are rendering conventional measurement equipment a thing of the past. High current conduction tests of more than 1000A, sub pico-ampere leakage current measurements and evaluation of breakdown voltages of up to 10+kV become ever more important. In this presentation we will discuss typical IV and CV measurements on GaN and SiC power devices using the Keysight B1505A power device analyser.

Agenda for Thursday 12th is published on Keysight's website.

Pre-Register now at www.keysight.com/find/hotspots

Rohde & Schwarz Workshops

- Free to attend -

For more information, details and registration:
<http://www.eumw.rohde-schwarz.com/>

Location: NCC East, Level 2, Room Budapest

Tutorial Seminars - RF Basics in Test & Measurement

Tutorial abstract:

The RF world is rapidly changing as more and more digital communications standards such as 5G and WLAN 801.11ad/ay move into the mmWave world. Traditional methods of designing RF boards and components become design aspects of microwave boards and module development. Today, many mmWave engineers are confronted with new design challenges that are more or less typical for RF design engineers. Such design procedures may differ from the daily routine of mmWave engineers.

These RF basics and fundamentals will familiarize you with using a vector network analyzer for component testing and evaluation, which is still a classical field of mmWave engineering. Insight into digital modulation schemes, signals and the underlying aspects of fading in digital communications systems will help mmWave engineers understand the challenges that the communications industry faces today. A look at the fundamental aspects of signal generators and spectrum analyzers will show mmWave engineers the great flexibility that exists when designing communications systems, radar systems and solutions.

Tuesday 10th October 2017 **09:30 – 11:00**
Fundamentals of Vector Network Analysis

Tuesday 10th October 2017 **11:15 – 12:45**
Calibration in Vector Network Analysis

Wednesday 11th October 2017 **09:30 – 11:30**
Introduction to Digital Signals and Digital Modulation

Wednesday 11th October 2017 **11:45 – 13:15**
Understanding Fading and its Effects

Thursday 12th October 2017 **9:30 – 10:30**
Fundamentals of Signal Generators and Oscillators (YIG vs. VCO)

Thursday 12th October 2017 **10:45 – 12:15**
Fundamentals of Spectrum Analysis



ROHDE & SCHWARZ

Technical Workshops

Tuesday 10th October 2017 **13:30 – 17:30**
RF & Microwave Component Testing

Workshop Chair: Markus Lörner, Market Segment Manager RF & Microwave Components, Rohde & Schwarz

The design of all involved millimeter components is becoming more complex in order to fulfill the stricter requirements associated with higher bandwidths and frequencies. Power amplifiers have a strong impact on the overall system performance and require special attention. The new architectures with beamforming antennas use multiple elements and require many PAs to drive them. They need to become smaller and more efficient to enable the necessary high degree of integration.

This workshop discusses how to verify the performance of components like PAs, converters, mixers and filters for these emerging applications. Experts from the test and measurement world will provide answers on how to verify the demanding requirements placed on new components.

Wednesday 11th October 2017 **13:30 – 17:30**
5G Communications

Workshop Chair: Meik Kottkamp, 5G Technology Manager, Rohde & Schwarz

LTE, including all its enhancements in LTE-Advanced and LTE-Advanced Pro, has become the dominant cellular technology. It provides the evolutionary path towards 5G, namely New Radio (NR) in 3GPP. NR will be specified in 3GPP within the Release 15 timeframe. In particular, non-standalone operation with LTE-A Pro will be completed by the end of 2017. Revolutionary aspects of NR include the use of the cmWave and mmWave spectrum with advanced antenna implementation. This enables dynamic beam steering in combination with spatial multiplexing known as massive MIMO.

This workshop discusses the key technology components relevant to using the cmWave and mmWave spectrum. R&D measurement aspects will be explained in detail, with a focus on verifying massive MIMO antenna. 5G coverage measurement solutions in the field will also be illustrated. Experts from the test and measurement world will provide answers on how to most efficiently solve the main verification tasks resulting from NR.

Thursday 12th October 2017 **12:30 – 16:30**
Radar Applications

Workshop Chair: Dr. Steffen Heuel, Technology Manager A&D, Rohde & Schwarz

Radar has been around for more than one hundred years, ever since Christian Hülsmeyer from Germany patented his "Telemobiloskop" in 1904. Since then, radar has been applied in a variety of applications such as presence detection, air traffic control, military use and even automotive. These different applications need different radar systems that make use of various frequencies, signals and processing and require versatile test and measurement methods. This workshop presents the latest radar test and measurement developments – from signal generation, wideband analysis and phase noise testing to simulated RF environments for testing the many radar requirements.

National Instruments Workshops

- Free to attend -

Location: NCC East, Level 2, Room Krakau

Tuesday 10th October 13:00 – 16:00

Intuitive Microwave Filter Design

Overview:

This 3-hour workshop, presented by Dan Swanson from SW Filter Design, will focus on two detailed filter design examples using NI AWR Design Environment and SW Filter Design software. The first example is a microstrip combline filter and the second is a narrow-band, high Q-cavity combline filter. The same design strategy, based on Dishal's method and port tuning, will be used for both filters.



- Step 1 will be to determine the required coupling coefficients and external Q for our filter.
- Step 2 will be to define a suitable resonator that has enough unloaded Q to meet our insertion loss requirement.
- Step 3 will be to build design curves that relate coupling coefficients and external Q to physical dimensions in our filter.
- Step 4 we will build a virtual prototype of the complete filter and apply port tuning. The port tuning procedure will demonstrate how to adjust each resonator frequency and all the couplings between resonators, including cross-couplings.
- Step 5 we will build a two-port EM model of our filter and confirm that we are meeting our specification.

To view the complete agenda and to register, visit:
awrcorp.com/eumw2017



Wednesday 11th October 10:00 – 16:00

RF/Microwave Power Amplifier (PA) Forum

The fourth annual EuMW RF and Microwave PA Forum will focus on device technologies, characterisation, modelling and end-use applications of RF and microwave PAs. The forum aims to encourage discussion and provide insight into the latest approaches to device models, parameter extraction measurement techniques, process technologies as well as modern PA design flow and theory. The forum's agenda is segmented into sequential sessions to allow attendees to selectively attend any/all presentations of interest.

Presentation Highlights:

- Keynote: The Outphasing PA: Revisiting 80 Years of Questionable Assumptions and Unrealised Performance Potential
Dr. Steve C. Cripps - Cardiff University
- First Pass Design Methodology for a 0.7 - 2.7 GHz 100 W RFLPA
Jack Brunning - SARAS Technology
- Introducing STORM - Near 0dB PAPR Waveform of mmWave 5G
Dr. Doron Ezri - Tel-Aviv Research Center, Huawei
- Cardiff Model+ Investigating Bias and Frequency Interpolation
Dr. Tudor Williams - Mesuro
- And many more

To view the complete agenda and to register, visit:
awrcorp.com/eumw2017

Thursday 12th October 10:00 – 13:00

Software Defined Radio Hands-On: FPGA Prototyping with Over-the-Air Signals

NI SDR solutions scale from design and prototyping, to deployment, enabling faster innovation and accelerated results. Attend this hands-on session to see first-hand how the LabVIEW Communications System Design Suite, when paired with NI USRP-RIO hardware, can accelerate productivity and drive rapid innovation. During this session, attendees will:

- Build an FM radio
- Create a real-time LTE link between two USRP-RIOs and transmit video on the downlink
- Explore LTE and WiFi coexistence
- Learn how leading researchers are leveraging NI SDR solutions to break world-records in spectral efficiency with Massive MIMO, prove out FD-MIMO as a candidate technology for 5G, and experiment on LTE/WiFi coexistence in real-world conditions

To view the complete agenda and to register, visit:
ni.com/eumw

EXHIBITOR WORKSHOPS & SEMINARS

IHP Workshop

- Free to attend -

For registration visit:
ihp-microelectronics.com/EuMW2017



Location: Exhibition Hall Room (Far right hand corner)

Thursday 12th October 09:30 – 13:00

16th Workshop "High Performance SiGe BiCMOS Technology Platform for innovative RF and Photonic ICs"

The Workshop delivers firsthand information about IHP's technologies, services and integrated circuits. IHP's offerings are very suitable for demanding applications such as wireless and broadband communication, medical technology, aerospace, mobility, wireless security, and industrial automation.

Agenda:

9:30 - 10:10

Latest Developments on SiGe BiCMOS Technologies with "More-than-Moore" Modules for mm-wave and THz Applications - M. Kaynak

In last decade, SiGe BiCMOS technologies open a new cost-efficient market at mm-wave frequencies. The latest developments on SiGe HBTs with f_{max} of beyond 700 GHz boosts the research and development effort on circuit and system area to take share from the new market. In parallel to the developments on SiGe HBT performance, "More-than-Moore" path, which covers all the additional functionalities to the standard CMOS process (i.e. MEMS devices, microfluidics, photonics, heterogeneous integration, etc...), allows to realize multi-functional circuits and systems. In this talk, the latest developments regarding the high-speed devices and heterogeneous integration techniques at IHP will be discussed.

10:10 - 10:50

Photonic BiCMOS Technology for High-Speed Photonic-Electronic Integration - L. Zimmermann

In this talk, a new monolithic platform technology for co-integration of silicon photonics with high-performance BiCMOS will be presented. The main application of the technology is in the area of RF frontends for implementing efficient sub-systems in high-speed optical communications. Present status of the technology will be reviewed; future developments toward 400G systems will be addressed; pros and cons in comparison to other integration technologies will be discussed.

10:50 - 11:10 Coffee Break

11:10 - 11:50

Overview on MPW Offerings and Process Design Kit Features – R.F. Scholz

IHP offers research partners and customers access to its powerful cutting edge SiGe:C BiCMOS technologies. Integrated HBTs provide cut-off frequencies of up to 500 GHz. Special integrated RF modules like RF MEMS, Through Silicon Vias, Localized Backside Etching, and ultra fast pnp HBTs are available. Technology overview, MPW schedule, and PDK news for 2018 will be presented.

11:50 - 12:30

Integrated Broadband and High-Frequency Circuit Platforms in SiGe BiCMOS Technology - D. Kissinger

This talk presents integrated circuit solutions up to 500 GHz in high-performance IHP BiCMOS technologies. These include broadband drivers and transimpedance amplifiers for high-speed fiberoptical communication systems, as well as transceiver platforms for wireless data communication and radar sensors. Several state-of-the-art circuit realizations are outlined to demonstrate the capabilities and potential of modern SiGe BiCMOS technologies.

12:30 Lunch

MICROAPPS 2017 – Stand 97

- Free to attend -

Welcome to the seventh annual European Microwave Week (EuMW) Microwave Application Seminars (MicroApps), sponsored by National Instruments, Rohde & Schwarz, and Horizon House. MicroApps will be held Tuesday, 10 October through to Thursday, 12 October 2017 in the MicroApps Auditorium (Stand 97), which is located near the entrance of the exhibition floor, making it a convenient stop while attending EuMW.

MicroApps are 20-minute exhibitor technical presentations that provide an opportunity for EuMW attendees to experience state-of-the-art applications, products, design techniques, and processes of interest to the RF and microwave community.

Once finalised, a complete agenda will be posted on the EuMW MicroApps website at www.eumicroapps.com and published in the official EuMW Show Guide. Additional printed copies will also be available on site at the EuMW registration desks.

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MicroApps Highlights:

- Daily keynotes presented by:
 - Dr. Steve Cripps, Cardiff University
 - Dr. James Rautio, Sonnet Software
 - Dan Swanson, SW Filter Design
- A variety of practical application topics describing novel products and processes.








Free access to MicroApps is enabled by an exhibition-only badge or conference badge. Complimentary USB key containing the papers presented and bottled water will also be available.

We look forward to seeing you at Stand 97 during EuMW 2017 for MicroApps!

The EuMW MicroApps Committee








CONFERENCE SESSIONS MATRIX - SUNDAY

Room	08:30-10:10	Coffee Break	10:50-12:30	Lunch	13:50-15:30	Coffee Break	16:10-17:50
Hongkong	<p>Workshop WS-01 Microwave Photonics: An Enabling Technology for 5G?</p>						
Kiew	<p>Workshop WS-02 Advances in GaN Device Technology for Millimeter-Wave Applications</p>						
Riga	<p>Workshop WS-03 Wireless 100Gb/s and Beyond: Progress in Ultra-fast Wireless Communications</p>						
St. Petersburg	<p>Workshop WS-04 Equipment and Antennas for Satellite Communication</p>						
Krakau	<p>Workshop WS-05 Microwave and THz Devices and Circuits Based on Graphene</p>						
Prag	<p>Workshop WS-06 Integration of III-V Nanowire Semiconductors for Next Generation High Performance CMOS SOC Technologies, and Competitive Solutions</p>						
Budapest	<p>Workshop WS-07 High-Q RF MEMS Devices and Multiphysical CroShort Course SS-Layer Circuit Design</p>						
Istanbul	<p>Workshop WS-08 High Efficiency Power Amplifiers and Smart Transmitters</p>						
Oslo	<p>Workshop WS-09 5G - From Concepts to Circuits</p>						
Kopenhagen	<p>Workshop WS-10 Fan-out Wafer Level and 3D Packaging Technologies for RF and mm-Wave Applications: Available Technologies and Applications from Industry</p>						
Stockholm	<p>Workshop WS-11 Chipless RFID Systems, Technology and Applications</p>						
Seoul	<p>Workshop WS-12 Newest Trends in OTA Performance Testing for Automotive and 5G</p>				<p>Short Course SS-01 Multibeam Antennas and Beamforming Networks</p>		
Shanghai	<p>Workshop WS-13 Advanced RF and Microwave Circuit Technologies</p>						
Neu Delhi	<p>Workshop WS-14 Modelling, Identification and Suppression of Parasitic Modes in On-Wafer Measurements</p>				<p>Workshop WS-15 The Basics of Travelling Wave Tube Amplifiers</p>		

	EuMW		Joint EuMC/ EuMIC
	EuMC		Joint EuMC/ EuRAD
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	EuRAD		








CONFERENCE SESSIONS MATRIX - MONDAY

Room	08:30-10:10	Coffee Break	10:50-12:30	Lunch	13:50-15:30	Coffee Break	16:10-17:50
Kiew	EuMIC01 MMICs for mm-Wave Subsystems				EuMIC06 THz Integrated Circuits		EuMIC09 New Approaches for Broad-band GaN Power Amplifiers
Riga	EuMIC02 RF-Power and Thermal Behaviour of GaN and Silicon Devices				EuMIC07 Advanced Silicon Devices and Circuits		EuMIC10 Device and Behavioural Modelling
St. Petersburg	EuMIC03 Integrated Receivers and Transceivers		EuMIC04 EuMIC Opening Session		EuMIC08 Wideband Multifunction Components		EuMIC11 Oscillators and Synthesizers
Krakau	Workshop WM-01 Current and Future Use of Spectrum by PMSE - 4th PMSE Workshop at EuMW						
Prag	Workshop WM-02 Electromagnetic Sensors for Life Science Applications						
Budapest	Workshop WM-03 Far-Field and Near-Field Techniques for Wireless Energy Transfer						
Instanbul	Workshop WM-04 High Power RF- and Microwave Amplifiers and Generators				Workshop WM-05 Connecting to MMIC at Millimeter-Waves		
Oslo	Workshop WM-06 THz Electronics Technology for Communications and Sensing						
Kopenhagen	Workshop WM-07 mm-Wave Antenna Measurement Techniques and Facilities Planning						
Stockholm	Workshop WM-08 Novel Fabrication Technologies for Sub-Millimeter Wave to THz Applications						
Neu Delhi	EuMW Student School						
Singapur	EuMW Doctoral School						
Conference Centre				EuMIC05 EuMIC Interactive Session (12:30 - 14:10)			

	EuMW		Joint EuMC/ EuMIC
	EuMC		Joint EuMC/ EuRAD
	EuMIC		Joint EuMIC/ EuRAD
	EuRAD		








CONFERENCE SESSIONS MATRIX - TUESDAY

Room	08:30-10:10	Coffee Break	10:50-12:30	Lunch	13:50-15:30	Coffee Break	16:10-17:50	18:30 - 21:30
Hongkong	EuMW MINT 8:00-15:00						EuMW WiM Reception 16:30-18:00	
Sydney								Welcome Reception
Kiew	EuMC/EuMIC01 High Performance Si-Based Power Amplifiers			EuMIC14 Foundry Session (12:40 - 13:20)	EuMC/EuMIC03 Power Amplifier Linearisation		EuMC08 GaN-Based Power Amplifiers	
Riga	EuMIC12 Device Characterisation				EuMC/EuMIC04 Interconnects and Packaging		Career Platform Special Session	
St. Petersburg	EuMIC13 Highly Integrated mm-Wave Transceivers				EuMC/EuMIC05 Reconfigurable and Tunable RF and Microwave Circuits		EuMIC15 EuMIC Closing Session	
Prag	Young Professionals in Microwaves				EuMC04 Integrated Antennas - Circuit and Feed Design		EuMC09 Integrated Antennas - Technology and Design	
Instanbul	EuMC01 Multiport Planar Coupling Structures				EuMC05 Novel Planar Passive Components		EuMC10 Novel Technologies for Passive Components	
Oslo	Workshop WTu-01 Terahertz Technologies: A Device and Application Perspective from Fundamentals to Implementations							
Kopenhagen	EuMC02 Tunable Passive and Active Filters				EuMC06 Radio Frequency Identification (RFID)		EuMC11 Wireless Power Transfer	
Tokio			EuMW01 EuMW/EuMC Opening Session					
Seoul	EuMC/EuMIC02 Special Session: Funding for Research				EuMW WiM 13:00-14:30		EuMC12 Front-End Components for Radio Astronomy, Communications, and Radar	
Shanghai	EuMC03 Novel Technologies for Future Wireless Communication Systems				EuMC07 Antenna Array Technology - Design, Manufacturing, and Applications		EuMC13 Antennas in Printed Technology	
Neu Delhi	EuMW Student School							
Singapur	EuMW Doctoral School							
Exhibition Hall					EuMC/EuMIC06 EuMC/EuMIC Interactive Session (14:30 - 16:10)			

	EuMW		Joint EuMC/ EuMIC
	EuMC		Joint EuMC/ EuRAD
	EuMIC		Joint EuMIC/ EuRAD
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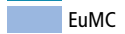




CONFERENCE SESSIONS MATRIX - WEDNESDAY

Room	08:30-10:10	Coffee Break	10:50-12:30	Lunch	13:50-15:30	Coffee Break	16:10-17:50	17:50-18:00
Hongkong	EuMC14 Antennas for mm-Wave Applications		EuMC/EuRAD01 Antenna Systems - Industrial Perspectives		EuMC/EuRAD03 Focused Session: Conformal Antennas and Arrays		EuMC/EuRAD04 Beam Steering Antennas and Technologies	
Kiew	EuMC15 Impedance Matching Solutions for GaN Power Amplifiers		EuMC22 High-Efficiency Power Amplifiers		EuMC28 Amplifiers and Receivers		EuMC35 Advanced Oscillator Design	
Riga	EuMC16 Special Session: Novel Microwave Devices and Measurements in Central Europe		EuMC23 Focused Session: Advanced Microwave Materials		EuMC29 Metasurfaces and Frequency-Selective Surfaces		EuMC36 Metamaterials, Periodic Structures, and Applications	
St. Petersburg	EuRAD01 EuRAD Opening Session		The Defence & Security Forum					
Foyer St. Petersburg								Def & Sec Cocktail Reception
Prag	EuMC17 RF MEMS and Sensors		EuMC24 Additive Manufacturing Techniques for RF Applications		EuMC30 Sub-THz Components and Electro-Optic Systems		EuMC37 Special Session: Microwave Research in Asia Pacific	
Instanbul	EuMC18 Design Techniques and Implementations of Planar Couplers		EuMC25 Advanced Waveguide Structures		EuMC31 Novel Synthesis and Design Techniques for Microwave Filters		EuMC38 Substrate-Integrated Waveguide Filters and Diplexers	
Oslo	Short Course SW-01 Modulation Schemes and Interference of Automotive Radars				Workshop WW-01 Technologies and Circuits for Advanced Automotive Radar and Related Applications			
Kopenhagen	EuMC19 Special Session: Stochastic Electromagnetics		EuMC26 Special Session: Microwave Research in Latin America		EuRAD02 Synthetic Aperture Radar		EuRAD03 Radar Remote Sensing	
Seoul	EuMC20 Wireless Communication Channels		EuMC/EuRAD02 Microwave Systems		EuMC32 Advances in Measurements		EuMC39 On-Wafer Device Characterisation	
Shanghai	Student/Doctoral School Hands-on Experience							
Neu Delhi	Workshop WW-02 Millimetre Wave Radar Sensor Design in Nanoscale RF-CMOS Technologies				Workshop WW-03 Recent Advancements in Wide-Band and Efficient GaN Power Amplifiers			
Singapur			EuMC27 Components and Techniques for Microwave Vacuum Electronics		EuMC33 Focused Session: Microwave Vacuum Electronics		EuMC40 High-Power Microwave and mm-Wave Sources	
Exhibition Hall		EuMC21 EuMC Interactive Session 1 (10:00 - 11:40)				EuMC34 EuMC Interactive Session 2 (14:30 - 16:10)		

	EuMW		Joint EuMC/ EuMIC
	EuMC		Joint EuMC/ EuRAD
	EuMIC		Joint EuMIC/ EuRAD
	EuRAD		








CONFERENCE SESSIONS MATRIX - THURSDAY

Room	08:30-10:10	Coffee Break	10:50-12:30	Lunch	13:50-15:30	Coffee Break	16:10-17:50
Hongkong	EuMC/EuRAD05 Advanced Radar Technologies and Systems		EuMC/EuRAD08 Modelling and Synthesis of Array Antennas				
Kiew	EuMC/EuRAD06 Polarisation Diversity and Measurements		EuMC/EuRAD09 Radar Signal Sources				EuRAD08 MIMO Radar Systems
Riga	EuMC41 Medical Microwave Applications		EuMC45 Biomedical Sensing and Dielectric Characterisation				
St. Petersburg	EuRAD04 Automotive Radar 1		EuRAD06 Automotive Radar 2				EuRAD09 Automotive Radar 3
Prag	EuMC42 Numerical Modelling of Guided-Wave Structures		EuMC46 Numerical Modelling of Radiating Structures				MTT Young Professionals Macrowaving your career
Instanbul	EuMC43 Advanced Dielectric Resonator Filters		EuMC47 Compact and Advanced Implementations of Waveguide Filters				
Oslo	EuMC44 Dielectric Material Characterisation		EuMC48 Wireless Technologies				EuMC/EuRAD10 Special Session: Radar Technology and System Applications in Central Europe
Kopenhagen	EuRAD05 Localisation and Tracking		EuRAD07 MIMO Radars and Waveforms				EuRAD10 Classification and Recognition
Tokio					EuMW02 EuMW/EuMC Closing Session		
Shanghai					Workshop WTh-01 Resource-Efficient Localization in Wireless Sensor Networks		
Neu Delhi	Workshop WTh-02 Short Range mm-Wave Imaging Systems						
Singapur	Workshop WTh-03 Integrated Circuits for High Datarate THz-Communication						
Exhibition Hall		EuMC/EuRAD07 EuMC/EuRAD Interactive Session (10:00 - 11:40)					

	EuMW		Joint EuMC/ EuMIC
	EuMC		Joint EuMC/ EuRAD
	EuMIC		Joint EuMIC/ EuRAD
	EuRAD		

CONFERENCE SESSIONS MATRIX - FRIDAY

Room	08:30-10:10	Coffee Break	10:50-12:30	Lunch	13:50-15:30	Coffee Break	16:10-17:50
Kiev	EuRAD11 Remote Sensing and Surveillance		EuRAD14 Short-Range Radar Applications				
Riga	Workshop WF-01 Present and Future Perspectives of Passive Radar						
St. Petersburg	EuRAD12 Radar Applications 1		EuRAD15 Radar Applications 2		EuRAD16 EuRAD Closing Session		
Foyer St. Petersburg				Lunch EuRAD			
Prag	Workshop WF-02 Wearable Antennas and Smart Textiles						
Budapest	Short Course SF-01 Synthetic Aperture Radar (SAR)						
Istanbul	Workshop WF-03 Highly Integrated mm-Wave Systems for Emerging Industrial and Consumer Radar-Based Applications						
Oslo	Workshop WF-04 Active Electronically Scanned Array (AESA) Systems – Status and Trends						
Kopenhagen	Workshop WF-05 The Internet of Space, a New Satellite Communication Technique						
Stockholm	Short Course SF-02 Radar Based Detection of Drones						
Seoul	Workshop WF-06 Sub-Millimetre Wave and THz Imaging for Security						
Shanghai	Workshop WF-07 Future Automotive Radar Systems				Workshop WF-08 Automotive Radar Measurement Solutions - For End-of-Line Purposes as well as in Aftersales		
Neu Delhi	Short Course SF-03 Noise Radar Technology						
Conference Centre		EuRAD13 EuRAD Interactive Session (10:00 - 11:40)					

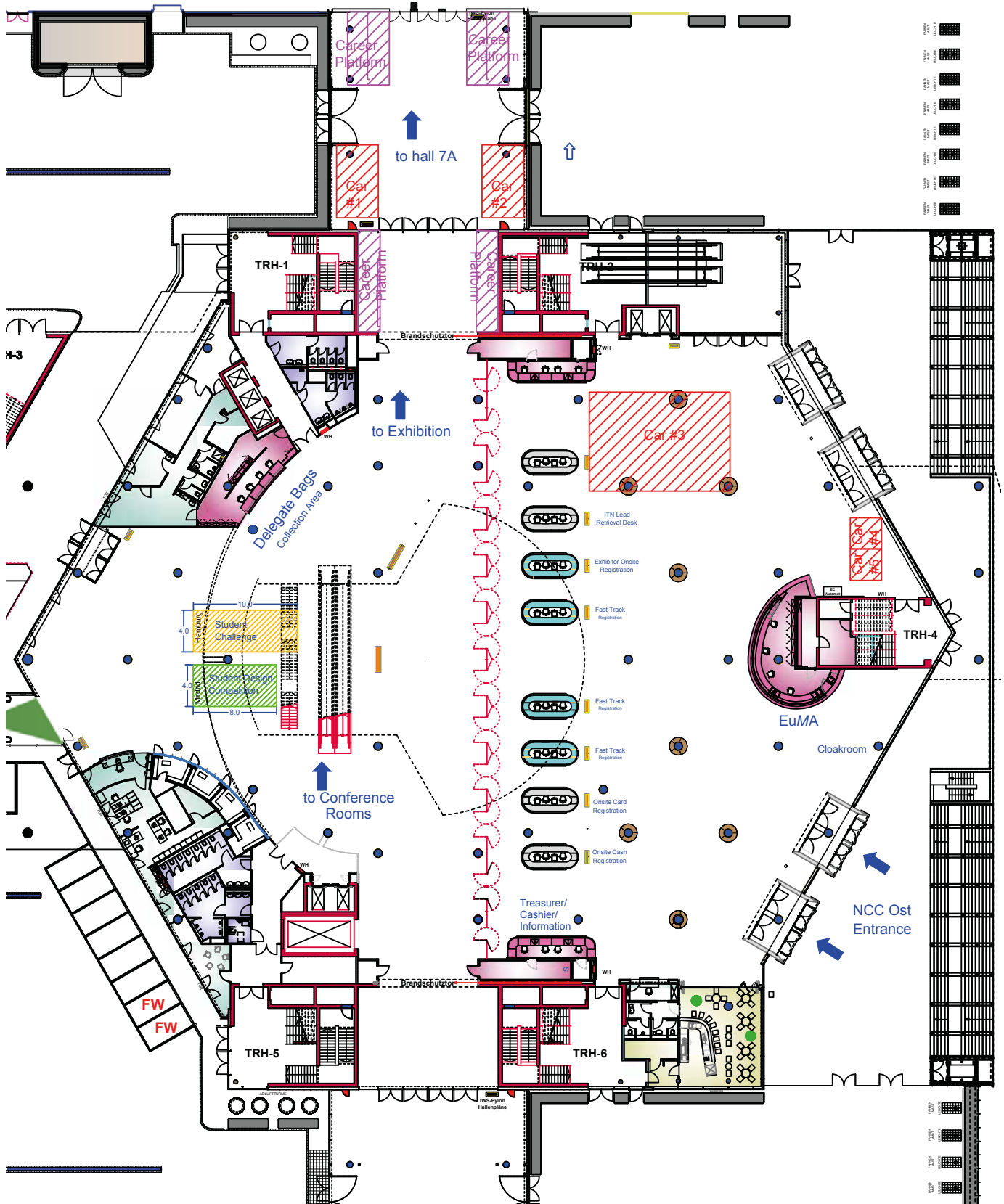
	EuMW		Joint EuMC/ EuMIC
	EuMC		Joint EuMC/ EuRAD
	EuMIC		Joint EuMIC/ EuRAD
	EuRAD		

EXHIBITOR WORKSHOP MATRIX

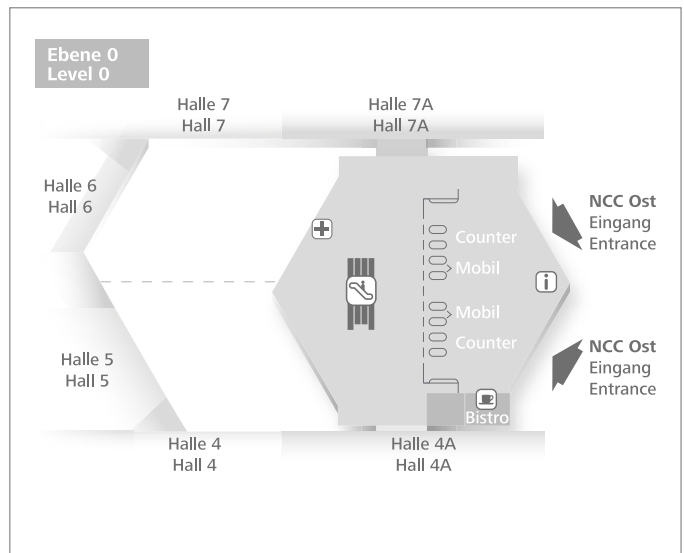
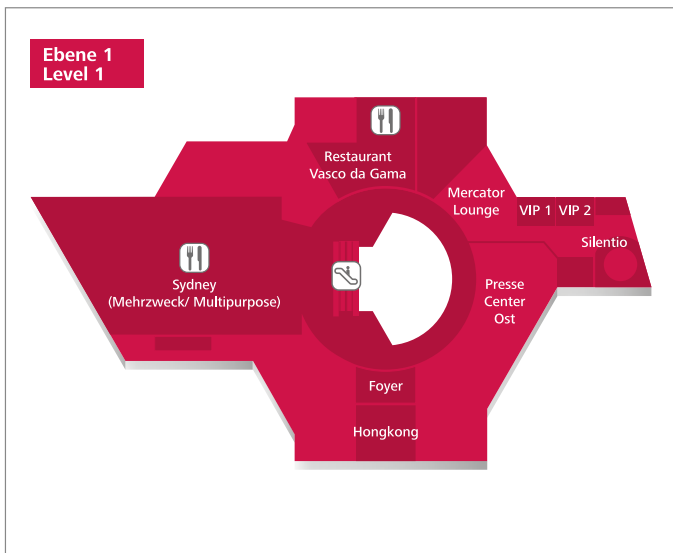
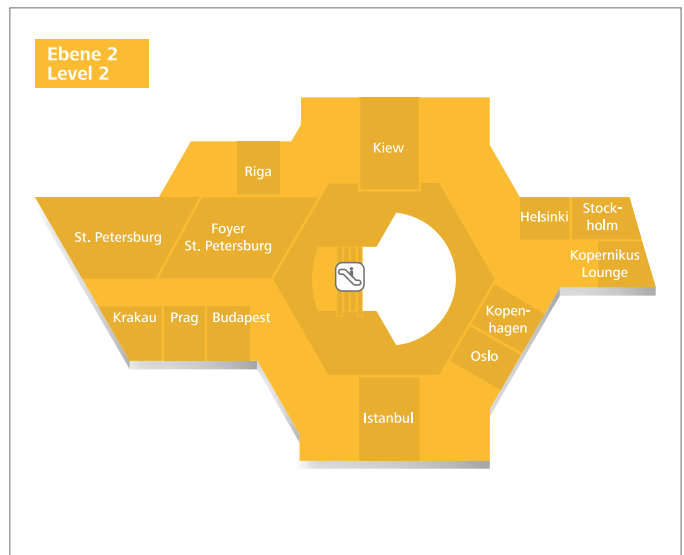
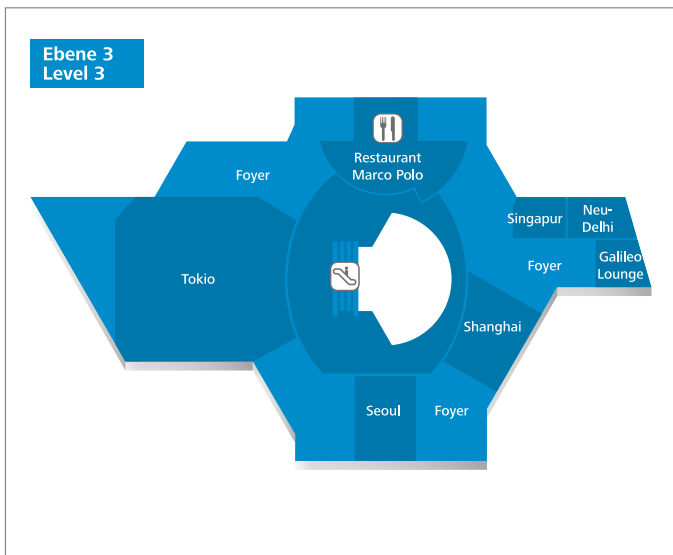
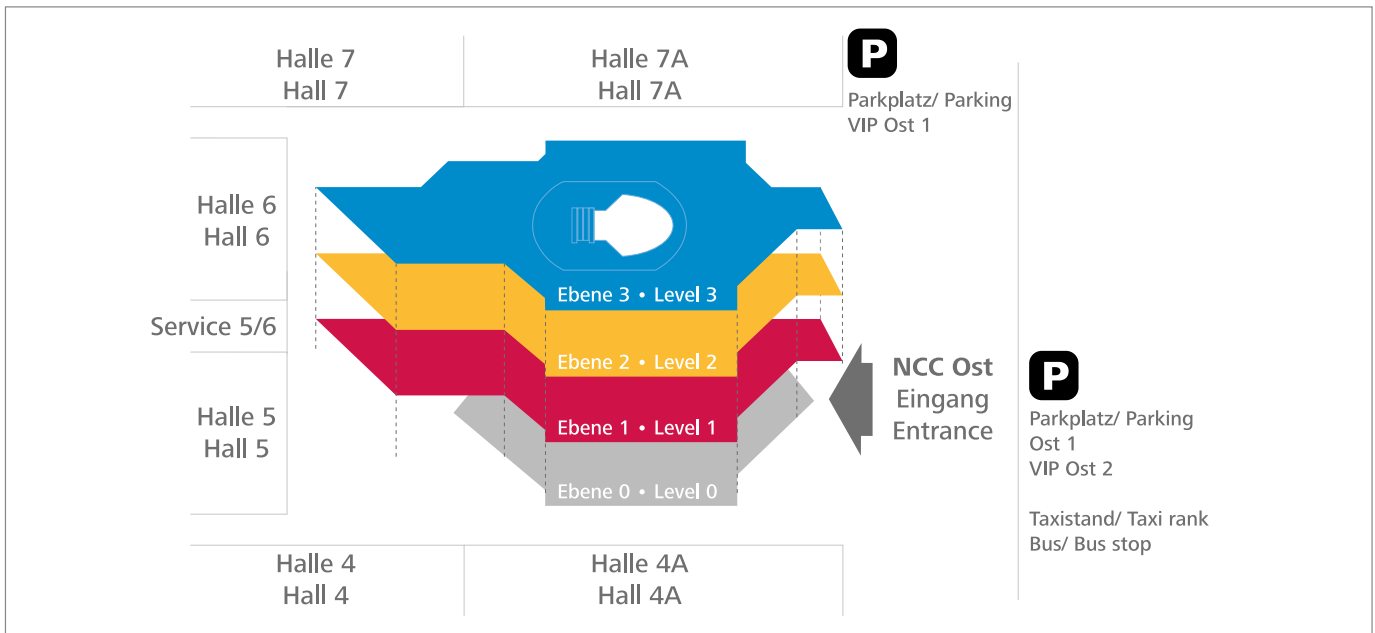
Date	Room		
Tuesday 10th October	Krakau		13:00 – 16:00 National Instruments Workshops
	Helsinki	09:30 - 17:30 Keysight Technologies Workshops	
	Budapest	09:30 - 12:45 Rohde & Schwarz Tutorial Seminars	13:30 - 17:30 Rohde & Schwarz Workshops
Wednesday 11th October	Krakau	10:00 – 16:00 National Instruments Workshops	
	Helsinki	09:30 - 17:30 Keysight Technologies Workshops	
	Budapest	09:30 - 13:15 Rohde & Schwarz Tutorial Seminars	13:30 - 17:30 Rohde & Schwarz Workshops
Thursday 12th October	Krakau	10:00 – 13:00 National Instruments Workshops	
	Helsinki	09:30 - 13:00 Keysight Technologies Workshops	
	Budapest	09:30 - 12:15 Rohde & Schwarz Tutorial Seminars	12:30 - 16:30 Rohde & Schwarz Workshops
	Exhibition Hall Room	9:30 - 13:00 IHP Workshops	

- Keysight Technologies Workshops
- National Instruments Workshops
- Rohde & Schwarz Workshops
- IHP Workshops

FLOOR PLAN



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EXHIBITOR LIST



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Chengdu Keylink Microwave Technology	Hi-Rel Group LLC	Nesuro LTD	Teledyne Storm Microwave
Chengdu Sampling Master Electronic Technology Corporation Ltd	Holzworth Instrumentation	Noffz	Telemeter Electronic GmbH
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DICONEX - DELTA OHM			Wolfspeed, A Cree Company
DOWA HD Europe GmbH			Wuerth Elektronik eiSos GmbH & Co. KG

The Exhibitor List is correct at the time of going to press. It is subject to change.

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