

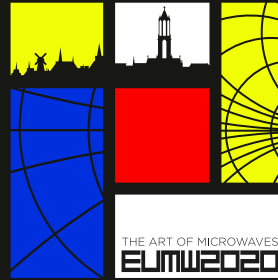
SIX DAYS

THREE CONFERENCES

THREE FORUMS

ONE EXHIBITION

EUROPEAN MICROWAVE WEEK 2020
JAARBEURS CONVENTION CENTRE
UTRECHT - THE NETHERLANDS
10 - 15 JANUARY 2021



**EUROPEAN
MICROWAVE WEEK**
JAARBEURS UTRECHT
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10-15 JANUARY 2021
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The European Microwave Week 2020 organisers would like to thank the following companies for their help and valued support throughout this year's event.

PLATINUM SPONSOR



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Make ideas real



Welcome to the 23rd European Microwave Week

The Corona virus has swept across the globe. We have managed to move the European Microwave Week from September 2020 to January 2021, because we so much value that real-life, person-to-person interaction. Register and visit!

"Be part of the European Microwave Week, that will be remembered as the first big Microwave Conference after Corona."

Welcome! We are excited to host the European Microwave Week in The Netherlands, the country where it all started in 1998, when three conferences merged into the 'Microwave Week'. This turned out to be a strategic and very successful move: 22 years later this week has grown into the biggest event of its kind in Europe. To me, the week can be summarised in four words: Learn, meet, enjoy and explore!

Learn. This week represents the state-of-the-art in RF, microwaves and radar. Academia and industry present well over 400 scientific talks. Although this is more than any individual can absorb, it guarantees that - if you work in this field - you can pack your week with relevant insights and new developments. Short courses will get you up to speed for new topics, workshops will bring you all the new developments for those already working in the field. Exchange ideas with colleagues from academia and industry. Stay skilled in a world that is changing at an unprecedented rate.

"If you work in this field - you can pack your week with relevant insights and new developments."

Meet. This week is where the entire community meets. Meet, to interface with all the relevant industries at the largest microwave and radar tradeshow - this tradeshow alone is more than worth a visit! Stop by the EuMA booth and become a member. That is the first step to get involved in volunteering: Do so for a few years and suddenly realise that you actually know all the famous names in microwaves and radar. Meet, to learn before things even get published. Meet old friends to catch up, meet to make new friends that last a lifetime.

Enjoy. This week's venue maximally facilitates learning and meeting. Utrecht is a historic place that welcomes visitors warmly. Enjoy its canals, churches, modern and ancient art, and over 3000 years of history. Enjoy its famous music scene, century-old restaurants, bars and nightlife. Enjoy the Railway museum where we will host a splendid dinner amidst historic trains. Enjoy the pub crawl and dancing festivities organised by us for you in the heart of the city. Both the conference venue and city centre are within five minutes walking from the railway station, so be prepared to combine work and fun!

"With over 400 scientific papers, around 30 workshops and short courses this will more than satisfy your scientific thirst."

EuMIC, EuMC, EuRAD. The European Microwave Integrated Circuits Conference, the European Microwave Conference and the European Radar Conference together form the scientific heart of the Microwave Week. Keynote speakers from around the globe to inspire our audience, semiconductors that literally work up to a THz, dedicated sessions on Teaching Microwave Engineering, a Focus Day on (Active) Array Antennas, there is just too much to name it all here. Female talent can meet their peers and get together during the Women-in-Microwaves event. EuMC, the oldest of the conferences involved, will be celebrating its 50th anniversary, which is the reason for the golden crown over this year's logo.

"We invite you to immerse yourself in the culture, art and history of Utrecht."

Explore! Browse through this programme to learn about the student activities (including a drone-detecting challenge: build a team, receive hardware and demonstrate your performance on-site), the different fora (the Defence, Security and Space Forum on Space Situational Awareness, the Automotive Forum, this year particularly on waveforms and AI in automotive radar, and the new 5G Forum that bridges the gap between business and technology), a workshop on Quantum Computing for Electronic Engineers, and there is something on 5G at virtually every time-slot. This week is so packed with science and fun, that you'll regret going home when the week is over!



FRANK VAN VLIET

General Chair
TNO, The Netherlands &
University of Twente, The Netherlands



BART NAUWELAERS

General Co-Chair
KU Leuven, Belgium

Welcome from the President of the European Microwave Association

On behalf of the European Microwave Association (EuMA), I warmly welcome you to the 23rd edition of the European Microwave Week in Utrecht! EuMA stands up for our microwave and RF community. We promote our microwave discipline wherever we can. We foster networking between scientists, engineers, decision makers and end-users. We pursue this in various ways. The European Microwave Week (EuMW) is our main asset and key event to do so.

EuMA is continuously improving itself to support our microwave community as good as possible. We recently released a 22 pages White Paper "For a Strong & Competitive European Wireless Technologies Ecosystem". This paper substantiates the strategic importance of wireless technologies for the 4th European Industrial Revolution and the digital European society. A free download is available at our website: www.eumwa.org.

EuMA actively supports education and offers to young researchers each year a number of scholarships at selected European industries and research institutes. The deadline of the next call is 28 November 2020. If you want to be a host for the 2021 edition please contact the EuMA Innovation Team at innovationteam@eumwa.org.

Most of you are familiar with EuMA,

but for those who aren't yet: We offer a membership to all working in the field of microwaves. If you are not a EuMA member yet, I encourage you to join. As member, you will enjoy reduced fees for attending the Week and other EuMA-sponsored conferences and workshops as well as the IEEE IMS and the APMC. You'll also have access to an archive of publications and the online version of the International Journal on Microwave and Wireless Technologies.

The European Microwave Week (EuMW) is the premier microwave conference and exhibition event in Europe. The success of the 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 / Microwave Journal forms an integral part of it.

As everybody knows, preparing and hosting the EuMW is a major effort, from paper submission and review to 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 Frank VAN VLIET and Bart NAUWELAERS, 2020 General Chair and Vice-chair; to Alex YAROVY, General TPC Chair; to Marcel VAN DER GRAAF,

Operational Officer; to Laura ANITORI Workshops and Short Courses Chair; to Ioan LAGER, Treasurer; as well as to Wim VAN CAPPELLEN and Dominique SCHREURS, EuMC Chair and TPC Chair; to François DEBORGIES and Domine LEENAERTS, EuMIC Chair and TPC Chair; and to Mayazurra RUGGIANO and Jacco DE WIT, EuRAD Chair and TPC Chair - just to name a few on behalf of the entire team. Thank you!

The European Microwave Week is back again in The Netherlands after the successful events in 1998, 2004, 2008 and in 2012. All members of the team have been working hard to set up an outstanding technical and scientific programme for you and I am sure they will make your stay in Utrecht exciting, enjoyable, and a rewarding experience of Dutch hospitality. I congratulate the team with a lot of very nice innovations like the Chinese Call for Papers.

I would like to cordially invite you to the EuMW 2020. Come to the wonderful city of Utrecht. Join us at EuMW 2020 and discover information you won't get anywhere else. Take the opportunity to meet and talk to colleagues and friends from all over the world you don't see every day. I hope to see you in Utrecht! And most of all: Get involved in our community!

EuMA is now also very active on various social media. Follow us @eumassociation on Facebook, LinkedIn, Twitter and Instagram.



FRANK VAN DEN BOGAART
President
European Microwave Association

Welcome to the 15th European Microwave Integrated Circuits Conference

It is with immense pride that we would like to welcome you all to Utrecht, The Netherlands, for the 15th European Microwave Integrated Circuits (EuMIC 2020) Conference. For once, the Conference will not happen in autumn but will be held on Monday the 11th and Tuesday the 12th of January 2021. Since we do not change a winning team, the EuMIC conference has been jointly organised by the GAAS[®] Association and EuMA, as ever since 2006. The city of Utrecht is very pleased to host the gathering of microwave experts and IC designers from all over the world.

This conference would not be without the efforts of the numerous authors trying to disseminate their work, and the dedication of the panel of reviewers and TPC members to spend their free time making the best selection in order to provide the most attractive programme. No one would imagine a major Conference without Workshops and Short Courses for which the organisers strive to gather key experts to cover the latest developments. We also have to acknowledge the previous EuMIC teams who did not spare their time to provide precious support. Finally, we would also like to thank all the people who never come under the spotlight though helping tremendously to make this Conference possible.

The EuMIC "raison d'être" is to provide a unique forum where both seasoned experts and new comers can exchange, learn, disseminate on any topic which relates to high frequency integrated circuits. Indeed, there is no proper design of an MMIC or RFIC without state of the art models, no good device without clever semiconductor engineering, no way to meet stringent requirements without bright and fresh ideas and no chance to convince a customer without sound measurements!

If you intend to be there already on Sunday and can refrain from enjoying Utrecht during the day, do register for one or more of the very good Workshops and Short Course. Monday is a busy day with a large offering: beyond the Opening Session, there will be nine regular sessions and the traditional EuMIC Get-together to conclude the day. On Tuesday, which hosts the Opening of the EuMW 2020, EuMIC offers two regular sessions, one joint session with EuMC, the Foundry Panel Session, the interactive Poster Session that will be preceded by a one-minute pitch for all presenters, and the Closing Session.

The EuMIC Opening Session will feature two distinguished invited speakers. Prof. John D. Cressler of Georgia Tech will break the mold by looking at SiGe Technology in Ways That Were Never Envisioned, while Prof. Alwyn

Seeds of University College London will present the recent developments in Photonic Integrated Circuits for Microwave Applications.

This year, the EuMIC Closing Session will start with the celebration of our best contributors. Indeed the EuMIC Prize for the best-contributed paper and the EuMIC Young Engineer Prize will be awarded by the EuMIC Prize Committee. Three GAAS[®] Association PhD student fellowships will also be awarded. This session will be concluded by two application-oriented presentations. Igor Tasevski, Vice President & Head of Product Development Unit Radio at Ericsson will explore Radio ICs for future wireless networks while Ville Kangas, Arctic Weather Satellite Project Manager at the European Space Agency will look at MetOp Second Generation mm-Wave Instruments and Technologies.

We have done all we could do to make this Conference a reality but only you, the attendees, can turn EuMIC 2020 into a success. The EuMIC team is looking forward to meet you: Hartelijk Welkom in Utrecht!



FRANÇOIS DEBORGIES
EuMIC Chair
ESA, The Netherlands



STEFAN HEINEN
EuMIC Co-Chair
RWTH Aachen University, Germany



DOMINE LEENAERTS
EuMIC TPC Chair
NXP, The Netherlands



CHRISTIAN FAGER
EuMIC TPC Co-Chair
Chalmers University of Technology, Sweden

Welcome to the 50th European Microwave Conference

With great pleasure and honour, the EuMC 2020 team warmly welcomes you to the 50th Microwave Conference, celebrating its golden edition! The history of the EuMC dates back to 1969, when the conference first took place in London. Since then, the conference has evolved into the largest event in Europe dedicated to a broad range of high-frequency topics, ranging from novel semiconductor and packaging technologies, photonics, passive and active microwave/millimeterwave circuits and antenna (arrays), up to system level, with innovative solutions for e.g., biomedical, mobile, and IoT applications.

We have done our very best to offer you an attractive conference where you can present your research and meet colleagues, learn about the latest trends and broaden your horizons, be inspired by world-leading keynote speakers from academia and industry, be exposed to the latest products in the exhibition, and make new friends. Our efforts have led to a rich program throughout the entire week. On Sunday and Monday there are 12 EuMC workshops and short courses on hot-topics, such as RF Technologies for 5G, and Advanced Measurement Techniques for Next Generation Communication Systems. Tuesday morning features the EuMW/EuMC Plenary Opening Session where Lars Reger, Executive Vice President & CTO at NXP Semiconductors, will present

the keynote speech “How Connectivity Technologies are Changing Vehicles”. Tuesday afternoon, we will host again the Women in Microwaves (WiM) event. This year’s WiM event comprises presentations and a panel discussion of leading female scientists from academia and industry. The conference sessions on Tuesday have tracks on power amplifiers, (integrated) antennas, packaging, THz electronics and photonics, and EM field theory and numerical techniques. On Wednesday, the program continues with more sessions on power amplifiers, passive components and filters, metamaterials, IoT, and Energy Harvesting Technologies. In addition, there is the highly recommended short course “Quantum Computing for Electrical Engineers” with 7 talks from experts in the field, organized in three main themes: quantum-computing fundamentals, physical platforms for quantum processors, and electronic interfaces for quantum computers. Plus a focused session on Innovative Antennas for Cubesats and Small-Space platforms. On Thursday, there are sessions on front ends, planar filters, biomedical applications, and characterisation techniques. The Netherlands is hosting an enormous amount of phased array research and development at universities, research institutes, and industry. Thursday is therefore designated as our special day on array technologies. An overview on the latest phased array

developments in Radio Astronomy, Space, and Defence are presented in three special sessions. In the EuMC Closing Session, also on Thursday, the EuMC Microwave Prize and two Young Engineer Prizes will be awarded. The Closing Session features a keynote by Hughes Boulnois (Airbus DS) “The Future of High-Throughput Satellites is Laser SatCom” and a keynote on New Frontiers for Wave Engineering Using Metamaterials by Andrea Alù, Founding Director and Einstein Professor at the Photonics Initiative, CUNY Advanced Science Research Center, USA. Last but not least, there are four more short courses and workshops on Friday.

A new element of the 2020 conference are 1-minute poster pitches: In the slot before the morning coffee, the poster presenters of the poster sessions will be pitching their work in the Media Arena for exactly one minute. Action and fun are guaranteed with big traffic lights for the timing, a timer counting down and a big red emergency button.

We hope that you will have a great time at the EuMC. Enjoy the conference!



WIM VAN CAPPELLEN

EuMC Chair
ASTRON, The Netherlands



DOMINIQUE SCHREURS

EuMC TPC Chair
KU Leuven, Belgium

Welcome to the 17th European Radar Conference

It is with great pleasure that the EuRAD 2020 team welcomes you to the 17th European Radar Conference, the key European event for the present status and future trends in the field of radar research, technology, system design, and applications. It 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.

We are proud to host EuRAD 2020 from 13th to 15th January 2021 in Utrecht at the Jaarbeurs, providing an ideal setting from plenary sessions to regular sessions, and individual discussions to workshops. Joining this conference is the ideal opportunity to keep up-to-date with the latest achievements in radar and to interact with international experts from industry and academia. The conference brings together radar experts, researchers, designers, and developers from all over the world to continuously stimulate innovation and benefit from cross-fertilization between applications. This year, the conference embraces the theme of “Awareness through Radar”, this thread links the plenary talks with the entire conference program, including the Space Situational Awareness Forum and the Automotive Forum.

In the opening session on Wednesday, two excellent keynote speakers will address important aspects of radar for space observations and naval ballistic missile defense. Goutam Chattopadhyay, senior research scientist at NASA Jet Propulsion Laboratory, will present ‘Millimeter-Wave and Terahertz Radar Instruments for Planetary, Cometary, Earth Observations, and Security Applications’. The second invited speaker is Captain Jorn Bleijs, Director of Weapon and Sensor Technology for The Netherlands Defence Material Organisation in the Maritime Systems Department, who will give a talk entitled ‘One step ahead of the enemy: innovative radar solutions are decisive for military use’. The EuRAD Opening is held in conjunction with the Defence, Security and Space Forum (DSS), which focuses further on Space Situational Awareness. For the closing session on Friday, an excellent speech will address the evolution of radar suites in the context of the Dutch frigate replacement program. The invited speaker is Winston van Oosterhout, Technical Director at Thales Nederland B.V., who will give a talk on “Multi-Band functionally integrated Multi-Function Radar sensor suites”. The opening and closing sessions thus complement each other providing contributions from research institution, government, and industry.

This year 175 papers were submitted to the conference and, after a rigorous selection process, 105 papers have been accepted and were organised into 20 oral sessions, one of them shared with EuMC, and one interactive poster session. Nine industrial keynotes are distributed over the oral sessions addressing recent innovation highlights. Additionally a focus session will address radar interference cancellation and waveform agility. Furthermore a number of special sessions will detail specific topics of interest, including one on Electronic Surveillance and Defence. Five attractive workshops and three short courses will complete and enhance the EuRAD programme, some of them shared with EuMC, on key topics like automotive in-cabin radar and networks with sensor fusion, micro-Doppler radar, multi-beam antennas and beamforming networks, radar system solutions for industrial and consumer sensing, MIMO radar, and cognitive radar signal processing.

We would like to express our deep gratitude to all the reviewers and the TPC members for undertaking their task in a professional and timely manner, and finally to all EuRAD conference delegates for your invaluable contribution to the success of EuRAD 2020. We look forward to meeting you at the EuRAD 2020 conference, and wish you an excellent stay in Utrecht!



MAYAZZURRA RUGGIANO

EuRAD Chair
Thales Nederland B.V.,
The Netherlands



JACCO DE WIT

EuRAD TPC Chair
TNO, The Netherlands

Welcome from the General TPC Chair

It is my sincere pleasure to welcome the European Microwave Week in the Netherlands in historical and at the same time very young city of Utrecht. For almost two years the Technical Program Committee worked hard to make this Dutch-Belgium Edition of the Week a great success.

A good program starts from good papers. Responding to our call for papers the authors from 61 country throughout the globe submitted 838 papers, with the majority of papers outside of the European Union. The first three largest national paper contributors to the week are Germany, China and the Netherlands. As General Technical Programme Committee Chair, I am very grateful to all reviewers and TPC members who are volunteering in the challenging time of corona crisis to make great technical program for EUMW 2020. More than 500 reviewers have laid down a solid basis for the paper selection by providing from 5 to 7 professional reviews per each submitted paper. For the first time in the history of the European Microwave Week all submitted papers were checked for (self) plagiarism using the standard IEEE tool. The Technical Program Committee with 104 members in virtual TPC meeting on March 28 have decided on paper selection having an acceptance rate of around 62 % (including focused sessions). These contributed papers have been complimented with

carefully selected industrial keynote presentations and special sessions resulting in total 91 oral sessions and 4 poster sessions. The sessions are placed in the conference matrix as much as possible along topical lines. From submitted papers we could clearly see the major trends in development in a broad field of microwaves: from circuitry to systems. To emphasize these trends, we enriched the program with three dedicated forums: DSS Forum on Space Situational Awareness, Automotive Forum and 5G Forum. The program is completed with carefully tuned workshops and special courses on topics of high interest to the microwave community.

The technical program has been managed through a new version of software system and I would like to thank Marc van Heijningen, Cristina Andrej and the staff from CONVERIA, who have efficiently contributed to the final programme preparation via setting up and managing the CONVERIA system. Special thanks to Marcel van der Graaf for his excellent support of TPC work at all stages. I also would like to express my gratitude to the TPC chairs of the individual conferences Dominique Schreurs, Domine Leenaerts and Jacco de Wit, general TPC co-chair Ronny Harmonnijn, WS coordinator Laura Anitori and Focussed/Special Session coordinator Stefania Monni for very efficient team work.

I wish you to enjoy the conference program, meet microwave community at the conference and at the exhibition, visit beautiful down town of Utrecht, recharge your batteries and be inspired by new ideas. Looking forward to meeting you in January in Utrecht.



ALEXANDER YAROVY
General TPC Chair
Delft University of Technology
The Netherlands

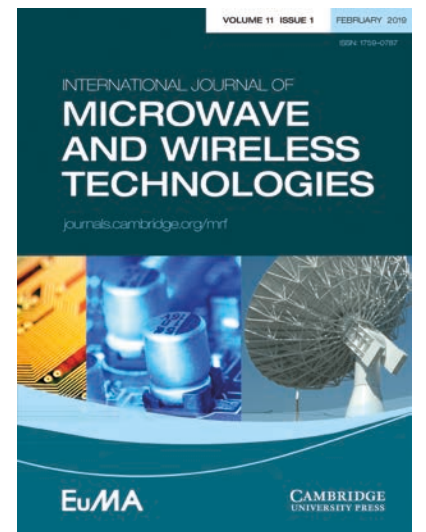
International Journal of Microwave and Wireless Technologies: EuMW 2020 Special Issue

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 ten 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 2020.

The authors of several 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 Dominique Schreurs, TPC chair of EuMC 2020, Domine Leenaerts, TPC chair of EuMIC 2020, and Jacco de Wit, TPC chair of EuRAD 2020.

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 2021.

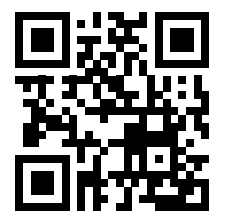
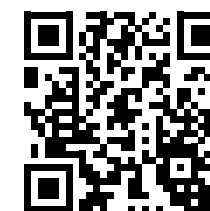
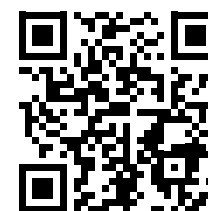


DOMINIQUE SCHREURS
EuMC 2020 TPC Chair

DOMINE LEENAERTS
EuMIC 2020 TPC Chair

JACCO DE WIT
EuRAD 2020 TPC Chair

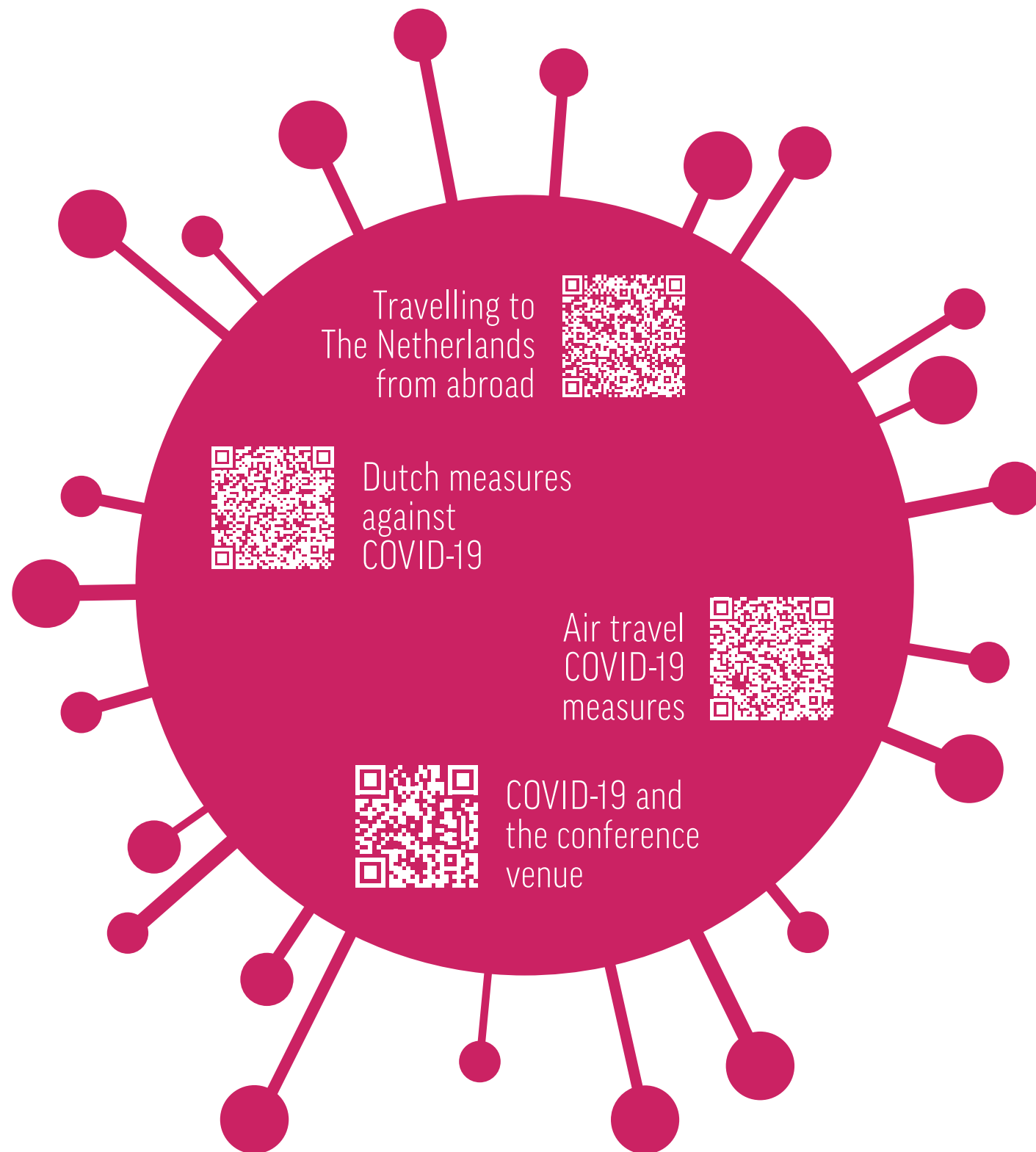
Follow us on Social Media



DARYNA PESINA
EuMA Social Media Officer

SOFIA KOTTI
EuMW 2020 Social Media Officer

COVID-19



COVID-19 EXTENDED REFUND POLICY

We understand that uncertainty about the development of the COVID-19 virus is a big concern to many of us. In addition to the regular refund policy, we have therefore implemented an EuMW 2020 extended

refund policy where you can cancel your participation in the EuMW 2020 conferences due to COVID-19 related circumstances (including company travelling policies) up to 31 December 2020, and get a full refund of

your conference registration fees. No questions asked, no further conditions. It's just another measure that we take to make your life as safe as possible, taking care of at least one uncertainty for you



Government of the Netherlands

8 May 2020

Hygiene rules for everyone

We can only take the next step forward if everyone follows these rules.



Wash your hands frequently.

- Wash your hands before going out, when you return home, after blowing your nose, before eating and after going to the toilet.
- Wash your hands for 20 seconds with soap and water. Dry them thoroughly.



Cough and sneeze into your elbow.



Use paper tissues to blow your nose.

- Discard tissues immediately after use.
- Always wash your hands after blowing your nose.



Don't shake hands.



Keep a distance of 1.5 metres from others.

- This does not apply to people living in one household.
- Keeping two arms lengths away reduces the risk of people spreading the infection.

**alleen samen krijgen we
corona onder controle**

More information:
rijksoverheid.nl/coronavirus
0800 1351

The EuMW 2020 Organising Committee



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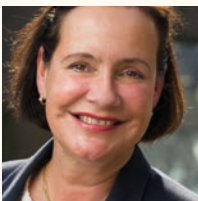
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Monique André de la Porte
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Marco Martorella
DSS Forum Chair
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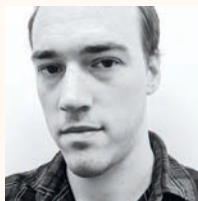
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In Memoriam: Roberto Sorrentino

Professor Roberto Sorrentino died on Tuesday, 3 March 2020. Roberto Sorrentino was an electronics engineer who had a distinguished career in the field on microwave and millimetre-wave circuits and antennas. He received in recent years the IEEE Microwave Career Award, the EuMA Distinguished Service Award and the Order of Merit of the Italian Republic. He received his doctoral degree in electronic engineering from the University of Rome “La Sapienza”, Rome, Italy, in 1971 and he began his career as an Assistant Professor at “La Sapienza” University in 1974. From 1986 to 1990 he was a Professor at the University of Rome “Tor Vergata” and in November 1990 he became a Professor at the University of Perugia. Between 1983 and 1986 he was a Research Fellow at the University of Texas at Austin, where he worked with Professor Tatsuo Itoh. In 2007 he founded RF Microtech s.r.l., a successful spin-off company from the University of Perugia specialising in microwave and radio-frequency technologies. This Umbrian company became a leader in the field of antenna design and satellite communication systems, employing 25 staff. He was the author of more than 150 technical papers in international journals and 200 refereed conference papers and he wrote and edited several books for John Wiley and McGraw-Hill.



Roberto Sorrentino was one of the six Founder Members of the European Microwave Association, which was created in 1998 to manage the annual European Microwave Conference and to create the European Microwave Week. He attended EuMC annually from 1973 and was deeply involved in the Technical Programme Committee and Management Committee. He served as the first President of the Association from 1998 to 2009. In 2010 the EuMA presented him its Distinguished Service Award. In 2014 he was the General Chair of the 17th European Microwave Week, held in Rome.

An active member of the IEEE and the Microwave Theory and Techniques Society (MTT-S) throughout his career, he was elected an IEEE Fellow for his contribution to the modelling of planar and quasi-planar microwave and millimetre-wave circuits. In 1993 he received the IEEE MTT-S Meritorious Service Award, in 2000 the IEEE Third Millennium Medal, in 2004 the IEEE MTT-S Distinguished Educator Award, and in 2015 the IEEE Microwave Career Award. In 2012, with S Bastioli and C Tomassoni, he received the MTT-S Microwave Prize for the paper “A New Class of Waveguide Dual-Mode Filters Using TM and Nonresonating Modes”, published in the MTT Transactions.

Roberto Sorrentino was the Chair of the IEEE Section of Central and South Italy, founded and chaired a local MTT/AP Chapter, was the Editor-in-Chief of IEEE Microwave and Guided Wave Letters, served on the MTT AdCom, sat on Technical Committees MTT-15 on Field Theory and MTT-1 on Computer-Aided Design, the Editorial Board of the Proceedings of the IEEE and the IEEE Electromagnetics Award Committee.

He was Vice Chair and then Chair of the International Union of Radio Science (URSI) Commission D (Electronics and Photonics) and from 2007 he was the President of the Italian Commission of URSI. He was one of the founders and from 2002-08 the first

President of the Italian Electromagnetic Society (SIEm).

In January 2020 Roberto Sorrentino was awarded the prestigious honour of the Grand Officer of the Order of Merit of the Italian Republic for his commitment in the field of research. The award was conferred by the Head of State, Sergio Mattarella, on the proposal of the Prime Minister Giuseppe Conte.

Roberto Sorrentino was an outstanding member of our technical community because his achievements combined excellence in different fields. He enjoyed a high reputation as a scientist due to his many significant technical contributions throughout his career. He was a gifted educator and many of his former PhD students are now well-respected members of the microwave community, in Italy and internationally. And, at the same time, he was active as a technical manager, founding a successful spin-off company and running it until after his retirement. Altogether, this is a truly impressive record only very few in our community can demonstrate.

Beyond this, Roberto Sorrentino was always a communicative person, with an open and friendly attitude, building bridges and bringing people together and initiating collaboration between groups in different countries all over the world. The international microwave community is indebted to him for his dedication and his many contributions.

As the European Microwave Association, we have lost a founder, our first President and one of our most active members. More than this, he was a friend to many of us. Our sympathy and our thoughts are with his wife Linda and his family.

2019 European Microwave Week in Paris Best Paper Prizes: EuMIC

EuMIC Prize
Sponsored by EPIGAN



EPIGAN representative - Co-Author Arij Battikh – EuMIC Chair

Paper Title

Non-linear Modeling and Harmonic Balance Simulations of Track and Hold Amplifier

Authors

Dr. Abhijeet Dasgupta^{1 2}; Arij Battikh^{1 2}; Prof. Guillaume Neveux¹; Prof. Denis Barataud¹; Dr. Cédric Chambon²

¹ XLIM Research Institute - UMR CNRS 7252; ² Callisto Space



Co-Author Arij Battikh – GAAS[®] Association Representative – EuMIC Chair

EuMIC Young Engineer Prize
Sponsored by ENKRIS



Lucas Nyssens - EuMIC Chair - ENKRIS representative

Paper Title

Effective Resistivity Extraction of Low-Loss Silicon Substrate at Millimeter-Wave Frequencies

Authors

Lucas Nyssens; Martin Rack; Prof. Jean-Pierre Raskin
Université catholique de Louvain



Lucas Nyssens – GAAS[®] Association Representative– EuMIC Chair

2019 European Microwave Week in Paris Best Paper Prizes: EuMC

EuMC Microwaves Prize
Sponsored by Thales Alenia Space, Toulouse, France



Thales Alenia Space representative - Akanksha Bhutani – EuMC Chair

Paper Title
122 GHz FMCW Radar System-in-Package in LTCC Technology

Authors
Akanksha Bhutani¹; Dr. Benjamin Goettel²; Dr. Mario Pauli¹; Prof. Thomas Zwick¹
¹ Karlsruhe Institute of Technology; ² Wellenzahl GmbH & Co. KG

EuMC Young Engineer Prize
Sponsored by Thales DMS



Award Chair – Thales DMS representative - Maxwell Duffy – TPC General Chair

Paper Title
Discrete Supply Modulation of a Three-Stage K-Band PA

Authors
Maxwell Duffy; Dr. Gregor Lasser; Prof. Zoya Popovic;
CU Boulder

EuMC Young Engineer Prize
Sponsored by FormFactor



FormFactor representative - Audrey Cayron – Award Chair

Paper Title
Wideband and Compact 3-D Quadrature Coupler for 5G Applications

Authors
Audrey Cayron^{1 2}; Dr. Christophe Viallon^{3 1}; Dr. Ayad Ghannam⁴; Dr. Alessandro Magnani⁴; Prof. Thierry Parra^{3 1}
¹ LAAS-CNRS; ² INSA Toulouse; ³ Université de Toulouse
Paul Sabatier; ⁴ 3DiS Technologies

2019 European Microwave Week in Paris Best Paper Prizes: EuRAD

EuRAD Prize
Sponsored by Thales Nederland B.V.



EuRAD Co-chair and Chair – Ingrid Ullmann – Thales Nederland B.V. representative– EuRAD TPC Co-Chair and Chair

Paper Title
SAR Based Non-Destructive Evaluation of Irregularly Shaped Objects with Simultaneous Estimation of Geometry and Permittivity

Authors
Ingrid Ullmann, Julian Adametz, Martin Vossiek,
Institute of Microwaves and Photonics, Friedrich-Alexander
University, Erlangen, Germany

EuRAD Young Engineer Prize
Sponsored by HENSOLDT



HENSOLDT representative - Daniel Tajik - EuRAD Chair and Co-Chair — EuRAD TPC Chair and Co-Chair

Paper Title
Improving Quantitative Microwave Holography Through Simultaneous Use of the Born and Rytov Approximations

Authors
Daniel Tajik, Natalia K. Nikolova, Michael D. Noseworthy,
McMaster University, Hamilton, Ontario, Canada

GAAS® Ph.D. Student Fellowship



The GAAS® Association sponsors three student fellowships of €2,000 each, to be given to young full-time Ph.D. students each having an accepted paper at EuMIC 2020. The purpose is to recognise and provide financial assistance to international Ph.D. students who show promise and interest in pursuing a graduate degree in microwave electronics. In 2019, the three fellowship recipients were: Alberto Maria Angelotti, Abdul Ali and Babak Jamali (absent on the day of award).

1st Fellowship Recipient: Alberto Maria Angelotti



Alberto Maria Angelotti – GAAS® Association Representative – EuMIC Chair

2nd Fellowship Recipient: Abdul Ali



Abdul Ali – GAAS® Association Representative – EuMIC Chair

EuMA Pioneer Award



KOJI MIZUNO

Koji Mizuno, received the B.Eng., M.Eng., and D.Eng. degrees in electronic engineering from Tohoku University, Sendai, Japan, in 1963, 1965, and 1968, respectively. In 1968, he joined the Department of Electronic Engineering, Tohoku University as a Research Associate. He was appointed Professor of Electron Devices at the Research Institute of Electrical Communication (RIEC), Tohoku University in 1984. In March 2004 he retired from his appointment to become an Emeritus Professor.

He spent a sabbatical at Queen Mary College, University of London under the sponsorship of the SRC (Science Research Council, United Kingdom) in 1972–1973, and in 1990 he spent a six-month sabbatical at the California Institute of Technology, Pasadena and Queen Mary and Westfield College, London under the sponsorship of Monbusho (Ministry of Education, Science and Culture, Japan). From 1990 to 1998 he was a team leader of the Photodynamics Research Center, the Institute of Physical and Chemical Research (RIKEN), Sendai, where he ran a laboratory for THz research at the same time as he ran the laboratory at Tohoku University. He has been interested in the millimeter and THz region of the electromagnetic wave spectrum, and particularly in developing technologies of detection, generation and applications in this frequency regime.

He was awarded the IEEE Fellow grade in 1993, the Kenneth J. Button Medal in 1998, the Minister Award of MEXT (Ministry of Education, Culture, Sports, Science and Technology, Japan) in 2003, the Distinguished Educator Award of the IEEE MTT (Microwave Theory and Techniques) Society in 2005, and the Exceptional Service Award of the International Society of Infrared, Millimeter, and Terahertz Waves (IRMMW-THz) in 2015.

EuMA Distinguished Service Award



RAYMOND QUERE

Raymond Quéré, received the engineering degree from ENSEEIHT- Toulouse (France) in 1976, the French “agrégation” in applied sciences in 1978 and a PhD in electronic engineering from the University of Limoges in 1989. He was appointed professor at the University of Limoges in 1992 where he led researches on nonlinear behavior of microwave devices and circuits with a special emphasis on the nonlinear stability analysis and the characterization, modeling and simulation of nonlinear devices. He notably contributed to the characterization and modeling of thermal and trapping effects in Gallium Nitride devices. He authored or co-authored more than 200 papers and conference communications as well as the book “Stability of nonlinear microwave circuits”. He served in various technical committees as the Technical Program Committee of the EuMW for years as well as a reviewer for a number of journals and conferences. In 2009 he has been elevated to the grade of Fellow of the IEEE.

From 1998 to 2013 he led the department “Devices, Circuits, Signals and Systems” in XLIM – a joint laboratory of the French CNRS and the University of Limoges. From 2013 to 2017 he was the deputy director of the XLIM labs. During the same period he has been the holder of the chair “DEFIS-RF” funded by the French National Research Agency (ANR), Thales Alenia Space and Thales Corp. This chair aimed at the design of future RF terminals.

He has been serving the European Microwave community through various functions such as General Chairman of EuMW in 2005, member of EuMA BoD from 2012 to 2017 and the first Editor in Chief of the “International Journal of Microwave and Wireless Technologies” from 2009 to 2013.

Finally he has been the scientific advisor and/or funding member of the two spin-offs AMCAD Engineering and VTD. In January 2020 he co-founded NAlOBEE, a start-up specialized in wireless sensor networks for the Building Energy Efficiency.

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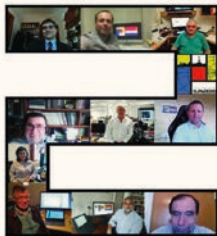
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BY AIR

From Schiphol Amsterdam Airport:
Take a direct (Intercity) train from Schiphol Airport to Utrecht Centraal Station (4 × per hour).

From Rotterdam-The Hague Airport:
Take the local RET bus 33 to Rotterdam Centraal station (6 × per hour) and then a direct (Intercity) train from Rotterdam Centraal station to Utrecht Centraal station (4 × per hour).

BY TRAIN

The Jaarbeurs Convention Centre is located within 500 m from Utrecht Centraal train station.

BY CAR

Please refer to the map on the inner back cover of this booklet for parking lot locations near the Jaarbeurs Convention Centre.

HOTEL RESERVATION

Horizon House has teamed up with Connex Hotels and Events, our official hotel booking supplier, to offer you the ability to book your accommodation for EuMW 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-2020-utrecht.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.

PERSONAL INVITATION (VISA)

A valid passport will be required for entry into the organising country, in this case The Netherlands. Since EuMW events are held in the European Union, no visa is usually required for travellers with passports from a number of countries, like for instance: European Union, Australia, Brazil, Canada, Japan, Singapore, South Korea or the United States. If you are registering as speaker, delegate or exhibitor and you need a visa, we recommend that you speak with the Dutch Consulate, in your own country. You should organise this at least 3 to 4 months prior to the EuMW. The organisers will be pleased to send a letter of invitation to any exhibitor, conference delegate or speaker requesting it. For assistance in obtaining a visa letter, please contact visa@eumw2020.org.

Local Information and Insurance

WI-FI

Wi-Fi is available in the exhibition hall and conference area. Login details can be found within your delegate bag.

ELECTRICITY

Electricity is supplied at 230V, 50 Hz. Type F sockets are used in The Netherlands.

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.

HISTORY & SIGHTSEEING

The city of Utrecht, located in the centre of The Netherlands, features a rich past and a dynamic present. This 2000 year old city features a wide range of interesting museums and cultural events. Its rich history began about twenty centuries ago. In 47 A.D. the Romans built a fortress as part of reinforcements along the Rhine where the Cathedral square (Domplein) is situated today. It is here

where the Union of Utrecht was signed in 1579, which is seen as the beginning of the Dutch Republic. Nowadays, Utrecht is a lively city with a pleasant and intimate atmosphere. The medieval city centre with its canals, wharfs, quaint streets and museum quarter is small enough to explore on foot. Featuring a large student population and many cafés and restaurants it is the ideal place to relax and make new friends. Through its central location, Utrecht serves as the perfect base from which to explore additional must-see Dutch attractions. More information can be found at <https://www.visit-utrecht.com>.

INSURANCE

It is highly recommended that all participants carry the proper travel and health insurance, as the organiser cannot accept any liability for any accident, illness, or injury that occur during or when travelling to the event. Please also insure 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 travelling to and from European Microwave Week 2020.

Conference Information

BADGES AND REGISTRATION

The registration area will be located near the entrance to Exhibition Hall 1 as signposted.

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. 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.

Those who have not pre-registered can do so on site until 15th January 2021. There will be on-site 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@aventri.com.

CONFERENCE ROOMS

Conference rooms are located in the Supernova, Media Plaza, and Juliana area as signposted. 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 can register for one, two or all three of the conferences. Registration at one

conference does not allow any access to other conference sessions. Those who wish to register for two or more conferences will receive a discount on these registrations.

SPEAKER PREPARATION SPACE

A speaker preparation area is located in Break Out 4.

INTERACTIVE SESSIONS

The interactive poster papers will be presented on electronic screens, which are located in the exhibition area as signposted on Tuesday, Wednesday and Thursday.

EXHIBITION HOURS

The exhibition area will be located in Exhibition Hall 1 as shown on the Floor Plan in this booklet. As a registered delegate you will have full access to the exhibition area.

The exhibition opening hours are:

- Tuesday 12th January 2021 9.30 – 18.00
- Wednesday 13th January 2021 9.30 – 17.30
- Thursday 14th January 2021 9.30 – 16.30

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

CONFERENCE PROCEEDINGS

All papers published for presentation at your chosen conference will be available to download from an online repository. Four weeks prior to the event, downloading instructions will be communicated to conference registrants.

Partner Programme



TOURS

GUIDED WALKING TOUR

A city walk that takes in Utrecht's must-see sights. The Utrecht Hotspots tour is the ideal city walk for first-time visitors to Utrecht. Led by an experienced



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guide, who takes the group along the hotspots of Utrecht, the places that should not be missed during a visit to the city. The tour includes the Dom Tower, the Oudegracht canal and its quays, churches with a story to tell and quaint lanes that are less well-known. During the tour, the guide will give information about all the historical details, highlighting the rich history of the city of Utrecht

CLIMB THE DOM TOWER

For more than six centuries, the city and its surroundings have been dominated by the magnificent Dom Tower, the highest medieval building in the Netherlands. You will definitely remember this 112-meter-high symbol of Utrecht. Climb its 465 steps and you will be rewarded with a breath-taking view of the city and the rural beauty beyond it.

DOMUNDER

Grab a smart torch and go on an underground discovery full of exciting stories and archaeological treasures. A visit is an archaeological



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logical discovery tour. The discovery tours have fixed starting times and first visit the medieval cellars of Domplein 4, where you will also find remains of the Roman fortress 'Trajectum'.

DISCOVER THE CITY OF AMERSFOORT (INCLUDING A VISIT TO THE MONDRIAAN HOUSE)

During this guided tour you walk around the beautiful medieval city of Amersfoort and experience its rich history. You will go through



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the unique land-and-water gate Koppelpoort and see the special Muurhuizen (wall houses). Your guide will bring you to the house where Piet Mondriaan, the famous artist was born. Here you can see a permanent exhibition about Mondriaan's life as an artist and his work. The museum also contains a full-scale replica of his famous Paris studio. Afterwards you can easily explore the shops and restaurants on your own and take the train back to Utrecht (15 minutes travel time, leaves 4 times per hour).

DISCOVER THE NEW DUTCH WATER LINE

45 forts, 6 branches and 2 castles. Once intended to defend the Netherlands against the enemy from the east, the 85-kilometer-long



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New Dutch Water Line now offers everything to enjoy for days. In the area that runs from Muiden to the Biesbosch, history, nature and delicious food and drinks go hand in hand. A good starting point to explore the New Dutch Water Line is the Water Line Museum at the 'Fort bij Vechten', near the city of Utrecht. Discover and experience how the Netherlands have been using water to keep the enemy out for years. And find out how it would look when the New Dutch Water Line would be flooded? Put on the VR glasses and make a parachute jump so that you can view it yourself.

EXPLORE ON YOUR OWN

MAG MAGAZINE

Your guide to the city's hotspots and cultural events! You can obtain your copy at the tourist information office and the information stand in the conference registration area.

UTRECHT REGION PASS

The Utrecht Region Pass is a 'pay-as-you-go' public transport card with nation-wide coverage linked to your credit card. It provides easy and carefree access to the entire public transport system in the Netherlands, as well as allowing you to rent a bicycle. Additionally, you can use the Utrecht Region Pass to visit some of the most appreciated destinations and places of interest in the province. More information on the Utrecht Region Pass can be obtained at the tourist information office.

Technology in Context: A Series of Philosophical Lectures.

A meaningful use of technology is a driving factor behind progress in society. Health care has dramatically improved through the use of technology. Communication between people has dramatically improved, or at least changed through cellphones and social media. As a rapidly evolving and high-tech area, microwaves have changed society and will continue to do so.

This edition of the European Microwave Week introduces a series of Philosophical lectures addressing the context of technological progress in the wider sense. There will be four lectures around lunchtime on Monday, Tuesday, Thursday and Friday, located in the Auditorium. Three of these lectures we can announce already now:

MONDAY

Bert Hubert,
geeky entrepreneur,
addressing the international
and geopolitical effects of
networking technology in his
talk: **"Network Threats"**

THURSDAY

Frans von der Dunk,
Professor and owner of
Black Holes, addressing
the laws ruling space in a
talk entitled: **"The Law of
Space"**

FRIDAY

Jacob Groote,
KPN Executive VP for 5G,
addressing the societal impact
and necessity of 5G
with a talk entitled:
"5G, But Why?"

We could not have arranged this set of lectures without the support of the "Cor Wit Fonds", aimed to contribute at the intersection between telecommunication research and

societal relevance to the quality of society. This support is kindly acknowledged.



Welcome Reception

Take the "Microwave Train" and join us for Tuesday's conference dinner in between historic Dutch trains

Workshops and Short Courses

Despite the organiser's best efforts to ensure the availability of all listed workshops and short courses, the list below may be subject to change.

Also workshop numbering is subject to change. Please refer to www.eumweek.com at the time of registration for final workshop availability and numbering.

SUNDAY 10 th January 2021			
W-02	EuMIC/EuMC	Half Day PM	Advanced Measurement Techniques for Next Generation Communication Systems
W-03	EuMIC	Full Day	High Performance GaN MMICs
W-06	EuMIC	Full Day	Sub-mmWave On-Wafer Measurements
W-11	EuMIC	Full Day	Integrated Doherty PAs for Cellular and mmWave Applications
W-17	EuMIC/EuMC	Full Day	Advanced RF Technologies for 5G
W-27	EuMC	Half Day AM	Wireless Power Transmission Recent Research Advances
W-29	EuMC	Full Day	Recent Advances in Additive Manufacturing of Microwave Components
S-03	EuMIC	Full Day	Fundamentals of Microwave PA Design
MONDAY 11 th January 2021			
W-07	EuMC	Full Day	High-Power Microwave Industrial Applications
W-08	EuMC	Half Day AM	Antenna/Modules in Package for mmWave for 5G
W-10	EuMIC/EuMC	Half Day PM	From Enabling GaN Technology to High-Performing Space-Borne SSPAs at mmWave
W-13	EuMC/EuRAD	Half Day AM	Advanced Applications of In-Band Full-Duplex Technology
W-18	EuMC	Full Day	Measurements at mmWave and Terahertz Frequencies of Three Measurement Quantities: S-Parameters, Power, and Complex Permittivity of Dielectric Materials
W-28	EuMC	Full Day	Microwave Wearable Circuits and Systems for Biomedical Applications
S-05	EuMC/EuRAD	Half Day PM	Multibeam Antennas and Beamforming Networks
S-07	EuMIC/EuMC	Half Day AM	From Device Characterisation to Amplifier Design: Advanced Large Signal Measuring, Fast and Accurate Modelling, and Reliable Designing
S-10	EuMC	Half Day PM	Intuitive Microwave Filter Design with EM Simulation
TUESDAY 12 th January 2021			
W-05	EuMC	Full Day	Digital Predistortion for 5G MIMO Wireless Transmitters
W-25	EuMC/EuRAD	Half Day PM	Advanced mmWave Radar System Solutions for Industrial and Consumer Sensing Applications
WEDNESDAY 13 th January 2021			
W-12	EuMIC/EuMC	Full Day	High-Efficiency Linear Power Amplifiers for High Bandwidth, High PAR Signals
W-14	EuRAD	Half Day PM	Automotive Radar Networks and Sensor Fusion
S-04	EuMIC/EuMC	Full Day	Quantum Computing for Electrical Engineers
S-08	EuMIC/EuMC	Half Day AM	High Power Amplification for Space Applications
THURSDAY 14 th January 2021			
W-15	EuRAD	Half Day PM	Recent Advances in Micro-Doppler Radar and its Applications
W-23	EuRAD	Half Day AM	High Resolution Radar for Automotive
W-31	EuMC	Full Day	5G and Beyond: Enabling RF Architectures and Technologies for Emerging Wireless Systems
FRIDAY 15 th January 2021			
W-21	EuMC	Half Day AM	Recent Advances in Topologies, Technologies and Practical Realizations of Microwave Sensors
W-30	EuMC	Half Day AM	Recent Advances on Microwave Filters
W-32	EuMIC/EuMC	Full Day	Practical Aspects of Running a Microwave Laboratory and How to Make Good Measurements Every Time
S-01	EuRAD	Half Day PM	Introduction to MIMO Radar
S-02	EuRAD	Half Day AM	Cognitive Radar Signal Processing

Registration Information

CONFERENCE REGISTRATION DETAILS

See pricing table on the following page.

ONLINE REGISTRATION

- All online registrations should be made at www.eumweek.com.
- Registrations completed up to and including 6th December 2020 will be charged at the 'Advance Discounted Rate' and those from 7th December 2020 will be charged at the 'Standard Rate'.
- Online registration is open from 13th September 2020 up to and during the event until 15th January 2021.

ONSITE REGISTRATION

- Onsite registration is available:
- Saturday, 9th January 2021 16:00 – 19:00
 - Sunday, 10th January 2021 08:00 – 17:00
 - Monday, 11th January 2021 08:00 – 17:00
 - Tuesday, 12th January 2021 08:00 – 17:00
 - Wednesday, 13th January 2021 08:00 – 17:00
 - Thursday, 14th January 2021 08:00 – 17:00
 - Friday, 15th January 2021 08:00 – 10:00

Onsite registration will be charged at the Standard Rates.

HOW TO REGISTER

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

ONLINE

- Delegates can register for one, two or all three of the conferences.
- Discounts will be given to those registering for two or more conferences.
- In addition to the conferences, delegates can register for forums, short courses or workshops.
- Discount is given when combining a forum, short course or workshop registration with a conference registration.
- 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 through the 'Oost Entree' and to the right, towards Exhibition Hall 1.
- 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.

BADGE AND DELEGATE BAG COLLECTION

Online registrants: bring a photo ID and a copy of your registration email badge barcode to the Fast Track check-in desks at the registration area.
Onsite registrants: register using our Self Service terminals and receive your printed badge upon payment.

Scan your badge at the specified delegate bag area to collect your delegate bag.

Registration and badge collection 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.

NL MoD
Reduced Rate

For the EuMW 2020 only, personnel of the NL MoD can register at a reduced rate. This very attractive rate includes access to EuRAD, the DSS Forum and the exhibition, lunch boxes on Wednesday and Thursday and the seated EuRAD lunch. The Advance Discounted rate for this is € 100,- (up to and including 6th December 2020), and € 140,- from 7th December 2020 onwards. No further options or combined discounts will be available.

Registration Fees

Full Week ticket: Get the most out of this year’s Microwave Week with a Full Week ticket. Combine all three conferences with access to the Defence, Security and Space and the 5G forum (the automotive forum is not included), and top your week off with Workshops or Short Courses of your choosing. To keep you fueled, lunch is included everyday, as are of course the social events: the EuMIC Get-Together, the Welcome reception and the EuRAD seated lunch.

Registration at one conference does not allow access to the sessions of the other conferences.

Reduced rates are offered if you have society membership to any of the following: EuMA[®], GAAS, IET or IEEE. 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 18th September 2020). The fees shown below are invoiced in the name and on behalf of the European Microwave Association. Fees invoiced by EuMA with respect to the European Microwave Week 2020 are exempt from Dutch VAT. All payments must be in € (Euros) – cards will be debited in € (Euros).

CONFERENCES REGISTRATION	ADVANCE DISCOUNTED RATE (FROM 13 th SEPTEMBER UP TO & INCLUDING 6 th DECEMBER 2020)				STANDARD RATE (FROM 7 th DECEMBER 2020 & ONSITE)			
	Society Member [⚡]		Non-Member		Society Member [⚡]		Non-Member	
1 Conference	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.
EuMC	€ 480,-	€ 130,-	€ 680,-	€ 190,-	€ 680,-	€ 190,-	€ 950,-	€ 260,-
EuMIC	€ 370,-	€ 120,-	€ 520,-	€ 170,-	€ 520,-	€ 170,-	€ 730,-	€ 240,-
EuRAD	€ 330,-	€ 110,-	€ 460,-	€ 160,-	€ 460,-	€ 160,-	€ 650,-	€ 220,-
2 Conferences	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.
EuMC + EuMIC	€ 680,-	€ 260,-	€ 960,-	€ 360,-	€ 960,-	€ 360,-	€ 1.340,-	€ 500,-
EuMC + EuRAD	€ 650,-	€ 250,-	€ 910,-	€ 350,-	€ 910,-	€ 350,-	€ 1.280,-	€ 480,-
EuMIC + EuRAD	€ 560,-	€ 240,-	€ 780,-	€ 330,-	€ 780,-	€ 330,-	€ 1.100,-	€ 460,-
3 Conferences	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.
EuMC + EuMIC + EuRAD	€ 830,-	€ 370,-	€ 1.160,-	€ 520,-	€ 1.160,-	€ 520,-	€ 1.630,-	€ 730,-
Full Week Ticket	€ 1.280,-	€ 750,-	€ 1.690,-	€ 970,-	€ 1.630,-	€ 920,-	€ 2.180,-	€ 1.200,-



BECOME A MEMBER – NOW!

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

One can apply for EuMA membership by ticking the appropriate box during registration for EuMW. Membership is valid for one year, starting when the subscription is completed. The discount for the EuMW fees applies immediately.

Members have full e-access to the International Journal of Microwave and Wireless Technologies. The printed version of the journal is no longer available.

EUMA KNOWLEDGE CENTRE
The EuMA website has its Knowledge Centre which presently contains over 20,000 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.

SPECIAL FORUMS AND SESSIONS REGISTRATION	Date	ADVANCED DISCOUNTED RATE (UP TO & INCLUDING 6 th DECEMBER 2020)		STANDARD RATE (FROM 7 th DECEMBER 2020 & ONSITE)	
		Delegates*	All Others**	Delegates*	All Others**
Automotive Forum	12 th January 2021	€ 260,-	€ 360,-	€ 320,-	€ 420,-
5G Forum	15 th January 2021	€ 60,-	€ 90,-	€ 80,-	€ 100,-
Defence, Security & Space Forum	13 th January 2021	€ 20,-	€ 60,-	€ 20,-	€ 60,-
European Microwave Student School	12 th January 2021	€ 40,-	€ 40,-	€ 40,-	€ 40,-
Tom Brazil Doctoral School of Microwaves	14 th January 2021	€ 40,-	€ 40,-	€ 40,-	€ 40,-

* those registered for EuMC, EuMIC or EuRAD ** those not registered for a conference

WORKSHOPS AND SHORT COURSES	IN COMBINATION WITH CONFERENCE REGISTRATION				WITHOUT CONFERENCE REGISTRATION			
	Society Member [⚡]		Non-Member		Society Member [⚡]		Non-Member	
	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.	Standard	Student/Sr.
Half Day	€ 100,-	€ 70,-	€ 130,-	€ 100,-	€ 130,-	€ 100,-	€ 170,-	€ 130,-
Full Day	€ 140,-	€ 100,-	€ 190,-	€ 140,-	€ 190,-	€ 140,-	€ 250,-	€ 190,-

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Defence, Security and Space Forum

Space Situational Awareness

Wednesday 13th January 2021
08:30 to 17:50, Auditorium
+ cocktail reception

Chair: Marco Martorella, University of Pisa, Italy
Co-Chair: Mark Bentum, Eindhoven University of Technology & ASTRON, The Netherlands

Space has become a new battleground where both economic and military interests clash. Space Situational Awareness (SSA) refers to keeping track of objects in orbit and predicting where they will be at any given time, in other words: determine a persistent and continuously updated picture of the situation in space. According to NATO's definition, SSA is the knowledge and the understanding of military and non-military events, activities, circumstances

and conditions within and associated with the space environment or space-related systems. To accomplish this, a complex infrastructure must be in place that includes sensors, communications systems, physical phenomena knowledge, technical and management skills that allow for all the necessary systems to operate and interact effectively. The Defence, Security and Space Forum will address the topic of Space Situational

Awareness. When thinking of Space and SSA, we tend to ask ourselves many questions that are related to our ability to understand and handle Space, for instance: What have we learnt in the past years of SSA activities? How is the “New Space Era” affecting Space and its safety? Are our SSA systems keeping up the pace of the new developments in Space? Are we prepared to face what the future may hold?

World-wide renowned experts will present and discuss various SSA-related topics, ranging from space surveillance, challenges and threats in Space to Space Weather, providing some answers to the above questions and with the aim of triggering valuable discussions where SSA will be the primary focus. Technological aspects will be considered that are impacting both military and civilian scenarios. Well-known and new threats will also be discussed in order to understand the risks that space induces.

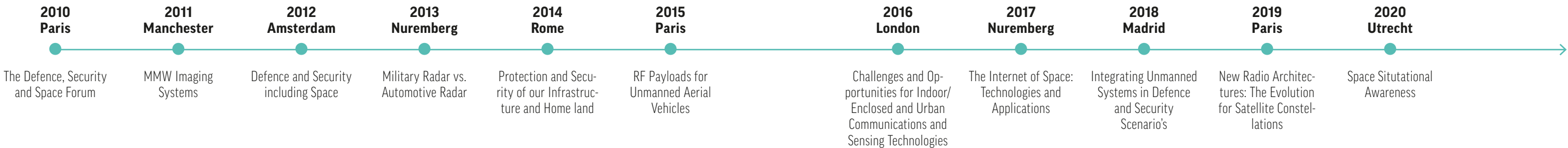


Registration and Programme Updates

Registration fee is €20 for those who registered for a conference and €60 for those not registered for a conference. Cocktail reception as well as a lunch snack and beverages are included in the fee. The Conference Special Events section of the EuMW website will give further details and updates.

Programme

08:30 – 10:10	EuRAD opening	12:40 – 13:40	Strategy Analytics Lunch & Learn Session Eric Higham, Strategy Analytics; “Space Situational Awareness in the New Space Era” This session will explore some trends, forecasts and drivers that are influencing the congestion in space. The presentation will address evolving space capabilities in the commercial and defence segments of the space industry, along with the benefits these capabilities will enable.	15:30 – 16:10	Coffee Break	<div>Moderator: Marco Martorella<ul style="list-style-type: none">René de Jongh, Strategy Director, Thales NetherlandsDavid Otten, Dutch AirforcePeter Knott, Director of Fraunhofer-FHRMohamed Abouzahra/Gregg Hogan, Hastack-MIT-Lincoln LaboratoryRene Thaens, NATO</div>	
10:10 – 10:50	Coffee Break			16:10 – 17:50	Executive Round Table Forum: Space Situational Awareness Which technologies need to be implemented to face future challenges? What are the technological gaps that need to be filled? How important is to collaborate to improve SSA? What are the current and future threats that we should consider and try to mitigate or eliminate? How can research help towards improving SSA? World-wide experts from academia, industry and military areas are invited to this Table for an open discussion about SSA and its crucial role to safeguard Space and guarantee that current and future services, upon which we rely, are preserved		
10:50 – 12:30	Space Situational Awareness Moderator: Mark Bentum Three renowned experts will present and discuss various SSA-related topics. Peter Knott, Director of Fraunhofer-FHR, will address the radar sensors for SSA. Mohamed Abouzahra and Gregg Hogan, Haystack-MIT-Lincoln Laboratory, will present an emergency-response system supported by NATO and David Otten, Dutch Airforce, will talk about Space In the Dutch MoD, the current focus and activities of the Defense Space Security Center.	13:50 – 15:30	Microwave Journal Industry Panel Session The Microwave Journal Industry Session will be made up of several company presentations that illustrate the technological innovation that industry is developing for Space Situational Awareness related topics.			17:50 – 18:30	Cocktail Reception



The Automotive Forum Automotive Radar

Tuesday 12th January 2021
08:30 to 17:50, Auditorium
+ dinner on Monday evening, 11th January 2021

Chair: Thomas Zwick, Karlsruhe Institute of Technology, Germany
Co-Chairs: Martin Kunert, Robert Bosch GmbH & Frank Gruson, Continental AG, Germany
Local Arrangements Chair: Cicero Vaucher, NXP, The Netherlands

Following applications like keyless entry and tire pressure monitoring systems, mobile communications and recently automotive radar made microwave technologies a strong pillar inside the automotive world. The first 77 GHz automotive radar sensors entered the European market in 1999. In 2019, the European Microwave Association (EuMA) for the first time organized

the Automotive Forum to provide an open platform for industrial experts to discuss technical aspects, concepts and radar architectures as well as market issues in the area of microwaves in the automotive industry. The forum consists of a good mix of technical presentations, plenary and panel discussions as well as networking time. This year's event will focus on the following topics:

1. Modulation & operation principles
2. Radar architectures
3. Artificial intelligence in automotive radar
4. Automotive radar interference

The forum is mainly devoted to technical experts from automotive industry throughout the whole supply chain.

Keynote speakers will present their views on special technical solutions as well as regulatory or strategic issues. The evening before the event, we will get together in a networking dinner. Early registration is recommended.



Registration and Programme Updates

Advanced Registration fee (up to & incl. 6th December 2020) is €260 for those who registered for a conference and €360 for those not registered for a conference. Standard Registration fee (from 7th Decmber 2020 & onsite) is €320 for those who registered for a conference and €420 for those not registered for a conference.

The networking dinner as well as a lunch snack and beverages are included in the fee. The Conference Special Events section of the EuMW website will give further details and updates. Due to limited room size early registration is recommended.

Programme

SESSION 1: MODULATION AND OPERATION PRINCIPLES (Chair: Cicero Vaucher, NXP, The Netherlands)

08:30 08:50	Automated Driving: Market Perspective for Radar Cédric Malaquin, Yole, France
08:50 09:10	Radar Technology for Assisted and Automated Driving Frank Gruson, Continental AG, Germany
09:10 09:30	Hybrid Analog Phased Array and Advanced Algorithms Radar for Long-Range High-Resolution Detection and AI Maha Achour, Metawave Corporation, USA
09:30 09:50	MIMO Radar Waveforms for Automotive Feike Janson, NXP Semiconductors, The Netherlands
09:50 10:10	Open Discussion on all Presentations of the Session
10:10 10:50	Coffee

SESSION 2: RADAR ARCHITECTURES (Chair: Frank Gruson, Continental, Germany)

10:50 11:10	Achieving True Safety on the Road with an Automotive-Dedicated Imaging Radar Chipset Noam Arkind, Arbe Robotics, Israel
11:10 11:30	Asymptotic Electromagnetic Fields Computation as an Optimal Method for Radar-in-Vehicle Performance Prediction Alexander Ioffe, Aptiv, Germany
11:30 11:50	Scope, Challenges and Opportunities for 140 GHz Automotive Radar Simon Tejero Alfageme, Huawei Technologies Duesseldorf GmbH, Germany
11:50 12:10	Radar Digitalization André Roger, Infineon Technologies, Germany
12:10 12:30	Open Discussion on all Presentations of the Session
12:30 13:50	Lunch

SESSION 3: ARTIFICIAL INTELLIGENCE IN AUTOMOTIVE RADAR (Chair: Martin Kunert, Robert Bosch GmbH, Germany)

13:50 14:10	Development of Deep Learning Approaches for Radar-Based Autonomous Driving Georg Kusch, Astyx GmbH, Germany
14:10 14:30	CNN-Based Signal Processing for Automotive Sensors Tim Berthold, Dream Chip Technologies GmbH, Germany Nicolai Behmann, IMS Hannover, Germany
14:30 14:50	Reflex-Level Object Type Classification for Automotive Radar Michael Ulrich, Robert Bosch GmbH, Germany
14:50 15:10	Machine Learning and Radar Techniques for Enhanced Vehicle Perception Sonia Ghelani, Texas Instruments, USA
15:10 15:30	Open Discussion on all Presentations of the Session
15:30 16:10	Coffee

SESSION 4: AUTOMOTIVE RADAR INTERFERENCE (Chair: Thomas Zwick, Karlsruhe Institute of Technology, Germany)

16:10 16:30	Automotive Radar Mutual Interference - Snapshots of Today's Situation Alicja Ossowska, Valeo Schalter und Sensoren GmbH, Germany & Richard Körber, Astyx GmbH, Germany
16:30 16:50	Radar to Radar Interference: Real Threat and Opportunities Francesco Laghezza, NXP Semiconductors, The Netherlands
16:50 17:10	Methods to Avoid Radar Interference - An Overview of the Swedish Radcom Project Karl Vanas, Volvo Car Corporation, Sweden
17:10 17:30	IMIKO-Radar: Methods for Cooperative Interference Mitigation Werner Sörgel, Tim Poguntke and Thomas Binzer, Robert Bosch GmbH, Germany
17:30 17:50	Open Discussion on all Presentations of the Session

The 5G Forum

From Technology to Business

Friday, 15th January 2021,
08:45 to 15:45, Auditorium

Chair: Bart Smolders, Eindhoven University of Technology, The Netherlands
Co-Chairs: Toon Norp, TNO, The Netherlands & Ulf Gustavsson, Ericsson, Sweden



Registration and Programme Updates

Please refer to the special forums and session fees table for registration fees. Lunch and beverages are included in the fee. The Conference Special Events section of the EuMW website will give further details and updates

The introduction of 5G is a major trend in cellular telecommunications; in various countries 5G frequency licenses are being awarded and 5G networks are rolled out. 5G promises to support a range of new applications - automotive, public safety, media, health, satellite communication, and factory automation to name a few - are supported using the same NR radio interface technology. The concept of 5G network slicing enables a single 5G network infrastructure to

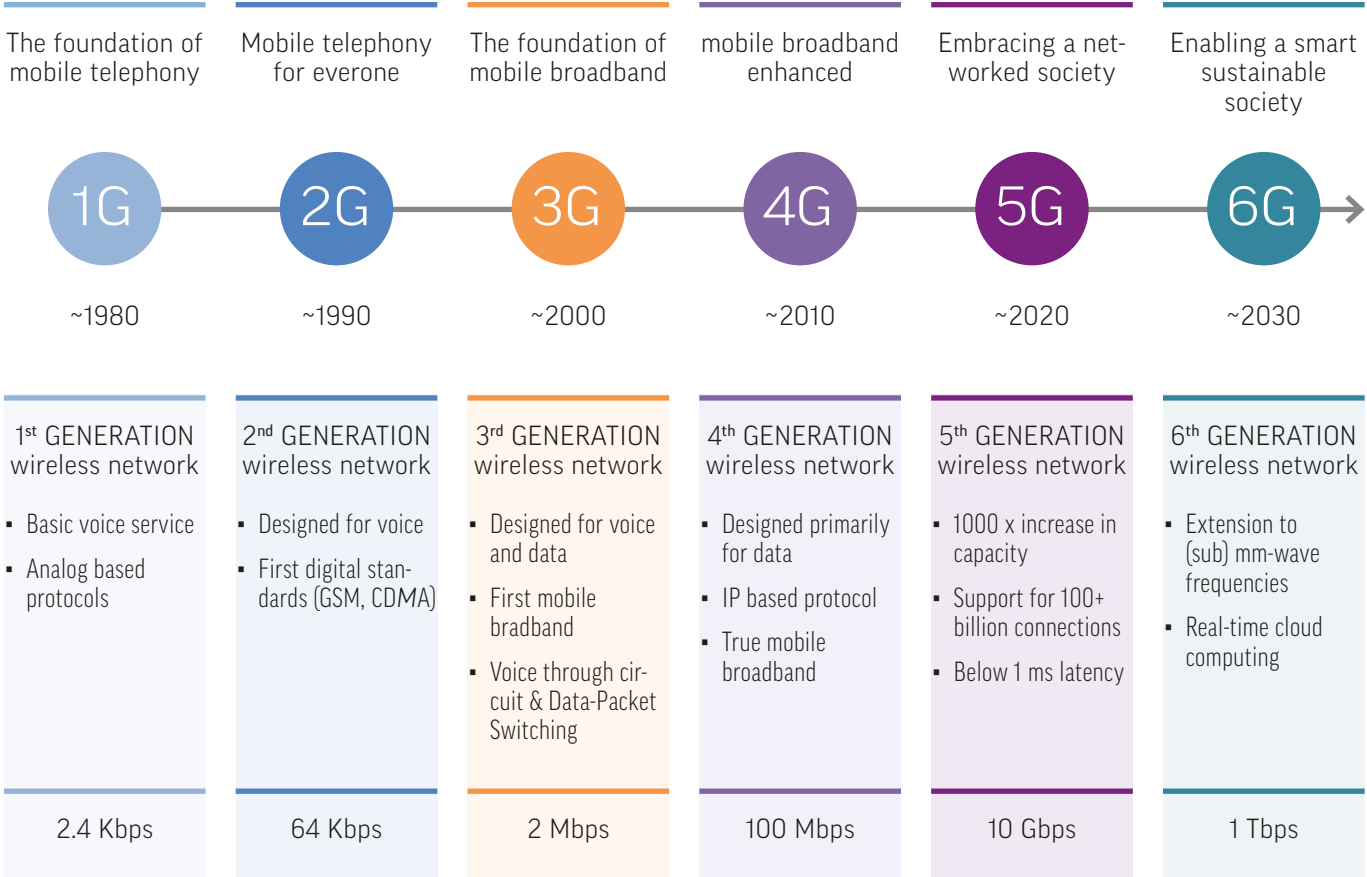
provide multiple virtual networks, each optimised for a particular application, service or industrial customer. In Europe, there are three pioneer frequency bands earmarked for 5G. Two of these - the 700 MHz band and the 3.5 GHz band - are in the same sub 6 GHz range of spectrum where most current cellular technologies can be found. The third pioneer band is the 26 GHz band; a new frequency band which will introduce microwave technology in cellular networks.

For the microwave industry, 5G will be a major new market opportunity. The market of billions of mobile phones is interesting, and on top of that, the application of microwave frequencies in 5G will imply the deployment of huge numbers of small basestations with electronic beam-steering capabilities. It is therefore of interest for the microwave community to get a system- and technology-level overview of what 5G will bring and how microwave technology can play a role in 5G

The 2020 5G Forum hosts a mix of technical presentations, posters, demo sessions and a panel discussion. Technical presentations from industrial experts will address 5G strategic and market needs and discuss how these can be met with technology solutions. Poster and demo sessions during lunch allow research projects to show their advances with new 5G technology and provides an excellent networking opportunity.

Programme

08:45 09:00	Chairman Welcome Speech	11:45 12:15	Pitches of Posters and Demo Sessions that will be Given During Lunch
09:00 09:30	What can you do with 5G? Anders Furuskär, Ericsson, Sweden	12:15 13:45	Lunch Combined with Posters and Demo Session
09:30 10:00	5G Frequency Licensing and Regulations in Europe Peter Disseldorp, Radiocommunications Agency Netherlands	13:45 14:15	5G, but why? Business First, Technology Second Jacob Groote, 5G EVP, KPN, The Netherlands
10:00 10:30	5G OTA Testing Pertti Kangas, Keysight Technologies	14:15 14:45	Opportunities for 5G Features in Autonomous Driving Andreas Kwoczek, Volkswagen, Germany
10:30 10:45	Coffee	14:45 15:15	The Role of 5G in Factory Automation
10:45 11:15	Beamforming Concepts in 5G David Astely, Ericsson, Sweden	15:15 15:45	Panel Discussion with the Speakers of the Day Moderator: Toon Norp, TNO, Netherlands
11:15 11:45	Semiconductor Technology for 5G Handsets and Base Stations Domine Leenaerts, NXP Semiconductors, The Netherlands	15:45 16:00	Chairman Closing Remarks



Welcome from the Student Activities Chair

The European Microwave Week programme offers valuable events for engineers at every stage of their microwave career. Special emphasis is placed on supporting students and young professionals in our field by a number of dedicated and Corona-proof student activities. For Bachelor and Master students, the Student School, organised by Prof. David Ricketts, is devoted to teaching everything the beginning engineer needs to know about the basics of modern radars with the focus on building their very own radar transceiver in the hands-on part of the course. To keep everybody motivated, the best transceiver design is awarded with a cash prize, kindly sponsored by Thales Nederland B.V. The Student School is also open for interested PhD students who wish to build up knowledge in this area. PhD students may also participate in the Tom Brazil Doctoral School of Microwaves. This event, founded in 2011, was in former years simply known as the Doctoral School of Microwaves. It has been renamed in honour of Tom Brazil, who passed away in 2018, for his outstanding contribution to Microwaves in general and Microwave education in particular. Tom Brazil was one of the two founding fathers of the Doctoral School. The School is this year organized as a one-day event with lectures on the design of integrated active array systems for 5G millimetre-wave, covering

everything from microwave IC design to signal processing. The in-depth technical programme is complemented with a lecture on concurrent engineering for complex systems, which presents a methodology for working in multi-disciplinary teams, and a lecture on boosting productivity and creativity for a successful completion of a PhD project. Creativity is also the essential ingredient for the Student Design Competitions. Student teams, which may consist of Bachelor, Master and/or PhD students, take part in one of the two competitions organized by Ampleon and ASTRON. While Ampleon's competition is "biased" on a challenging amplifier topic, ASTRON wants to know how to accurately locate drones using the radio frequency interference emissions of the their electric motors. The best teams will be awarded with cash prizes, so you can expect to see high quality student designs to be presented on the exhibition floor. For those who want to take their acquired skills to industry, there is the Career Platform. This three-day event aims to bring the jobs and career opportunities to students and young professionals, all in a single place and time. This unique place provides multiple activities like career workshops, a recruitment space, a start-up panel, and special sessions to boost the careers of the next generation of microwave engineers. All

these activities are centred around the Career Lounge, a cosy area with comfortable seats and refreshments, where contacts to companies can be made in an informal fashion. For the first time in the history of the European Microwave Week, this year's edition features a social event for all young and young-at-heart microwave enthusiasts: Microwave Nightfever! Organised by the Student Activities committee, IEEE Young Professionals and IEEE MTT-S Young Professionals. Everyone is welcome and there will be some complimentary drinks and snacks on a first come first serve basis. It's especially during these informal events that long-lasting relations are made and networks grow! In this spirit and on behalf of the entire Student Activities committee, I would like to express a warm welcome to all students and young professionals that take part in this special edition of the European Microwave Week! Thank you for staying connected to our community and for choosing this event as your must-visit conference despite the restrictions caused by the Covid-19 pandemic. Special thanks also to the entire Student Activities team, the vast majority of them PhD students themselves. Your dedication and hard work in the recent period have ensured that we can offer a high-quality programme to our colleagues. The future is looking bright!



ULF JOHANNSEN
Student Activities Chair
Eindhoven University of Technology,
The Netherlands

Student Design Competitions

Tuesday, 12th January and Wednesday, 13th January 2021
Exhibition Hall

The Student Design Competitions involve master and doctoral students designing and measuring a microwave device developed prior to the conference. This competition is open to all students. Measurements will be open to attend for all EuMW participants. A representative of the design team must be present at the conference. This year, two competitions will be offered:

Competitions

Thrust 1: Drone Localisation System

Design a drone localisation system operating from 0.5 GHz to 1.5 GHz. The system should be able to determine the position of drones by detecting the radio frequency interference transmitted by the drones.

This thrust is organised and sponsored by ASTRON. Prizes are co-sponsored by Thales Nederland B.V. and the IEEE Benelux AP/MTT joint chapter. For questions please contact David Prinsloo (prinsloo@astron.nl). For more information and additional competition details visit www.bit.ly/eumw2020sdc.

Thrust 2: Wideband Amplifier Biasing Network

Design and realise a biasing network for RF high power amplifiers, considering low insertion loss at the operation bandwidth and low input impedance at the low frequency region. This thrust is organised and sponsored by Ampleon Netherlands BV.

For questions please contact Adam Cooman (adam.cooman@ampleon.com) or visit www.ampleon.com/news/events/student-design-competition-at-eumw-2020.html.

**Outsmart
your fellow students
on a level Microwave
playing field.**

Women in Microwaves Stronger Together

Tuesday, 12th January 2021
Media Arena

WiM Chair: Marion Matters-Kammerer, Eindhoven University of Technology, The Netherlands
WiM Co-Chair: Dominique Schreurs, KU Leuven, Belgium

The Women in Microwaves event will be in the theme of "Stronger Together". The past months have shown to us the importance of bringing people together, be it in-person or online. Cooperating in research, industry and education, networking on national and international level and interacting with your colleagues are key aspects in our work and career. In this context we will organize a symposium with several international female speakers showing to us their

career paths. We will engage in joint discussions and actively extend our networks. Don't miss this dedicated and unique event and meet with colleagues from around the world. Join as in the Media Arena at:

12:30 to 13:50 - Lunch Lecture
16:10 to 17:50 - Panel Discussion and Drinks

More details on the final program will be published via the conference website.

**Register (free of charge) for
this unique networking event
via: [women.microwaves@
eumw2020.org](mailto:women.microwaves@eumw2020.org)**

Career Platform

Tuesday, 12th January to Thursday, 14th January 2021

Various locations, refer to programme

Organisers: Thomas Bressner & Rabia Syeda, Eindhoven University of Technology, The Netherlands

The Career Platform is a three-day event that is conducted with the support of EuMW, EuMA and the IEEE MTT-S / Region 8 Young Professionals. The Career Platform is dedicated to students, graduates, and young professionals where they can get in touch with companies to increase their network and inform themselves about current job offers. This unique place provides multiple activities like career workshops, recruitment space, a start-up panel, and special

sessions to boost the career of the next generation of microwave/millimetre-wave, radar, wireless, and integrated circuits engineers. All these activities are centred around the Career Lounge, a cosy area with comfortable seats and refreshments, where contacts to companies can be made in an informal fashion. During the conference, all this will be supported by social media (Facebook, LinkedIn, Xing, etc.) as well as the European RF andMicrowave job portal

www.rf-and-microwavejobs-in-europe.eu, which is the virtual marketplace for students and companies to meet at and in-between European Microwave Weeks.

WHAT IS IN IT FOR YOU?

Get ready to start your own company.
Meet your future employer.
Boost your CV.
Expand your network.

Events

08:30 – 17:50 **Career Lounge**
Tuesday, 12th January to Thursday, 14th January 2021
Where: Round Control
No registration and free access (including visitors)
A space dedicated to informal chats with the Career Platform's partner-companies.

10:50 – 17:50 **Job Dating**
Thursday, 14th January 2021
Where: BOR6
Companies can invite candidates and book time slots during the Career Platform. Companies that are participating in the Career Platform might invite candidates to 1-on-1 interviews in a quiet environment. The companies can book time slots and hand out invitations to their candidates during the first two days of the Career Platform (12th and 13th January 2021). The Job Dating will take place on the third day of the Career Platform (14th January 2021).

13:50 – 15:30 **Career Workshops**
Tuesday, 12th January 2021
Where: Media Arena
No registration – Restricted to M.Sc. and Ph.D. students

Workshop 1: “Transferable Skills and Networking” (45min)
Presenter: Arjen van Vliet, University of Utrecht
Do you realise what skills you've acquired at university? People tend not to think much about these things. Transferable skills are useful in all kinds of professional contexts, and you carry them with you from one job to the next. If you want to convince an employer that you're

the right person for a job or an internship, you need the ability to present your skills with clarity and conviction. This workshop will make you aware of the transferable skills you've developed during your studies, at your (temporary) jobs, and during your extracurricular activities and help you to present them while networking.

10 minutes break

Workshop 2: “Improve your Curriculum Vitae (CV) for a Great First Impression” (45min)
Presenter: Arjen van Vliet, University of Utrecht
You will learn what is standard practice for writing an effective CV. Using instruction videos and detailed explanations of do's and don'ts, we will show you the different components that make up CVs. We'll also discuss how employers select from all the CVs and letters they receive, and how you can use this knowledge to your advantage. During the workshop, you will start working on your CV and give each other feedback. There will be plenty of time for you to ask any questions you may have.

13:50 – 15:30 **Start-Up Panel**
Wednesday, 13th January 2021
Where: Media Arena
No registration – free access (including exhibition visitors)
Do you have an idea for a start-up? You need some help to make it grow? Then the Start-Up Panel at the EuMW 2020 can help you. Multiple incubators and start-up programs from the EU will present what they are doing and how they can help you. The short presentations of each entity are followed by an open discussion.

10:50 – 12:30 **Special Session**
Wednesday, 13th January 2021
Where: Media Arena
No registration – free access (including exhibition visitors)

The European Microwave Industry Market and Professional Opportunities
Top industry-leading speakers will give their vision and insights. The session will describe the main market of the European Microwave Industry with a focus on Professional Opportunities.

Connect with us on social media for more



08:30 – 17:30 **Company Wall and Job Wall**
12th January to Thursday, 14th January 2021
Where: Loopbrug
No registration – free access (including exhibition visitors)

The company wall is an additional space where companies can present themselves and their work on a poster (A0 or A1). Furthermore, at the same location is a job wall where companies can announce vacancies (A4).

For details on the program and speakers, visit www.eumweek.com/docs/Career_platform.html



5th European Microwave Student School “Practical Workshop: Build a Frequency-Modulated Continuous Wave Radar in 1-day”

Tuesday, 12th January 2021
Beam (Introduction) + Transitzone C (Hands-on)

Organiser: David Ricketts, North Carolina State University, US

Co-organisers: Tom van Nunen & Teun van den Biggelaar, Eindhoven University of Technology, The Netherlands

During the EuMW 2020 we will celebrate the fifth edition of the European Microwave Student School. In this workshop you will learn the theory and design of FMCW radar. With this theoretical foundation, you will design, simulate and fabricate by hand, each component of your radar. You will then work in a team to assemble a complete radar and test it before the end of the class. The only background you need is basic microwave engineering knowledge and a desire to learn and build with your hands! This workshop is sponsored by Thales Nederland B.V.

The registration fee for this event is €40. For further information please visit <https://www.eumweek.com/students/studentschool.html>.

Tom Brazil Doctoral School of Microwaves “The Route to 5G: Design of mmWave Active Array Systems, from RFIC to Signal Processing”

Thursday, 14th January 2021
Spark

Organiser: Jaap Essing, TNO, The Netherlands

Co-organiser: Robbert Schulpén, Eindhoven University of Technology, The Netherlands

Every year, the European Microwave Week features the Doctoral School of Microwaves, which is a one-day workshop. In memory of Tom Brazil, who was one of the founders of this event, it has now been renamed “Tom Brazil Doctoral School of Microwaves”. Its objective is to cover the needs of a Ph.D. student that go beyond the standard conference programme. This year’s Doctoral School will have lectures on technical topics, as well as on boosting your soft skills, by experts from both academia and industry. The overall theme of the technical topics is 5G mmWave with a focus on the

design of integrated active array systems, covering the fields all the way from RFIC to signal processing. The Doctoral School will start with a lecture on the applications and requirements for 5G mmWave communication. From there, the lectures will go bottom-up from the system’s subcomponents, having lectures on IC and antenna design for 5G mmWave, towards the design of a full active array system for mmWave applications. These lectures will emphasize multi-physics and co-design related aspects. Next to these hardware-oriented lectures, the signal processing side of 5G mmWave

M.Sc. and Ph.D. students can register via the delegate registration of the EuMW by selecting the Doctoral School. The registration fee for this event is €40. The possible number of participants is limited, so secure your ticket well in advance.

systems will also be covered. In one of the lectures, the stochastic modelling of radio hardware imperfections to bridge the gap between circuit design and communication engineering is discussed, whereas in another lecture the focus will be on beamforming and massive MIMO for 5G mmWave from a signal processing perspective. The technical programme is complemented with a lecture on concurrent engineering for complex systems, which presents a methodology for working in multi-disciplinary projects, and a lecture on high-performance leadership. .





Programme

08:30 – 10:10	Introduction and Theory of FMCW Radars and System Simulation of a 2.4 GHz Radar David Ricketts, Professor (North Carolina State University, US)	16:10 – 17:00	Hands-on Session 3: Radar Component Testing and System Assembly David Ricketts, Professor (North Carolina State University, US)
10:10 – 10:50	Coffee break	17:00 – 17:50	Testing of Radars with Teams
10:50 – 12:30	Hands-on Session 1: Radar Component Design and Simulation. David Ricketts, Professor (North Carolina State University, US)		
12:30 – 13:50	Lunch		
13:50 – 15:30	Hands-on Session 2 : Radar Component Fabrication David Ricketts, Professor (North Carolina State University, US)		
15:30 – 16:10	Coffee break		





Programme

08:30 – 09:20	mmWave Applications for 5G Mobile Communication Systems Wolfgang Templ (Nokia Bell Labs, Germany)	13:50 – 14:40	Modern AESA Panel Array for mmWave Applications Patrick Schuh (Hensoldt, Germany)
09:20 – 10:10	Integrated Circuits for 5G Wireless Communication Giovanni Mangraviti (IMEC, Belgium)	14:40 – 15:30	Stochastic Modelling of Radio Hardware Imperfections – Bridging the gap between circuit design and communication engineering Ulf Gustavsson (Ericsson, Sweden)
10:10 – 10:50	Coffee break	15:30 – 16:10	Coffee break
10:50 – 11:40	Antenna Design for 5G mmWave Communication Daniele Cavallo (Delft University of Technology, The Netherlands)	16:10 – 17:00	5G mmWave Massive MIMO – System Architectures, Beamforming and Signal Processing Thomas Eriksson (Chalmers University of Technology, Sweden)
11:40 – 12:30	Leaving the Field Behind – How the best get better Paul Rulkens (Agrippa Consulting, The Netherlands)	17:00 – 17:50	Concurrent Engineering for Large Multi-disciplinary Projects Michel van Pelt (ESA, The Netherlands)
12:30 – 13:50	Lunch		

SUNDAY

					
Room	08:30 – 10:10	10:50 – 12:30	13:50 – 15:30	16:10 – 17:50	EVENING PROGRAMME
Mission 1	W-03 High Performance GaN MMICs				
Mission 2	W-17 Advanced RF Technologies for 5G				
Quest	W-29 Recent Advances in Additive Manufacturing of Microwave Components				
Auditorium	S-03 Fundamentals of Microwave PA Design				
Expedition	W-11 Integrated Doherty PAs for Cellular and mmWave Applications				
Flash	W-27 Wireless Power Transmission Recent Research Advances			W-02 Advanced Measurement Techniques for Next Generation Communication Systems	
Spark	W-06 Sub-mmWave On-Wafer Measurements				

MONDAY

								
Room	08:30 – 10:10	10:50 – 12:30		13:50 – 15:30		16:10 – 17:50		EVENING PROGRAMME
Mission 1	EuMIC02 D-Band to H-Band Amplifiers			EuMIC05 ICs for mmWave Beamforming Systems		EuMIC08 ICs for Communication and Sensing		
Mission 2	EuMIC03 GaN MMIC Power Amplifiers			EuMIC06 Advances in mmWave and High Power Technologies		EuMIC09 Advanced Solutions for Integrated Power Amplifiers		
Quest	EuMIC04 Receivers and LNAs			EuMIC07 Oscillators and Switches		EuMIC10 Nonlinear Modelling		
Expedition	W-28 Microwave Wearable Circuits and Systems for Biomedical Applications							
Polar		EuMIC01 EuMIC Opening						
Auditorium	W-13 Advanced Applications of In-Band Full-Duplex Technology		Technology in Context Network Threats	S-05 Multibeam Antennas and Beamforming Networks				
Spark	W-08 Antenna/Modules in Package for mmWave for 5G			W-10 From Enabling GaN Technology to High-Performing Space-Borne SSPAs at mmWave				
Flash	S-07 From Device Characterisation to Amplifier Design: Advanced Large Signal Measuring, Fast and Accurate Modelling, and Reliable Designing			S-10 Intuitive Microwave Filter Design with EM Simulation				
Glow	W-18 Measurements at mmWave and Terahertz Frequencies of Three Measurement Quantities: S-Parameters, Power, and Complex Permittivity of Dielectric Materials							
Beam	W-07 High-Power Microwave Industrial Applications							
Off-site								Automotive Forum Networking Dinner 18:30 - 22:00
Off-site								EuMIC Get-Together 18.30 - 21.00

MONDAY 08:30 – 10:10

	Mission 1	Mission 2	Quest
	EuMIC02 D-Band to H-Band Amplifiers <div>Chair: Michael Schlechtweg¹</div> <div>Co-Chair: Herbert Zirath²</div> <div>¹Fraunhofer Institute for Solid State Physics IAF, ²Chalmers University of Technology</div>	EuMIC03 GaN MMIC Power Amplifiers <div>Chair: Franco Giannini¹</div> <div>Co-Chair: Patrick Schuh²</div> <div>¹University of Rome Tor Vergata, ²Hensoldt</div>	EuMIC04 Receivers and LNAs <div>Chair: Julien Lintignat¹</div> <div>Co-Chair: Ana Peláez²</div> <div>¹XLIM UMR 7252, University of Limoges/CNRS, ²Teledes S.A.</div>
08:30 – 08:50	EuMIC02-1 A 200 mW D-Band Power Amplifier with 17.8% PAE in 250-nm InP HBT Technology <div>Ahmed Ahmed¹, Munkyo Seo², Ali Farid¹, Miguel Urteaga³, James Buckwalter¹, Mark Rodwell¹</div> <div>¹University of California, Santa Barbara, ²Department of Electrical and Computer Engineering, Sungkyunkwan University, South Korea, ³Teledyne Scientific and Imaging</div>	EuMIC03-1 Single-Chip 100-Watt S-Band Power Amplifier in 0.25 µm GaN HEMT MMIC Technology <div>Gijs van der Bent¹, Peter de Hek¹, Frank E. van Vliet¹, Zineb Ouarch Provost²</div> <div>¹TNO, ²UMS</div>	EuMIC04-1 A CMOS Wide-Band Low Noise Mixer for LTE Application <div>Olim Hidayov¹</div> <div>¹Analog Devices GmbH</div>
08:50 – 09:10	EuMIC02-2 G-Band Power Amplifiers in 130 nm InP Technology <div>Minguan Bao¹, Vessen Vassilev², David Gustafsson¹, Herbert Zirath²</div> <div>¹Ericsson AB, ²Chalmers University of Technology</div>	EuMIC03-2 34 dBm GaN Doherty Power Amplifier for Ka-band satellite downlink <div>Anna Piacibello¹, Rocco Giofrè², Roberto Quaglia³, Vittorio Camarchia⁴</div> <div>¹Politecnico di Torino, ²Università di Roma "Tor Vergata", ³Cardiff University</div>	EuMIC04-2 20-Gb/s 60-GHz OOK Receiver for High-Data-Rate Short-Range Wireless Communications <div>Ali Ferschischi¹, Sami Ur Rehman¹, Vincent Rieß¹, Corrado Carta¹, Frank Ellinger²</div> <div>¹Technische Universität Dresden, Germany</div>
09:10 – 09:30	EuMIC02-3 Full H-Band LNA in 35 nm mHEMT Technology with Constant Current Bias Control <div>Rainer Weber¹, Arnulf Leuther¹, Roger Lozar¹, Hermann Massler²</div> <div>¹Fraunhofer IAF</div>	EuMIC03-3 A GaN-on-Si MMIC Power Amplifier with 10 W Output Power and 35% Efficiency for Ka-Band Satellite Downlink <div>Paolo Colantonio¹, Rocco Giofrè²</div> <div>¹University of Rome Tor Vergata, ²University of Roma Tor Vergata</div>	EuMIC04-3 An 8 Gbps Adaptive Receiver for RF over FSO in 28 nm CMOS <div>Fatemeh Aghlmand¹, Saransh Sharma², Azita Emami¹</div> <div>¹California Institute of Technology</div>
09:30 – 09:50	EuMIC02-4 A Full D-Band Low Noise Amplifier in 130 nm SiGe BiCMOS using Zero-Ohm Transmission Lines <div>Tim Maiwald¹, Julian Potschka¹, Katharina Kolb¹, Marco Dietz², Klaus Aufinger³, Akshay Visweswaran³, Robert Weigel¹</div> <div>¹FAU Erlangen-Nürnberg, ²Infineon Technologies AG, ³imec, Leuven</div>	EuMIC03-4 Ka-Band 4 W GaN/Si MMIC Power Amplifier for CW Radar Applications <div>Chiara Ramella¹, Corrado Florian², Elisa Cipriani³, Marco Pirola⁴, Franco Giannini¹, Paolo Colantonio⁴</div> <div>¹Politecnico di Torino - DET, ²University of Bologna, ³ESA / ESTEC, ⁴University of Rome Tor Vergata</div>	EuMIC04-4 A High-Gain SiGe BiCMOS LNA for 5G In-Band Full-Duplex Applications <div>Tahsin Alper Ozkan¹, Abdurrahman Burak¹, Ilker Kalyoncu¹, Mehmet Kaynak², Yasar Gurbuz²</div> <div>¹Sabanci University, ²IHP Microelectronics GmbH</div>
09:50 – 10:10	EuMIC02-5 Design of a 240-GHz LNA in 0.13 µm SiGe BiCMOS Technology <div>Mid Najmussadat¹, Raju Ahamed², Mikko Varonen², Dristy Parveg³, Yehia Tawfik³, Kari Halonen¹</div> <div>¹School of Electrical Engineering, Aalto University, ²VTT Technical Research Centre of Finland</div>	EuMIC03-5 Real-Time, In-Circuit Temperature Sensing of an X-Band GaN Power Amplifier <div>Simon Mahon¹, Olivia Eli¹, Leigh Milner², Evgeny Kuxa², Anthony Parker³, Melissa Gorman¹, Michael Heimlich¹</div> <div>¹Macquarie University, ²Defence Science and Technology Group</div>	EuMIC04-5 A Ku Band MMIC Sigle Chip Frequency Converter for Telecom Satellite Applications <div>Davide Resca¹, Francesco Scappaviva¹, Andrea Biondi¹, Luca Cariani¹, Francesco Vitulli²</div> <div>¹MEC s.r.l., ²Thales Alenia Space Italia</div>

MONDAY 10:50 – 12:30

ROOM	Polar	
	EuMIC01 EuMIC Opening Session <div>Chairs: François Deborgies¹, EuMIC Chair and Domine Leenaerts², EuMIC TPC Chair</div> <div>Co-chairs: Stefan Heinen³, EuMIC Co-Chair and Christian Fager⁴, EuMIC TPC Co-Chair</div> <div>¹ESA-ESTEC, ²NXP, ³RWTH Aachen University, ⁴Chalmers University of Technology</div>	<div>12:30 –13:50 Technology in Context Bert Hubert “Network Threats” Room: Aditorium Refer to p.27 for more information.</div>
10:50 – 11:00	Welcome Address Opening of the European Microwave Integrated Circuits Conference 2020 <div>François Deborgies</div> <div>EuMIC Chair</div>	11:45 – 12:30 Photonic Integrated Circuits for Microwave Applications <div>Prof. Alwyn Seeds</div> <div>University College London, UK</div>
11:00 – 11:45	Breaking the Mold: Using SiGe Technology in Ways That Were Never Envisioned <div>Prof. John D. Cressler</div> <div>Gergia Institute of Technology, US</div>	
	The silicon-germanium heterojunction bipolar transistor (SiGe HBT) is the first practical bandgap-engineered device to be successfully implemented in silicon. SiGe HBTs combine transistor-level RF performance approaching that of III-V technologies, with integration levels, reliability, yield, and hence cost commonly associated with conventional Si CMOS fabrication. All at very conservative lithographic feature sizes. While SiGe HBTs possess modest breakdown voltages compared to their III-V counterparts, their performance has reached truly impressive levels, including: multi-hundred GHz frequency response bandwidth, low noise (broadband + 1/f), high output resistance, good RF linearity, and robust power handling capability. As such, SiGe technology, now spanning multiple technology generations in mass production, has made successful in-roads in a diverse set of performance-constrained applications, ranging from precision analog, to PAs for 4G/5G, to µ-wave and mm-wave transceivers for communications, sensing, and radar, to near-THz imaging systems, to integrated photonics. This remarkable utilization diversity continues to expand in interesting ways, often along avenues that were never envisioned at the technology’s inception. Examples include: 1) operation within radiation-intense environments such as space, 2) operation at incredibly low temperatures (to mK temperatures, to support the emerging needs of the quantum realm), 3) operation to very high temperatures (250°C, for power electronics), and 4) deployment as photosensitive elements for integrated photonic systems. This presentation will review the state-of-the-art in SiGe technology, show some impressive illustrations of its more conventional uses, and then will present examples of these surprising, newly-emerging trends, offered here as food-for-thought for the EuMIC community.	Photonics has found application in microwave systems for low loss transmission and distribution of wideband signals, for signal processing and for signal generation, particularly at THz frequencies. Photonic systems require sub-micron alignment of components due to the short wavelength of the optical sources- commonly in the range 0.8 microns to 1.6 microns. This leads to high assembly costs and significant operating environment challenges. The integration of the components required for a microwave photonic system offers the prospect of reduced assembly costs and the ability to deploy systems in challenging environments. This presentation will describe hybrid and monolithic approaches to integration using Indium Phosphide (InP) technology, including the development of advanced devices such as Uni-Travelling Carrier (UTC) THz photodiodes and advanced tuneable semiconductor lasers. It will also introduce system techniques such as comb generation and optical phase-locking for THz frequency synthesis. The presentation will also introduce advanced technologies for the monolithic integration of semiconductor lasers on Silicon (Si) substrates, which could offer major cost reductions and integration scale increases for future systems. The presentation will conclude with a summary of future opportunities and challenges for integrated microwave photonics.





MONDAY 13:50 – 15:30

	<div>Mission 1</div> <div><div>EuMIC05</div><div>ICs for mmWave Beamforming Systems</div><div>Chair: Frank E. van Vliet¹</div><div>Co-Chair: Pierre Busson²</div><div>¹TNO, ²ST Microelectronics</div></div>	<div>Mission 2</div> <div><div>EuMIC06</div><div>Advances in mmWave and High Power Technologies</div><div>Chair: Peter Magnee¹</div><div>Co-Chair: Rüdiger Quay²</div><div>¹NXP Semiconductors, ²IAF-Fraunhofer: Fraunhofer Institute for Applied Solid-State Physics</div></div>	<div>Quest</div> <div><div>EuMIC07</div><div>Oscillators and Switches</div><div>Chair: Vadim Issakov¹</div><div>Co-Chair: Patrice Gamand²</div><div>¹University of Magdeburg, ²ALPHA-RLH</div></div>
<div>13:50 – 14:10</div>	<div><div>EuMIC05-1</div><div>A Downconversion Link for a 5G Repeater using a Passive Power Adjustment Technique and Analog Predistortion</div><div>Julian Potschka¹, Katharina Kolb¹, Tim Maiwald¹, Marco Dietz², Amelie Hagelauer², Klaus Aufinger², Robert Weigel¹</div><div>¹Friedrich-Alexander University Erlangen-Nuremberg (FAU), ²Infineon Technologies AG</div></div>	<div><div>EuMIC06-1</div><div>Back Gate Impact on the Noise Performances of 22FDX Fully-Depleted SOI CMOS</div><div>Ousmane Kane¹, Luca Lucci¹, Pascal Scheiblin¹, Thierry Poiroux¹, Jean Charles Barbe¹, François Danneville²</div><div>¹CEA LETI, ²IEMN, Univ. Lille, UMR 8520 CNRS, Avenue Poincaré, F-59652 Villeneuve d'Ascq</div></div>	<div><div>EuMIC07-1</div><div>Free-Running 2.4 GHz Ring Oscillator-Based FSK TX/RX for Ultra-Small IoT Motes</div><div>David Burnett¹, Filip Maksimovic¹, Brad Wheeler¹, Osama Khan¹, Ali Niknejad¹, Kristofer Pister¹</div><div>¹University of California, Berkeley</div></div>
<div>14:10 – 14:30</div>	<div><div>EuMIC05-2</div><div>A V-Band Vector Modulator Based Phase Shifter in BiCMOS 0.13 µm SiGe Technology</div><div>Kevin Drenkhahn¹, Ahmed Gadallah¹, Aniello Franzese², Christoph Wagner², Andrea Malignaggi²</div><div>¹TU Ilmenau, ²IHP - Leibniz-Institut für innovative Mikroelektronik</div></div>	<div><div>EuMIC06-2</div><div>Design of III-V Vertical Nanowire MOSFETs for Near-Unilateral Millimeter-Wave Operation</div><div>Stefan Andric¹, Lars Ohlsson Fhager¹, Lars-Erik Wernersson¹</div><div>¹Lund Univeristy</div></div>	<div><div>EuMIC07-2</div><div>Linearity Enhancement Method for a Wide-Band Digitally Controlled Oscillator</div><div>Yun Fang¹, Zhong Tang², Xiao-Peng Yu¹, Zhiwei Xu¹, Hao Gao²</div><div>¹Zhejiang University, ²Eindhoven University of Technology (TU/e)</div></div>
<div>14:30 – 14:50</div>	<div><div>EuMIC05-3</div><div>A 65 nm CMOS SOI 4-bit Digitally Controlled Variable Gain Amplifier for Ka-Band Beamforming</div><div>Steeven Voisin¹, Vincent Knopik¹, Jeremie Forest¹, Eric Kerherve²</div><div>¹STMicroelectronics, ²University of Bordeaux, Bordeaux INP, UMR CNRS 5218, IMS Laboratory</div></div>	<div><div>EuMIC06-3</div><div>DC and RF Characterization of Nano-Ridge HBT Technology Integrated on 300 nm Si Substrates</div><div>Sachin Yadav¹, Abhitosh Vais¹, Rana Y. Elkashlan¹, Liesbeth Witters¹, Komal Vondkar¹, Yves Mols¹, Amey Walke¹, Hao Yu¹, Reynald Alcotte¹, Mark Ingels¹, Piet Wambacq¹, Robert Langer¹, Bernardette Kunert¹, Niamh Waldron¹, Bertrand Parvais¹, Nadine Collaert¹</div><div>¹imec, Leuven</div></div>	<div><div>EuMIC07-3</div><div>A 33% Tuning Range Cross-Coupled DCO with “Folded” Common Mode Resonator Covering both 5G MMW Bands in 16-nm CMOS FinFET</div><div>Igor Gertman¹, Run Levinger¹, Sergey Bershansky¹, Jasmin Kadry¹, Gil Horovitz²</div><div>¹Intel Corp.</div></div>
<div>14:50 – 15:10</div>	<div><div>EuMIC05-4</div><div>34-42 GHz CMOS Transceiver Frontend for Versatile Arrays</div><div>Sumeet Londhe¹, Noam Smilovich¹, Shay Avner¹, Noam Bar-Helmer¹, Samuel Jameson¹, Eran Socher¹</div><div>¹Tel Aviv University, ²Rafael Advanced Teachnologies</div></div>	<div><div>EuMIC06-4</div><div>Reconfigurable PCM GeTe-Based Latching 6-bit Digital Switched Capacitor Bank</div><div>Tejinder Singh¹, Raafat R. Mansour¹</div><div>¹University of Waterloo</div></div>	<div><div>EuMIC07-4</div><div>A Non-Reflective T/R Switch with Leakage Cancellation Technique for 5G mmWave Application</div><div>Yi-Tong Wang¹, Lin-Sheng Wu¹, Liang-Feng Qiu¹, Li-Yun Shi¹, Junfa Mao¹</div><div>¹Shanghai Jiao Tong University</div></div>
<div>15:10 – 15:30</div>	<div><div>EuMIC05-5</div><div>A 28 GHz and 38 GHz High-Gain Dual-Band LNA for 5G Wireless Systems in 22 nm FD-SOI CMOS</div><div>Xin Xu¹, Stefan Schumann¹, Ali Ferschichi¹, Wolfgang Finger¹, Corrado Carta¹, Frank Ellinger¹</div><div>¹Technische Universität Dresden, ²Globalfoundries Dresden LLC & Co. KG</div></div>	<div><div>EuMIC06-5</div><div>A GaN/SiC UHF PA for Particle Accelerators with 100-145V Quasi-Static Drain Modulation</div><div>Gabriele Formicone¹, James Custer¹</div><div>¹Integra Technologies, Inc.</div></div>	<div><div>EuMIC07-5</div><div>RF SPST Switch Based on Innovative Heterogeneous GaN/SOI Integration Technique</div><div>Frederic Drillet¹, Jerome Loraine¹, Hassan Saleh¹, Imene Lahbib¹, Brice Grandchamp¹, Lucas Igna-Prat¹, Insaf Lahbib¹, Ousmane Sow¹, Gregory U'Ren¹</div><div>¹X-FAB</div></div>

MONDAY 16:10 – 17:50

	<div>Mission 1</div> <div><div>EuMIC08</div><div>ICs for Communication and Sensing</div><div>Chair: Herbert Zirath¹</div><div>Co-Chair: Ian Gresham²</div><div>¹Chalmers University of Technology, ²Anokiwave</div></div>	<div>Mission 2</div> <div><div>EuMIC09</div><div>Advanced Solutions for Integrated Power Amplifiers</div><div>Chair: Joseph Staudinger¹</div><div>Co-Chair: Paolo Colantonio²</div><div>¹NXP Semiconductor Inc, ²University of Rome Tor Vergata</div></div>	<div>Quest</div> <div><div>EuMIC10</div><div>Nonlinear Modelling</div><div>Chair: Justin King¹</div><div>Co-Chair: Valeria Vadalà²</div><div>¹Trinity College Dublin, ²University of Ferrara</div></div>
<div>16:10 – 16:30</div>	<div><div>EuMIC08-1</div><div>A 1-to-4 SiGe BiCMOS Analog Demultiplexer Sampling Front-End for a 116 GBaud-Receiver</div><div>Philipp Thomas¹, Tobias Tannert¹, Markus Grözing¹, Xuan-Quang Du¹, Manfred Berroth¹</div><div>¹University of Stuttgart</div></div>	<div><div>EuMIC09-1</div><div>Design of a Compact Power Amplifier with 18.6 dBm 60 GHz 20.5% PAE in 22 nm FD-SOI</div><div>Mengqi Cui¹, Zoltán Tibenszky¹, Corrado Carta¹, Frank Ellinger¹</div><div>¹Technische Universität Dresden</div></div>	<div><div>EuMIC10-1</div><div>Advanced Modelling Techniques Enabling E-Band Power Amplifier Design for 5G Backhauling</div><div>Valeria Vadalà¹, Antonio Raffo¹, Alberto Colzani², Matteo Angelo Fumagalli², Giuseppe Sivverini¹, Gianni Bosi¹, Giorgio Vannini¹</div><div>¹University of Ferrara, ²SIAE Microelettronica S.p.A.</div></div>
<div>16:30 – 16:50</div>	<div><div>EuMIC08-2</div><div>An Analog Costas Loop MMIC in 130 nm SiGe BiCMOS Technology for Receiver Synchronization of QPSK and BPSK Modulated Signals</div><div>Eswara Rao Bammi¹, Ingmar Kallfass¹</div><div>¹Institute of Robust Power Semiconductor Systems (ILH) - University of Stuttgart</div></div>	<div><div>EuMIC09-2</div><div>Ka-Band Dual Input Stacked 22 nm CMOS FDSOI Power Amplifier with Transformer-Based Power Combiner</div><div>Jere Rusanen¹, Nuutti Tervo¹, Timo Rahkonen¹, Aarno Pärssinen¹, Janne P. Aikio¹</div><div>¹University of Oulu</div></div>	<div><div>EuMIC10-2</div><div>Simulating Drain Lag of GaN HEMTs with Physics-Based ASM Model</div><div>Petros Beleniotis¹, Frank Schnieder², Matthias Rudolph¹</div><div>¹Brandenburg University of Technology (BTU) Cottbus-Senftenberg, ²Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik</div></div>
<div>16:50 – 17:10</div>	<div><div>EuMIC08-3</div><div>Design Considerations on the Realization of Signal Sources at mm-Waves</div><div>Leonardo Pantoli¹, Habeeb Bello¹, Giorgio Leuzzi¹, Herman Jalli Ng¹, Dietmar Kissinger²</div><div>¹University of L'Aquila, ²IHP-Leibniz-Institut für innovative Mikroelektronik, ³Institute of Electronic Devices and Circuits, Ulm University</div></div>	<div><div>EuMIC09-3</div><div>A 28-GHz High Linearity and High Efficiency Class-F Power Amplifier in 90-nm CMOS Process for 5G Communications</div><div>Bo-Ze Lu¹, Yunshan Wang¹, Zhi-Jia Huang¹, Kun-You Lin¹, Hwei Wang¹</div><div>¹National Taiwan University</div></div>	<div><div>EuMIC10-3</div><div>Modelling of InP DHBTs in a Transferred-Substrate Technology with Diamond Heat Spreader</div><div>Tom Keinicke Johansen¹, Maruf Hossain¹, Ralf Doerner¹, Hady Yacoub¹, Ksenia Nosaeva², Tanjil Shivan², Wolfgang Heinrich¹, Viktor Krozer²</div><div>¹Technical University of Denmark, ²Ferdinand-Braun-Institut (FBH) Leibniz-Institut für Höchstfrequenz-technik</div></div>
<div>17:10 – 17:30</div>	<div><div>EuMIC08-4</div><div>A 95-135 GHz Low Power Dicke Radiometer in SiGe BiCMOS Technology</div><div>Roei Ben-Yishay¹, Danny Elad¹</div><div>¹ON Semiconductor</div></div>	<div><div>EuMIC09-4</div><div>A 2 GHz Compact 60 W Fully Integrated 3-Way Doherty for Si-multaneous Dual-Band Operation</div><div>Marc Vigneau¹, Mariano Ercoi¹</div><div>¹Ampleon</div></div>	<div><div>EuMIC10-4</div><div>Energy and Charge Conservation for FET Models</div><div>Ciarán Wilson¹, Marek Schmidt-Szalowski², Justin King¹</div><div>¹University College Dublin, ²Ampleon Netherlands, ³Trinity College Dublin</div></div>
<div>17:30 – 17:50</div>	<div><div>EuMIC08-5</div><div>E/W-Band CPW-based Amplifier MMICs Fabricated in a 60 nm GaN-on-Silicon Foundry Process</div><div>Robert Malmqvist¹, Rolf Jonsson¹, Anders Bernland¹, Mingquan Bao², Rémy Leblanc¹, Koen Buisman⁴, Christian Fager³, Kristoffer Andersson³</div><div>¹Swedish Defence Research Agency (FOI), ²Ericsson Research, Ericsson AB, ³OMMIC SAS, ⁴Chalmers University of Technology</div></div>	<div><div>EuMIC09-5</div><div>A High-Linear Ka-Band Power Amplifier with Diode-Based Analogue Predistortion</div><div>Junlei Zhao¹, Adam Cooman¹, Alireza Shamsafar¹, Mohadig Rousstia¹, Domenico Calzona¹, Sergio Pires¹</div><div>¹Ampleon Netherlands B.V.</div></div>	<div><div>EuMIC10-5</div><div>Estimation of Large-Signal Output Capacitance of a Power Transistor</div><div>Marek Schmidt-Szalowski¹, Mauro Marchetti², Gustavo Avolio²</div><div>¹Ampleon, ²Anteverta MW Maury Microwave</div></div>

TUESDAY

					
Room	08:30 – 10:10	10:50 – 12:30	13:50 – 15:30	16:10 – 17:50	EVENING PROGRAMME
Mission 1	EuMIC11 Transceiver and Transmitter ICs		EuMIC13 Foundry Panel	EuMC07 Wireless Communication Systems	EuMC14 Microwave and mmWave Systems
Mission 2	EuMC01 Power Amplifiers for Sub 6 GHz Application		EuMC08 Power Amplifiers Based on III-V & CMOS Technologies for 5G	EuMC15 Doherty and Load Modulated Power Amplifier Structures	
Quest	EuMIC/EuMC01 Silicon Integrated Sub-mmWave Circuits		EuMC09 Terahertz Electronic Devices	EuMC16 Terahertz Photonic Devices and System	
Expedition	EuMIC12 Design and Characterisation Techniques		EuMC10 MIMO and 5G Antennas	EuMC17 Phased and Transmit Arrays	
Polar			EuMIC14 1-Minute Poster Pitch (13:50 - 14:10)	EuMIC16 EuMIC Closing Session	
Auditorium	Automotive Forum Automotive Radar: Waveforms, Architectures, AI and Interference		Technology in Context Philosophical Lecture	Automotive Forum Automotive Radar: Waveforms, Architectures, AI and Interference	
Spark	EuMC02 Array Antennas		EuMC11 Waveguide and Horn Antennas	EuMC18 5G Antenna Systems	
Flash	EuMC03 Advanced Packaging Components and Techniques		EuMC12 Advanced Packaging Solutions for mmWave Applications	EuMC19 3D-Printing Technologies	
Glow	EuMC04 Theoretical and Computational Electromagnetics		EuMC13 Numerical Methods in Microwave Technology	EuMC20 Modelling of Field Radiation and Scattering	
Beam	Student School Build Your Own Radar: Instruction		W-25 Advanced mmWave Radar System Solutions for Industrial and Consumer Sensing Applications		
Media arena	EuMC05 1-Minute Poster Pitch (09:40 - 10:10)	Women in Microwaves Lunch Lecture	Career Platform How to Stand Out in a Job Application	Women in Microwaves Panel Discussion	
Fluor				Teaching Microwaves Increase Your Microwave Lecturing Skills	
Round control		Career Platform Career Lounge: Meet Jobs, Build Careers			
Transitzone B		Automotive Forum Lunch			
Transitzone C		Student School Build Your Own Radar: Hands-On Experience			
loopbrug		Career Platform Company Wall and Job Wall			
Beatrix		Opening of the European Microwave Week EuMC/EuMW Opening			
Juliana 2	W-05 Digital Predistortion for 5G MIMO Wireless Transmitters				
Hall 1		EuMC06 Interactive Poster Session	EuMIC15 Interactive Poster Session		
Hall 1	Student Design Competition Detect a Drone / Build (a part of) an Amplifier				
Off-site					EuMW Welcome Reception 18.30 - 22.00

TUESDAY 08:30 – 10:10

	Mission 2	Spark	Flash	Glow
	EuMC01 Power Amplifiers for Sub 6 GHz Application Chair: Olof Bengtsson ¹ Co-Chair: Mark van der Heijden ² ¹ Ferdinand-Braun-Institut (FBH), ² NXP Semiconductors	EuMC02 Array Antennas Chair: Ilona Rolfes ¹ Co-Chair: Antti Räisänen ² ¹ Ruhr-University Bochum, ² Aalto University	EuMC03 Advanced Packaging Components and Techniques Chair: Kamal K Samanta ¹ Co-Chair: Miguel Sanchez-Soriano ² ¹ Sony Europe B.V., ² University of Alicante	EuMC04 Theoretical and Computational Electromagnetics Chair: Francisco Mesa ¹ Co-Chair: Alessandro Galli ² ¹ Universidad de Sevilla, ² Sapienza University of Rome
08:30 – 08:50	EuMC01-1 Efficiency and Linearity of Digital “Class-C Like” Transmitters <i>Dieuwert Mul¹, Robert Bootsman¹, Quinten Bruinsma¹, Yiyu Shen¹, Sebastian Krause², Rüdiger Quay³, Marco Pelk³, Fred van Rijjs³, Rob Heeres³, Sergio Pires³, Morteza S. Alavi³, Leo C.N. de Vreede³</i> ¹ Delft University of Technology, ² Fraunhofer IAF, ³ Ampleon Netherlands B.V.	EuMC02-1 Endfire Coupled-Mode Patch Antenna Array with Balanced Feeding <i>Haozhan Tian¹, Tatsuo Itoh²</i> ¹ University of California Los Angeles (UCLA), ² University of California, Los Angeles	EuMC03-1 BenzoCycloButene-Based In-Package Substrate Integrated Waveguides for Sub-THz Applications <i>Giuseppe Aciri¹, Emmanuel Pistono², Florence Podevin¹, Philippe Ferrari¹, Luigi Boccia³, Anne-Sophie Grimault⁴, Nicolas Zerounian⁴, Frédéric Aniel⁴, Loïc Vincent⁴</i> ¹ INPG, RFIC-Lab, ² UGA, RFIC-Lab, ³ University of Calabria, ⁴ Centre de Nanosciences et Nanotechnologies, ⁵ INPG, CIME	EuMC04-1 Designing Microwave Circuits Using Genetic Algorithms Accelerated by Convolutional Neural Networks <i>Takuma Akada¹, Kazuhiro Fujimori¹</i> ¹ Graduate School of Natural Science and Technology, Okayama University
08:50 – 09:10	EuMC01-2 A 2.4/3.5 GHz Dual-Band Power Amplifier with Filter-Based Bias Network and SRFT Matching <i>Saraunsh Bayaskar¹, Paolo Enrico de Falco², Taylor Barton³</i> ¹ Qorvo, ² University of Colorado, Boulder, ³ University of Colorado Boulder	EuMC02-2 Gap-Waveguide Cavity Slot Array Based on Two Metal Layers at 120 GHz <i>Teng Li¹, Florian Boes¹, Karina Schneider¹, Thomas Zwick¹</i> ¹ Karlsruhe Institute of Technology	EuMC03-2 Large Scale Array Antenna Packaging for 5G mmWave Base Station <i>Dohyuk Ha¹, Kwanghyun Baek¹, Juneseok Lee¹, Sang-hoon Park¹, Jung-Ho Park¹, Jinsu Heo¹, YoungJu Lee¹</i> ¹ Samsung Electronics	EuMC04-2 A DE/WD/VM Hybrid Algorithm for Multiple-Constraint Synthesis of Concentric Ring Arrays <i>Shaoyi Xie¹, Jiawei Li¹, Hao Shao¹, Letian Guo¹, Guangjian Deng¹</i> ¹ Northwest Institute of Nuclear Technology
09:10 – 09:30	EuMC01-3 A Miniaturized 160 W Power Amplifier with 40% Efficiency at 9 dB Power Back-Off over 2.3–4.7 GHz <i>Mustazar Iqbal¹, Rui Hou¹, Gunnar Johansson¹, Richard Hellberg¹, Bo Berglund¹</i> ¹ Ericsson AB	EuMC02-3 A Wideband Slot Array Antenna with Cosecant Squared Pattern <i>Qiang Wang¹, Fengyun Cui¹, Lin Pan², Panpan Chen¹, Lincui Li¹</i> ¹ Institute of Engineering Electronics, China Academy of Engineering physics, ² China Academy of Engineering physics	EuMC03-3 Integrated Microfluidic Cooling for S-Band 10-Watt CW Power Amplifiers on Hybrid PCBs <i>Huaiqiang Yu¹</i> ¹ Sichuan Institute of Piezoelectric and Acousto-optic Technology (SIPAT)	EuMC04-3 An Efficient Butterfly Factorization-Based Method for Electromagnetic Near-Field Calculations <i>XiaoWei Huang¹, XinQing Sheng¹</i> ¹ Beijing Institute of Technology
09:30 – 09:50	EuMC01-4 2-GHz Class-E Power Amplifier Using a Compact Redundancy-Free Harmonic Tuning Circuit <i>Shinichi Tanaka¹, Hirotaka Asami¹</i> ¹ Shibaura Institute of Technology	EuMC02-4 A C-band Transmitarray for Spatial Multiplexing and Diversity Applications <i>Pavel Turalchuk¹, Irina Munina², Vitaliy Kirillov², Alexander Verevkin², Dmitry Zelenchuk²</i> ¹ St. Petersburg Electrotechnical University “LETI”, ² St. Petersburg Electrotechnical University “LETI”, ³ Queen's University Belfast	EuMC03-4 A U-Band Rectangular Waveguide-to-Coplanar Waveguide Transition Using Metal Ridge <i>Yunfeng Dong¹, Vitaliy Zhurbenko¹, Tom Keinicke Johansen¹</i> ¹ Technical University of Denmark	EuMC04-4 A Randomized Low-Rank Decomposition Based Method for Solving Volume-Surface Integral Equation <i>Yan-Nan Liu¹</i> ¹ CAEP Software Center for High Performance Numerical Simulation
09:50 – 10:10	EuMC01-5 A 90W 1-3 GHz Power Amplifier Module <i>Mohammad Ghazizadeh¹, Sayyed-Hossein Javid-Hosseini¹, Vahid Nayyeri¹</i> ¹ Iran University of Science & Technology	EuMC02-5 A Low-Profile Shared-Aperture Dual-Band Broadband Antenna Array for SAR Applications <i>Tao Dong¹, Ke Li¹, Zhenghuan Xia¹, Xinhua Li¹</i> ¹ Beijing Institute of Satellite Information Engineering	EuMC03-5 Via-Less Waveguide-to-Stripline Transition Using 2D Electromagnetic Bandgap Structure <i>Zhi Li¹, Kevin Xu¹, Nathan Chordas-Ewell¹, Dongyin Ren¹, Jun H. Choi¹, Ryan Wu²</i> ¹ The State University of New York at Buffalo, ² NXP Semiconductors	EuMC04-5 Microwave Generation of Bessel-Gauss Beams: A Fully Vectorial Electromagnetic Approach <i>Walter Fuscaldo¹, Alessio Benedetti¹, Davide Comite¹, Paolo Burghignoli¹, Paolo Baccarelli², Alessandro Galli¹</i> ¹ Sapienza University of Rome, ² Roma Tre University

TUESDAY 12:30 – 14:20

Hall 1
EuMC06
EuMC Interactive Poster Session 1
Chair: Jan Geralt bij de Vaate ¹
Co-Chair: Mark Oude Alink ²
¹ ASTRON, ² University of Twente

EuMC06-1
Miniature Wilkinson Power Divider Based on Slow-Wave Microstrip Technology

Hamza Issa¹, Darine Kaddour², Philippe Ferrari¹

¹BAU, ²Univ. Grenoble Alpes, Grenoble INP, LCIS, ³Univ. Grenoble Alpes, RFIC-Lab

EuMC06-6
An X-band Cross-Coupled SIW Cavity VCO

Teanette van der Spuy¹, Tinus Stander¹

¹University of Pretoria

EuMC06-11
Alternative Solutions for Reducing the Undesired Coupling Effect in Stub Loaded Microstrip Filters for Ka-Band Applications

Celia Gomez Molina¹, Juan Hinojosa¹, Fernando Quesada Pereira¹, Vicente Enrique Boria Esbert², Marco Guglielmi³, Alejandro Alvarez Melcon¹, Giuseppe Macchiarella³

¹Universidad Politécnica de Cartagena, ²Universidad Politécnica de Valencia, ³Politecnico di Milano

EuMC06-16
A 28 GHz >30 dBm Output P1dB SPDT Switch with Integrated ESD Protection in CMOS 65 nm

Seunghyun Jang, Sunwoo Kong¹, Hui Dong Lee¹, Jeehoon Park¹, Kwang-Seon Kim¹, Bonghyuk Park¹

¹ETRI

EuMC06-2
Extended Smith Chart Concept and Application to Oscillator Analysis

Shigeki Takeda¹, Chun-Ping Chen², Tetsuo Anada²

¹Antenna Giken Co., Ltd., ²Kanagawa University

EuMC06-7
Wideband transversal acoustic wave filters. Application to connected cars.

Rafael Perea-Robles¹, Jordi Mateu¹, Carlos Collado¹, Robert Aigner²

¹Technical University of Catalonia, ²Qorvo

EuMC06-12
Compact Dual-Band Bandpass Filter Using Single Perturbed Rectangular Patch Resonator with Stubs

Jiawei Liu¹, Yonghong Zhang¹, Xiang Wan¹

¹University of Electronic Science and Technology of China

EuMC06-17
Design of a Low Noise Amplifier MMIC from 71-76GHz using GaAs mHEMT Technology

PRATIK DESHPANDE¹, Kai Parow Souchon¹, Jim Mayock¹, Qing Sun¹, Ben Rackauskas¹, Richard Reeves¹, Petar Jankovic¹, Václav Valenta²

¹VIPER RF, ²STFC Rutherford Appleton Laboratory, ³European Space Agency, ESA/ESTEC

EuMC06-3
High Quality Integrated Inductors in Fan-out Wafer-Level Packaging Technology for mmWave Applications

Kavin Senthil Murugesan¹, Mykola Chernobryvko¹, Sherko Zinal¹, Marco Rossi¹, Ivan Ndiip¹, Mathias Boettcher¹, Klaus-Dieter Lang¹, Marcel Wieland¹, Christian Goetze¹, Saquib Bin Halim¹, Jean Trehwella¹

¹TU Berlin, ²Fraunhofer Institut für Zuverlässigkeit und Mikrointegration (IZM), ³Global Foundries

EuMC06-8
A 24-38 GHz CMOS Wideband Frequency Quadrupler for Multi-Band Applications

Ping-Hsun Wu¹

¹ITRI

EuMC06-13
Open-/Short- Circuited Coupled-Line Structures for the Design of High-Selectivity Bandpass Filter

Photos Vryonides¹, Salman Arain¹, Abdul Quddious², Symeon Nikolau¹

¹Frederick University Nicosia, Cyprus, ²University of Cyprus

EuMC06-18
Multi-Band, Multi-Technology Remote Unit (RU) Based on RFSoc

Samuel Pereira¹, Luis Almeida¹, Arnaldo Oliveira¹, Nuno Borges Carvalho¹, Paulo Monteiro¹

¹Universidade de Aveiro

EuMC06-4
Coupled-Resonator Bandpass Power Dividers Based on Connected-Coupling Mechanisms

Shih-Cheng Lin¹, Yuan-Chun Lin¹, Sheng-Fuh Chang¹

¹National Chung Cheng University

EuMC06-9
Flexible Self-Resonant Detector Coil for Magnetic Resonance Imaging of Carbon-13

Vitaliy Zhurbenko¹, Juan D. Sánchez-Heredia¹, Wenjun Wang¹, Jan H. Ardenkjær-Larsen¹

¹Technical University of Denmark

EuMC06-14
Phase De-Embedding of Microwave Filter with Use of Cauchy Method and Extraction of Approximated Polynomial Greatest Common Divisor

Jedrzej Michalczyk¹, Jerzy Julian Michalski²

¹SpaceForest Ltd., ²SpaceForest

EuMC06-5
Compact Wideband Bandpass Filter Using Miniaturized Staircase Interdigital Resonators

Abdulrahman Widaa¹, Chang Jiang You², Mohammed Awad¹, Jingye Cai²

¹Kiel University, ²University of Electronic Science and Technology of China

EuMC06-10
A Novel Compact Microstrip Diplexer with Closely Spaced Channels

Ali Kursad Gorur¹, Alper Turkeli², Engin Dogan³, Ceyhan Karpuz², Adnan Gorur³

¹Nevsehir Haci Bektas Veli University, ²Nevsehir Haci Bektas Veli University, ³Nigde Ömer Halisdemir University, ⁴Pamukkale University

EuMC06-15
A New Method to Design Ceramic Filters with Finite Transmission Zeros

Huairen Yi¹, Zhengxiang Ma¹

¹Futurewei Technologies

Meet:

Visit to benefit from in-depth discussions during Tuesday's poster session.

TUESDAY 13:50 – 15:30

Mission 1

EuMC07
Wireless Communication Systems

Chair: Ilona Rolfes¹

Co-Chair: Alexander Koelpin²

¹Ruhr-University Bochum, ²Brandenburg University of Technology

Mission 2

EuMC08
Power Amplifiers Based on III-V & CMOS Technologies for 5G Applications

Chair: Paul Tasker¹

Co-Chair: Ana Peláez²

¹Cardiff Univeristy, ²Televes S.A.

Quest

EuMC09
Terahertz Electronic Devices

Chair: Jan Stake¹

Co-Chair: Jeffrey Hesler²

¹Chalmers University of Technology, ²Virginia Diodes Inc

Expedition

EuMC10
MIMO and 5G Antennas

Chair: Bart Smolders¹

Co-Chair: Thomas Zwick²

¹Eindhoven University of Technology (TU/e), ²Karlsruhe Institute of Technology (KIT)

13:50 – 14:10

EuMC07-1
Millimetre-Wave and Sub-Terahertz Technology and Research Trends for High Data Rate Communications - An Industry View

Renato Lombardi¹

INDUSTRIAL KEYNOTE

¹Huawei IT

EuMC08-1
4.5 GHz mMIMO PA for 5G with Flip-Chip Integration

Sergio Pires¹, Anh Nghiem²

INDUSTRIAL KEYNOTE

¹Ampleon Netherlands BV, ²Ampleon Netherlands B.V.

EuMC09-1
Generation and Detection of Wideband Modulated Signals for mmWave Applications

Jeffrey Hesler¹, Steven Durant¹, Theodore Reck¹, Eric Bryerton¹, Daniel Koller¹, Gerhard Schoenthal¹

INDUSTRIAL KEYNOTE

¹Virginia Diodes Inc.

EuMC10-1
Advances in Integrated Transceivers and Antennas for 5G Mobile Communications

Florian Pivit¹

INDUSTRIAL KEYNOTE

¹Nokia Bell Labs, Ireland

14:10 – 14:30

EuMC07-2
5G mm-Wave Over-The-Air Measurements of an Agile Multi-Beam Front-End

Steffen Spira¹, Kurt Blau¹, Reiner Thomä¹, Matthias A. Hein¹

¹Technische Universität Ilmenau

EuMC08-2
A 28 GHz Power Amplifier Combining Linearizer, Adaptive Bias and Gm Compensation to P1dB and Improve Back-Off Efficiency

Yu-Teng Chang¹, Li-Cheng Hung¹, Hsin-Chia Lu¹

¹National Taiwan University

EuMC09-2
InGaAs HEMT MMIC Technology on Silicon Substrate with Backside Field-Plate

Arnulf Leuther¹, Thomas Merkle¹, Laurenz John¹, Tim Christoph¹, Rolf Aidam¹, Axel Tessmann¹

¹Fraunhofer Institute for Applied Solid State Physics IAF

EuMC10-2
MIMO Antenna Design with Reconfigurable Radiation Pattern and High Port Isolation

Yi-Feng Cheng¹, Kwok-Keung M. Cheng¹

¹The Chinese University of Hong Kong

14:30 – 14:50

EuMC07-3
D-band Transmission Hub for Point to MultiPoint Wireless Distribution

Maruf Hossain¹, Viktor Krozer², Trung Le³, et al.⁴

¹Ferdinand-Braun-Institut, Leibniz-Institut für Höchstfrequenztechnik, Berlin, Germany, ²Goethe University Frankfurt/M, Frankfurt 60323, Germany, ³HF Systems Engineering GmbH, Kassel 34123, Germany

⁴For the complete author and affiliation list, please refer to the conference proceedings.

EuMC08-3
A 28 GHz and 38 GHz High-Gain Dual-Band Power Amplifier for 5G Wireless Systems in 22 nm FD-SOI CMOS

Xin Xu¹, Songhui Li¹, Laszlo Szilagyi¹, Christian Matthus¹, Wolfgang Finger¹, Corrado Carta¹, Frank Ellinger¹

¹Technische Universität Dresden, ²Globalfoundries Dresden LLC & Co. KG

EuMC09-3
140-190 GHz Broadband Amplifier in 300-nm InP/GaAsSb DHBT Technology

Wei Quan¹, Sara Hamzeloui¹, Akshay Mahadev Arabhavi¹, Ralf Flückiger¹, Olivier J. S. Ostinelli¹, Colombo Bolognesi¹

¹Millimeter-wave Electronics Laboratory, ETHz, ²DIRAMICS

EuMC10-3
An Outphasing MIMO Architecture Prototype

Bernhard Gäde¹, Stefan Erhardt¹, Georg Fischer¹, Ralf Müller¹

¹Friedrich-Alexander University of Erlangen-Nuremberg

14:50 – 15:10

EuMC07-4
Miniaturized Slot-Loaded SIW Resonator and Its Application to C-Band Low Phase Noise Oscillator

Samundra Kumar Thapa¹, Chen Baichuan¹, Adel Barakat¹, Kuniaki Yoshitomi¹, Ramesh Kumar Pokharel¹

¹Kyushu University

EuMC08-4
A 38-GHz High Linearity and High Efficiency Power Amplifier for 5G Applications in 65-nm CMOS

Xin-Yi Li¹, Yu-Chun Chen¹, Yunshan Wang¹, Tianwei Huang¹, Hui Wang¹

¹National Taiwan University

EuMC09-4
Short-Range Wireless Transmitter Using Mesoscopic Dielectric Cuboid Antenna in 300-GHz Band

Kazuki Yamada¹, Yuto Samura¹, Oleg Minin¹, Atsushi Kanno¹, Norihiko Sekine¹, Junichi Nakajima¹, Igor Minin¹, Shintaro Hisatake¹

¹University of Gifu, ²University of National Research Tomsk State, ³National Institute of Information and Communications Technology, ⁴SoftBank

EuMC10-4
Broadband Fan-out Phased Antenna Array at 28 GHz for 5G Applications

Imran Aziz¹, Dapeng Wu², Erik Öjefors³, Johanna Hanning⁴, Erik Wiklund⁴, Dragos Dancila⁴

¹Uppsala University, ²Sivers IMA AB

15:10 – 15:30

EuMC07-5
A 61-GHz RFID Frontend with SiGe Transceiver MMIC and SIW Coupling Network

Dominic Funke¹, Steffen Hansen¹, Christian Bredendiek¹, Thorben Grenter¹, Gerd vom Bögel¹, et al.¹

¹Ruhr-University Bochum, ²Fraunhofer Institute for High-Frequency Physics and Radar Techniques (FH), ³Fraunhofer Institute for Microelectronic Circuits and Systems (IMS), ⁴Fraunhofer Institute for Photonic Microsystems (IPMS)

⁵For the complete author list, please refer to the conference proceedings.

EuMC08-5
95 GHz 13 dBm IQ-Combined PA in 65 nm CMOS

Tal Elazar¹, Eran Socher²

¹Tel Aviv University, ²TAU

EuMC09-5
A 119 GHz Bandwidth Distributed Amplifier with a ±2 ps Group Delay Variation

Bas van de Ven¹, Tanjil Shivan¹, Xiao Liu¹, Maruf Hossain¹, Viktor Krozer¹, Marion K. Matters-Kammerer¹

¹Eindhoven University of Technology (TU/e), ²Ferdinand-Braun-Institut (FBH) Leibniz-Institut für Höchstfrequenztechnik

EuMC10-5
A Novel Automotive Ultra-Wideband 5G-MIMO-Antenna Array Printed on a Foil

Zafer Toprak¹, Simon Senega¹, Stefan Lindenmeier¹

¹University of the Bundeswehr Munich

TUESDAY 13:50 – 15:30

	Spark	Flash	Glow
	EuMC11 Waveguide and Horn Antennas <div>Chair: Lorenz-Peter Schmidt¹</div> <div>Co-Chair: Józef Modelski²</div> <div>¹Uni Erlangen, ²Warsaw University of Technology</div>	EuMC12 Advanced Packaging Solutions for mmWave applications <div>Chair: Kaynak Mehmet¹</div> <div>Co-Chair: Mikko Varonen²</div> <div>¹IHP Microelectronics GmbH, ²VTI Techni-cal Research Centre of Finland</div>	EuMC13 Numerical Methods in Micro-wave Technology <div>Chair: Ke Wu¹</div> <div>Co-Chair: Noushin Karimian²</div> <div>¹Polytechnique Montreal, ²The University of Manchester</div>
13:50 – 14:10	EuMC11-1 Elliptical Dual-Polarized High Gain Horn Antenna for Cell Partitioning in Millimeter-Wave Mobile Com-munications <div>Thomas Arthur Herbert Bressner¹, Martin Johansson¹, Ulf Johansen¹, Bart Smolders²</div> <div>¹Eindhoven Univeristy of Technology, ²Ericsson AB</div>	EuMC12-1 Advanced Multilayer Components and Front-End Modules for Millimetre-Wave and 5G Applica-tions <div>Kamal K Samanta¹</div> <div>¹Sony Europe B V</div>	EuMC13-1 Power Delivery Network Imped-ance Profile and Voltage Droop Optimization <div>Aurea Edna Moreno-Mojica¹, Jose E. Rayas-Sanchez¹, Felipe J. Leal-Romo¹</div> <div>¹ITESO - The Jesuit University of Guadalajara</div>
14:10 – 14:30	EuMC11-2 A Compact 30-50 GHz Plate-let Corrugated Feedhorn for Cryogenic Radio Astronomical Applications <div>Chau-Ching Chiong¹, Chen Chien¹, Shou-Ting Jian¹, Chin-Ting Ho¹, Yuh-Jing Hwang¹</div> <div>¹Institute of Astronomy and Astrophysics, Academia Sinica</div>	EuMC12-2 BiCMOS Through-Silicon Via (TSV) Signal Transition at 240/300 GHz for mmWave & Sub-THz Packaging and Heterogeneous Integration <div>Matthias Wietstruck¹, Steffen Marschmeyer¹, Christi-an Wipf¹, Matteo Stocchi¹, Mehmet Kaynak¹</div> <div>¹IHP - Leibniz Institut für innovative Mikroelektronik Sinica</div>	EuMC13-2 Technique for Eliminating Resonant Artifacts in Low Loss Material Measurement <div>MuhibUlr Rahman¹, Ke Wu¹</div> <div>¹POLY-GRAMES</div>
14:30 – 14:50	EuMC11-3 A Cost-Effective W-band Slotted Waveguide Antenna <div>Stanislav Sekretarov¹, Artur Kondrykov¹, Omytro Vavriv¹</div> <div>¹Institute of Radio Astronomy of the National Academy of Sciences of Ukraine</div>	EuMC12-3 Mode-Matched Common-Strip Coupler Interface for Millimeter-Wave and Terahertz Chip-to-Chip Waveguide Interconnects <div>Ahmed Sakr¹, Walid Dyab², Ke Wu³</div> <div>¹Faculty of Engineering, Cairo University, ²Prince Sultan University, ³Polytechnique Montreal</div>	EuMC13-3 Spectral Analysis of a Fabry-Perot Open Resonator with a Plane-Wave Expansion Method <div>Bartlomiej Salski¹, Tomasz Karpisz¹, Pawel Kopyt¹, Jerzy Krupka¹</div> <div>¹Warsaw University of Technology</div>
14:50 – 15:10	EuMC11-4 A Compact Substrate Integrated Self-Diplexing Antenna for WiFi and ISM Band Applications <div>Sounik Kiran Kumar Dash¹, Qingsha S Cheng¹, Rusan Kumar Barik¹, Nrusingha Charan Pradhan¹, Karthikey-an Sholampettai Subramanian¹</div> <div>¹Southern University of Science and Technology, Shenzhen, China, ²National Institute of Technology Tiruchirappalli, Tiruchirappalli 620015</div>	EuMC12-4 DC-to-Ka-Band Broadband Chip-to-Chip Interconnect Using Aerosol Jet Printing <div>Jubaid Qayyum¹, Cameron Crump¹, John Albrecht¹, Ahmet Ulusoy², John Papapolymerou¹</div> <div>¹Michigan State University, ²Karlsruhe Institute of Technology (KIT)</div>	EuMC13-4 A Fast Sensitivity Analysis Method for Lumped Impedance Elements in Antenna Design <div>Biyi Wu¹, XinQing Sheng¹</div> <div>¹Beijing Institute of Technology</div>
15:10 – 15:30	EuMC11-5 Substrate Integrated Waveguide Leaky-Wave Antennas with Tailored Characteristics for Millimeter-Wave Applications <div>DONGZE ZHENG¹, Ke Wu²</div> <div>¹Ecole Polytechnique de Montréal, ²POLY-GRAMES</div>	EuMC12-5 A CMOS-Compatible Solution for Propagation Channels on Silicon in the Millimeter-Wave Band <div>Ihsan El Masri¹, Thierry Le gouguec², Pierre-Marie Martin¹, Rozenn Allanic², Cédric Quendo²</div> <div>¹Université de Bretagne Occidentale, ²Lab-STICC- Université de Bretagne Occidentale</div>	

TUESDAY 14:20 – 16:10

Hall 1	
EuMIC15	
EuMIC Interactive Poster Session	
Chair: Christian Fager ¹	
Co-Chair: Mark Oude Alink ²	
¹ Microwave Electronics Laboratory, Chalmers University of Technology, ² University of Twente	
EuMIC15-1 A PLL Frequency Synthesizer In 65 nm CMOS for 60 GHz Sliding-IF Transceiver Yang Liu ¹ , Zhiqun Li ² , Hao Gao ³ ¹ Nanjing Institute of Technology, ² Southeast University, ³ Eindhoven University of Technology (TU/e)	EuMIC15-5 An Advanced Ageing Methodology for Robustness Assessment of Normally-Off AlGaIn/GaN HEMT Florent Albany ¹ , Arnaud Curutchet ¹ , Nathalie Labat ¹ , François Lecourt ¹ , Ewa Walasiak ² , Hassan Maher ¹ , Yvon Cordier ¹ , Nicolas Defrance ¹ , Nathalie Malbert ¹ ¹ IMS Bordeaux, ² OMMIC SAS, ³ LN2-UMI, ⁴ CRHEA, ⁵ EMN
EuMIC15-2 A Suitable Approach to Assess Thermal Properties of GaN Power Bars Rocco Giofrè ¹ , Paolo Colantonio ² , Matthias Auf der Maur ² , Andrea Reale ² ¹ University of Roma Tor Vergata, ² University of Rome Tor Vergata (Italy)	EuMIC15-6 A 30-36.6 GHz Low Jitter Degradation SIL QVCO with Frequency-Tracking Loop in 65 nm CMOS for 5G Frontend Applications Jhe-Wei Li ¹ , Wei-Cheng Chen ¹ , Jung Chou ¹ , Yu-Cheng Liu ¹ , Hong-Yeh Chang ¹ ¹ National Central University, ² ITRI
EuMIC15-3 A Large-Signal Behavioural Modeling Approach of GaN HEMTs for Power Amplifier Design M. Oguz Yegin ¹ , Armagan Gurda ² , Ulas Ozipek ² , Ekmei Özbay ² ¹ Bilkent University, ² Nanotechnology Research Center (NANOTAM), Bilkent University	EuMIC15-7 A Three Stage Gain Cell Topology with an Active Ultra-Wideband Input Matching in H-Band Athanasios Gatzastras ¹ , Hermann Massler ² , Arnulf Leuther ¹ , Sébastien Chartier ¹ , Ingmar Kallfass ¹ ¹ Institute of Robust Power Semiconductor Systems (ILH) - University of Stuttgart, ² Fraunhofer Institute for Applied Solid State Physics (IAF)
EuMIC15-4 A Broadband 60-GHz Low Noise Amplifier with 3.2 dB Noise Figure and 24 dB Gain Ali Ferschischi ¹ , Hatem Ghaleb ¹ , Sami Ur Rehman ¹ , Corrado Carta ¹ , Frank Ellinger ¹ ¹ Technische Universität Dresden, Germany	EuMIC15-8 Empowering GaN-Si HEMT Nonlinear Modelling for Doherty Power Amplifier Design Gianni Bosi ¹ , Antonio Raffo ¹ , Rocco Giofrè ² , Valeria Vadalà ¹ , Giorgio Vannini ¹ , Ernesto Limiti ² ¹ University of Ferrara, ² University of Rome "Tor Vergata"

Learn:

Take up discussions on a familiar topic or come learn something new during Tuesday's EuMIC poster session.

TUESDAY 16:10 – 17:50

	Mission 1	Mission 2	Quest	Expedition
	EuMC14 Microwave and mmWave Systems Chair: Kamran Ghorbani ¹ Co-Chair: Jan Vrba ² ¹ RMIT University, ² Czech Technical University in Prague	EuMC15 Doherty and Load Modulated Power Amplifier Structures Chair: Vittorio Camarchia ¹ Co-Chair: Didier Belot ² ¹ Politecnico di Torino, ² CEA - LETI	EuMC16 Terahertz Photonic Devices and System Chair: Marion K. Matters-Kammerer ¹ Co-Chair: Idelfonso Tafur Monroy ² ¹ Eindhoven University of Technology - TU/e, ² Eindhoven University of Technology (TU/e)	EuMC17 Phased and Transmit Arrays Chair: Ioan Lager ¹ Co-Chair: Thomas Emanuelsson ² ¹ Delft University of Technology, ² Gapwaves AB
16:10 – 16:30	EuMC14-1 Output Signal Characteristics of Optical Fiber Feed Direct Digital RF Transmitter Using SFP+ Module Ryo TAMURA ¹ , Mizuki Motoyoshi ¹ , Suguru Kameda ¹ , Noriharu Suematsu ¹ ¹ Research Institute of Electrical Communication, Tohoku University	EuMC15-1 A 1000 W Wideband Recursive Four-Way Doherty Amplifier for Base Station Application Xiaolong Yue ¹ , Yongqiang Zhou ¹ ¹ Ericsson	EuMC16-1 Photonics-enabled Millimetre-wave Phased-Array Antenna with True Time Delay Beam-steering Muhsin Ali ¹ , Robinson Cruzoe Guzmán ¹ , Luis Enrique Garcia-Muñoz ¹ , Frédéric van Dijk ² , Guillermo Carpintero ¹ ¹ Universidad Carlos III de Madrid, ² III-V Lab	EuMC17-1 Modular and Scalable Millimeter-Wave Patch Array Antenna for 5G MIMO and Beamforming Lingyun Ren ¹ , Bohao Lu ¹ , Fang Lu ¹ , Yonghui Shu ¹ ¹ SAGE Millimeter, Inc.
16:30 – 16:50	EuMC14-2 Multi-source Intermodulation in a Loaded-line Phase Shifter Martin Mattsson ¹ , Dan Kuylenstierna ¹ ¹ Chalmers University of Technology	EuMC15-2 High Power 400 W Symmetric Doherty with Extended Back-off Efficiency Range for 5G Cellular Infrastructure Applications Ramanujam Embar ¹ , Roy McLaren ¹ , Mir Masood ¹ ¹ NXP Semiconductors, USA	EuMC16-2 Investigation of De-Embedding Techniques Applied on Uni-Trave-ling Carrier Photodiodes Dimitrios Konstantinou ¹ , Christophe Caillaud ¹ , Simon Rommel ¹ , Ulf Johanness ¹ , Idelfonso Tafur Monroy ¹ ¹ Eindhoven University of Technology (TU/e), ² III-V Lab, a joint Lab from Nokia, Thales and CEA	EuMC17-2 Dual-Band Dual-Linearly Polarized Transmit Array at Ka-Band Reda MADI ¹ , Antonio Clemente ² , Ronan Sauleau ² ¹ CEA - LETI, ² CEA-LETI, ³ CNRS, Institut d'Électronique et de Télécommunications de Rennes, UMR-6164
16:50 – 17:10	EuMC14-3 Compact Microwave Based Water-Cut Sensor Suitable for Downhole Installation Muhammad Akram Karimi ¹ , Muhammad Aarsalan ² , Atif Shamim ¹ ¹ King Abdullah University of Science and Technology (KAUST), ² Saudi Aramco	EuMC15-3 Load Modulated Balanced Ampli-fier Designed for AM-PM Linearity Kimon Vivien ¹ , Paolo Enrico de Falco ² , Pascal Pierre-Charles-Felix ³ , Olivier Venard ¹ , Geneviève Baudoin ¹ , Taylor Barton ¹ ¹ ESYCOM - ESIEEE Paris, ² Colorado University, ³ SOMOS Semiconductor	EuMC16-3 All-Digital Outphasing Modulator for Radio-over-Fiber System Yuma Kase ¹ , Shinichi Hori ¹ , Naoki Oshima ¹ , Kazuaki Kunihiro ¹ ¹ NEC Corporation	EuMC17-3 Origami-Inspired Shape-Changing Phased Array D. Elliott Williams ¹ , Charles Dorn ¹ , Sergio Pellegrino ¹ , Ali Hajimiri ¹ ¹ Caltech
17:10 – 17:30	EuMC14-4 Millimeter-Wave Outphasing using Analog-Radio over Fiber for 5G Physical Layer Infrastructure Roel Budé ¹ , Meerten Versluis ¹ , Gleb Nazarikov ¹ , Simon Rommel ¹ , Bart van Ark ¹ , Ulf Johanness ¹ , Idelfonso Tafur Monroy ¹ , Bart Smolders ¹ ¹ Eindhoven University of Technology	EuMC15-4 High-Efficiency Asymmetric Doherty Power Amplifier with Spurious Suppression Circuit Yuki Takagi ¹ , Naoki Hasegawa ¹ , Yoshichika Ohta ¹ , Ryo Ishikawa ¹ , Kazuhiko Horio ¹ ¹ SoftBank Corp./ Technology Research Laboratory, ² The University of Electro-Communications	EuMC16-4 A Low Power CMOS Driver Integrated With Mach-Zehnder Modulator for PAM4 Optical Transmissions Tai-Hsing Lee ¹ ¹ ITRI	EuMC17-4 Amplitude Varying Phased Array Linearization Sara Hesami ¹ , Sina Rezaei Aghdam ² , John Dooley ³ , Thomas Eriksson ¹ , Christian Fager ¹ ¹ Microwave Electronics Laboratory, Chalmers University of Technology, ² Chalmers University of Technology, ³ Maynooth University
17:30 – 17:50	EuMC14-5 In-Vehicle Breathing Rate Moni-toring Based on WiFi Signals Muhammad Manzar Hussain ¹ , Alper Akbilek ¹ , Florian Pfeiffer ¹ , Bernd Napholz ² ¹ perisens GmbH, ² Daimler AG	EuMC15-5 500 W Three-way GaN Doherty Power Amplifier for Sub-6 GHz 5G New Radio Base Transceiver Systems Hyunuk Kang ¹ , Woojin Choi ¹ , Inan Kim ¹ , Dongwoo Lee ¹ , Youngoo Yang ¹ ¹ Sungkyunkwan University, ² Wave Electronics Co., Ltd.	EuMC16-5 Performance of Phase Modulated RoF for 5G Fronthaul Uplink Emine Moutaly ¹ , Salim FAci ² , Catherine Algani ² , Billabert Anne-laure ² , Philippos Asimakopoulos ³ , Nathan J.Gomes ¹ ¹ Ecole Supérieure Polytechnique, ² Conservatoire National des Arts et Metiers, ³ University of Kent	EuMC17-5 Sidelobe Level Suppression and Scan-Loss Compensation In A Wide-Angular Scanning Linear Array Using Subarrays Amplitude Control Fannush Akbar ¹ , Leonardus Ligthart ² , Gamantyo Hendrantoro ¹ , Ioan Lager ² ¹ Institut Teknologi Sepuluh Nopember, ² TU Delft


TUESDAY 16:10 – 17:50

	Spark	Flash	Glow	Fluor
	EuMC18 5G Antenna Systems Chair: Dirk Heberling ¹ Co-Chair: Józef Modelski ² ¹ RWTH Aachen University, ² Warsaw University of Technology	EuMC19 3D-Printing Technologies Chair: John Papapolymerou ¹ Co-Chair: Kaynak Mehmet ² ¹ Michigan State University, ² kaynak@ihp-microelectronics.com	EuMC20 Modelling of Field Radiation and Scattering Chair: Alessandro Galli ¹ Co-Chair: Guy Vandenbosch ² ¹ Sapienza University of Rome, ² KU Leuven	EuMW02 [Special Session] Teaching Microwave Engineering Chair: Elmine Meyer ¹ Co-Chair: Ulf Johanness ¹ ¹ Eindhoven Univeristy of Technology
16:10 – 16:30	EuMC18-1 Dual-Polarized Integrated Lens Antenna for Outdoor 60 GHz Point-to-Point Systems Andrey Mozharovskiy ¹ , Alexey Artemenko ¹ , Sergey Tikhonov ¹ , Sergey Churkin ¹ , Roman Maslennikov ¹ ¹ Radio Gigabit LLC	EuMC19-1 3D-Printed 3 dB Hybrid Coupler for D-Band Applications Konstantin Lomakin ¹ , Laura Klein ² , Mark Sippel ² , Klaus Helmreich ³ , Gerald Gold ⁴ ¹ Friedrich-Alexander University Erlangen-Nürnberg (FAU), ² Friedrich-Alexander Universität Erlangen-Nürnberg	EuMC20-1 Plasmon Resonances of Conformal Graphene Strip Placed on Circular Dielectric Rod: From Microwaves to Infrared Range Sergii Dukhopelnykov ¹ ¹ Institute of Radio-Physics and Electronics NASU	EuMW02-1 Lessons from Build-a-Radio/Radar in a Day: The Ins and Outs of Experiential Design for Students David Ricketts ¹ ¹ North Carolina State University
16:30 – 16:50	EuMC18-2 28-GHz Wideband Dual-Polarized Parasitic-Patch Antenna Array on Tile-Scale Package Mohadig Rousstia ¹ , Alireza Shamsafar ¹ , Junlei Zhao ¹ , Sergio Pires ¹ , Jorge Teixeira ¹ , Giuseppe Scalise ¹ , Luigi Boccia ² ¹ Ampleon Netherlands BV, ² University of Calabria	EuMC19-2 Optimization of the Conductivity of Microwave Components Printed by Inkjet on Polymeric Substrates by Photonic Sintering Chaimaa El Hajjaji ¹ , Nicolas Delhote ¹ , Serge Verdeyme ¹ , Malgorzata Piechowiak ² , Olivier Durand ³ ¹ XLIM UMR7252, Université de Limoges/CNRS, Limoges, FRANCE, ² CTTC Center for Technology Transfers in Ceramics, france	EuMC20-2 Design of Three-Layer Radome for Millimeter-Wave Antenna Tomoshige Furuhi ¹ , Natsumi Minamitani ¹ , Shun Sakaida ¹ , Kaoru Sudo ¹ , Kengo Onaka ¹ , Takaya Wada ¹ , Hisao Hayafuji ¹ ¹ Murata Manufacturing Co., Ltd.	EuMW02-2 Evolution of Microwave Teaching Methods and a Vision for the Future Petrie Meyer ¹ ¹ Stellenbosch University
16:50 – 17:10	EuMC18-3 Phased Array Antenna with Beam-forming Network for 5G mmWave Communication System Anil Kumar Pandey ¹ ¹ Keysight Technologies	EuMC19-3 Additively Manufactured Six-Port for mmWave Applications Laura Klein ¹ , Konstantin Lomakin ¹ , Mark Sippel ¹ , Klaus Helmreich ³ , Gerald Gold ⁴ ¹ Friedrich-Alexander Universität Erlangen-Nürnberg	EuMC20-3 Improved Modeling of Radiation Effects in Coplanar Waveguides with Finite Ground Width Gia Ngoc Phung ¹ , Uwe Arz ² , Karsten Kuhlmann ¹ , Ralf Doerner ¹ , Wolfgang Heinrich ³ ¹ Physikalisch-Technische Bundesanstalt (PTB), ² Ferdinand-Braun-Institut (FBH) Leibniz-Institut für Höchstfrequenztechnik	EuMW02-3 Learn Electromagnetics with Student-Led-Tutorials Mark Bentum ¹ , Ramiro Serra ² , Ulf Johanness ² , Chantal Brans ³ ¹ Eindhoven University of Technology (TU/e), ² Eindhoven University of Technology, ³ Eindhoven University of Technology
17:10 – 17:30	EuMC18-4 Millimeter-Wave Dual-Polarized Filtering Patch Antenna Array for 5G Applications Yingqi Zhang ¹ , Wanchen Yang ¹ , Wenquan Che ¹ , Quan Xue ¹ , Shaowei Liao ¹ , Wenhai Zhang ¹ ¹ South China University of Technology	EuMC19-4 3D Printed Spherical Cavity Resonator With Fine Tuning Using Nanomagnetic Thin Film Yuxiao He ¹ , Eric Drev ² , Premjeet Chahal ¹ , John Zhang ² , John Papapolymerou ¹ ¹ Michigan State University, ² Georgia Institute of Technology	EuMC20-4 H-polarized Plane Wave Scatter-ing by Cylindrically Conformal Periodic Finite Array with PEC and Resistive Patches Alexander Svezhentsev ¹ , Vladimir Volski ¹ , Guy Vandenbosch ¹ ¹ O.Usikov IRE NAS of Ukraine, ² Katholieke Universiteit Leuven	EuMW02-4 Curriculum Design for Part-Time Study in Microwave Engineering Tinus Stander ¹ ¹ University of Pretoria
17:30 – 17:50	EuMC18-5 Development of Flexible & Quasi-Optically Transparent CPW Antennas for 5G by Meshing Construction Maxime WAWRZYŃIAK ¹ , Julien Bras ² , Aurore Denneulin ¹ , Tan-Phu Vuong ¹ ¹ Univ. Grenoble Alpes, Grenoble INP, CNRS, IMEP LaHC, ² Univ. Grenoble Alpes, CNRS, Grenoble INP, LGP2, F-38000 Grenoble, France	EuMC19-5 A Fully Integrated Conductive and Dielectric Additive Manufacturing Technology for Microwave Circuits and Antennas Mengze Li ¹ , Yang Yang ¹ , Yungpeng Zhang ² , Francesca Iacopi ¹ , Shlomit Ram ¹ , Jaim Nulman ¹ ¹ University of Technology Sydney, ² University of Electronic Science and Technology of China, ³ Nano Dimension	EuMC20-5 Scattering of Surface Waves by a Discontinuity in Surface Impedance Tobias Schachl ¹ , Anas Al Rawi ² , Mike Payne ¹ ¹ University of Cambridge, ² BT Group plc	EuMW02-5 Challenges of First-Time Lecturing of an RF/ Microwave Engineering Course in a Kenyan University Shamim Omar Nassar ¹ ¹ RAF International University

TUESDAY 16:10 – 17:50

ROOM	Polar	
	<div><div><div><div><div><div></div><div>EuMIC16</div><div>EuMIC Closing Session</div></div></div><div><div>Chairs: François Deborgies¹, EuMIC Chair and Domine Leenaerts², EuMIC TPC Chair</div><div>Co-chairs: Stefan Heinen³, EuMIC Co-Chair and Christian Fager⁴, EuMIC TPC Co-Chair</div><div>¹ESA-ESTEC, ²NXP, ³RWTH Aachen University, ⁴Chalmers University of Technology</div></div></div></div></div>	
<div><div>16:10</div><div>16:20</div></div>	<div>Awards Ceremony</div> <div>Marion Matters-Kammerer</div> <div>Awards and Prizes Chair</div> <div>EuMIC Prize</div> <div>EuMIC Young Engineer Prize</div> <div>GAAS[®] Association Student Fellowships</div>	<div><div>17:00</div><div>17:40</div></div> <div>MetOp-SG mm-Wave Instruments and Technologies</div> <div>Ville Kangas</div> <div>Arctic Weather Satellite Project Manager, European Space Agency, The Netherlands</div>
<div><div>16:20</div><div>17:00</div></div>	<div>Radio ICs for Future Wireless Networks</div> <div>Igor Tasevski,</div> <div>Vice President & Head of Product Development Unit Radio, Ericsson, Sweden</div> <div>Stretching beyond traditional mobile access, wireless networks is on a quest to transform connectivity, as we know it today. With the ambition to provide data sharing anywhere at any time, for anyone and anything, the implementation challenges are demanding. Emerging RF technologies for 5G, such as MIMO and scaled phased arrays have reached a significant level of maturity, enabling product deployments and standards completion. First generations of millimeter-wave Radio IC are already deployed in products but improvements regarding power consumption, size and functionality are in need to facilitate even more cost effective deployments. Applications and use cases vary between geographies, however the trend is clear - phased arrays, massive MIMO, and millimeter-wave have significantly changed the way we build wireless networks for the future. The presentation will provide an overview of challenges and technology choices in the areas of advanced Radio IC development and antenna integration for 3GPP radio access applications. It will also reflect on various market dynamics and industry trends. Technology considerations for Radio HW research and emerging 6G application trials will be discussed. The emphasis is on projects where new RF capabilities are key differentiators.</div>	<div>The payload complement of MetOp Second Generation (MetOp-SG) includes three passive radiometers, the Microwave Sounder (MWS) on Satellite A, the Microwave Imager (MWI) and Ice Cloud Imager (ICI) on Satellite B. In total MWS, MWI and ICI provide 63 channels ranging from 18.7 GHz up to 664 GHz. During MetOp-SG Phase 0 (2007 – 2008), several challenges in the end-user requirements were identified, requiring technology developments. Channels up to 664 GHz were under consideration for ICI-Europe did not have Schottky technology available up to 664 GHz, even though developments themselves had started already long time ago (already early 90's for planar schottky). Noise performance requirements necessitated use of very low noise amplifiers (LNA) at frequencies up to 230 GHz – Europe did not have such technology available up to 230 GHz, although small gate length III-V HEMT process was available. Although technologies themselves were not available, end-user requirements and needs were very clear. Therefore Requirement specifications could be clearly established and Specific MetOp-SG developments could be then implemented. The speech will explain the technology development logic and history and explains how this development was done tightly together with the instrument design. The results achieved during the technology developments will be described, including qualification test results. Last an overview of the current status of the instruments and technology will be given and also an outlook on how the developments done will be used in future satellite missions.</div>
	<div><div>17:40</div><div>17:50</div></div> <div>Closing Remarks and Invitation to EuMIC 2021 in London</div> <div>François Deborgies, Chris Clifton¹</div> <div>¹EuMIC 2021 Chair</div>	

WEDNESDAY

						
Room	08:30 – 10:10	10:50 – 12:30		13:50 – 15:30	16:10 – 17:50	EVENING PROGRAMME
Progress				W-14 Automotive Radar Networks and Sensor Fusion		
Mission 1		EuRAD02 Dual Use & Waveform Design		EuRAD04 Doppler Processing Techniques for Low Reflectivity Targets	EuRAD06 Emerging & Industrial Applications	
Mission 2	EuMC21 Special Antenna Systems	EuMC27 [Focussed Session] Emerging Microwave Technology: Asia-Pacific		EuMC33 Advances on RF Power Amplifier Behavioural Modelling	EuMC39 Solid State High Power Amplifiers for Satellite and Radar Applications	
Quest		EuRAD03 Design and Calibration Concepts for Advanced Radar Systems		EuRAD05 Radar Circuits and Systems	EuRAD07 Radar Scenario Simulations	
Expedition	EuMC22 Novel Circuits Solutions for Energy Transfer in the Near-Field and Far-Field	EuMC28 Novel Wireless Power Transfer and Energy Harvesting Systems		EuMC34 Recent Advances in RFID and IoT Sensors	EuMC40 [Focussed Session] Emerging Antenna Technologies for RFID	
Polar	EuRAD01 EuRAD Opening Session					
Auditorium	EuMC23 [Focussed Session] Innovative Antennas for Cubesat Platforms	DSS Forum Space Situational Awareness	DSS Forum Strategy Analytics Lunch	DSS Forum Space Situational Awareness		DSS Forum Cocktail Reception
Spark	S-08 High Power Amplification for Space Applications			EuMC35 Integrated Antennas	EuMC41 SATCOM and mmWave Antennas	
Flash	EuMC24 Additive Manufacturing and Emerging Materials for mmWave Applications	EuMC29 Reconfigurable Planar Passive Components		EuMC36 Transmission Lines and Passive Components	EuMC42 Planar Power Dividers/ Combiners	
Glow		EuMC30 Non-Planar Filters		EuMC37 Non-Planar Filters and Devices	EuMC43 Non-Planar Devices and Systems	
Beam	EuMC25 Metamaterials for Circuits and Sensors	EuMC31 Frequency Selective Surfaces, Reflectors and Metamaterial Antennas		EuMC38 Metasurfaces and FSSs Applications	EuMC44 [Special Session] Silicon-Based Ka-Band Massive MIMO Systems	
Media arena	EuMC26 1-Minute Poster Pitch (09:40 - 10:10)	Career Platform [Special Session] Industry Market and Professional Opportunities	IEEE Young Professionals	Career Platform Startup Panel		
Fluor	S-04 Quantum Computing for Electrical Engineers					
Shuttle		IEEE Young Professionals				
Round control		Career Platform Career Lounge: Meet Jobs, Build Careers				
loopbrug	Career Platform Company Wall and Job Wall					
Juliana 2	W-12 High-Efficiency Linear Power Amplifiers for High Bandwidth, High PAR Signals					
Hall 1	Student Design Competition Detect a Drone / Build (a part of) an Amplifier)		EuMC32 Interactive Poster Session	Student Design Competition Detect a Drone / Build (a part of) an Amplifier		
Off-site						Microwave Nightfever 20.00 - 24.00
<div><div>EuMW</div><div>EuMC</div><div>EuRAD</div><div>EuMIC</div><div>Student Activity</div><div>EuMIC/EuMC</div><div>EuMC/EuRAD</div></div>						

EuMW

EuMC

EuRAD

EuMIC

Student Activity

EuMIC/EuMC

EuMC/EuRAD

WEDNESDAY 08:30 – 10:10

	Mission 2	Expedition	Auditorium	Flash
	EuMC21 Special Antenna Systems <div>Chair: Alexandros Feresidis¹</div> <div>Co-Chair: Lorenz-Peter Schmidt²</div> <div>¹University of Birmingham, ²Uni Erlangen</div>	EuMC22 Novel Circuits Solutions for Energy Transfer in the Near-Field and Far-Field <div>Chair: Yi Wang¹</div> <div>Co-Chair: Giuseppina Monti²</div> <div>¹University of Birmingham, ²University of Salento</div>	EuMC23 [Focussed Session] Innovative Antennas for Cubesats and Small-Space Platforms <div>Chair: Nelson Fonseca¹</div> <div>Co-Chair: Mauro Ettorre²</div> <div>¹European Space Agency, ESA/ESTEC, ²University of Rennes 1</div>	EuMC24 Additive Manufacturing and Emerging Materials for mmWave Applications <div>Chair: Andrei Muller¹</div> <div>Co-Chair: Chris Clifton²</div> <div>¹École polytechnique fédérale de Lausanne (EPFL), Nanolab, ²Sony Europe B V</div>
08:30 – 08:50	EuMC21-1 Low-Loss Electro-Mechanical Beam Steering of High Gain THz Antenna <div>Muhammad Rabbani¹, James Churm¹, Alexandros Feresidis¹</div> <div>¹University of Birmingham</div>	EuMC22-1 Input-Power-Synchronous Adaptively Biased Wide-Dynamic-Range High-Efficiency Rectifier with Zero-Threshold GaAs HEMTs <div>Jun Yamazaki¹, Ryo Ishikawa¹, Kazuhiko Honjo¹</div> <div>¹The University of Electro-Communications</div>	EuMC23-1 Design of a Dual Circularly Polarized Elliptical Feed Horn for CubeSat Reflectarray Applications <div>Mustafa Murat Bilgiç¹, Min Zhou¹, Peter Meincke¹, Andreas Ericsson¹, Erik Jørgensen¹, Michael Lumholt¹</div> <div>¹TICRA</div>	EuMC24-1 High Performance Cooling Solution for Highly Integrated RF-PCBs <div>Jens Leiss¹</div> <div>¹IMST GmbH</div>
08:50 – 09:10	EuMC21-2 A Tactical Broadband High Power Fork-Shaped Monopole Antenna <div>Ahmad Enadeddin¹, Abbas Akbarzadeh-Jahromi², B. L. G. Jonsson¹</div> <div>¹KTH - Royal Institute of Technology, ²University of Tehran</div>	EuMC22-2 Automatically switchable two-way rectifier <div>Massimo Del Prete¹, Diego Masotti², Alessandra Costanzo²</div> <div>¹Datalogic S.p.a., ²University of Bologna</div>	EuMC23-2 Compact Reconfigurable Antenna for Nanostallites <div>Simone Genovesi¹, Francesco Alessio Dicandia²</div> <div>¹University of Pisa, ²Greenwaves</div>	EuMC24-2 Monolithic SLA-Based Capacitive-ly-Loaded High-Q Coaxial Resonators and Bandpass Filters <div>Kunchen Zhao¹, Dimitra Psychogiou¹</div> <div>¹University of Colorado at Boulder</div>
09:10 – 09:30	EuMC21-3 Passive Antenna Systems Embedded into a Load Bearing Wall for Improved Radio Transparency <div>Lauri Vähä-Savo¹, Alejandra Garrido Atienza¹, Christian Cziezerski¹, Mikko Heino¹, Katsuyuki Haneda¹, Clemens Icheln¹, Xiaoshu Lü¹, Klaus Viljanen¹</div> <div>¹School of Electrical Engineering, Aalto University, ²University of Vaasa, ³School of Engineering, Aalto University.</div>	EuMC22-3 A High Sensitivity RF Energy Harvester for Diverse Environments <div>IBRAHIM KAGAN AKSOYAK¹, ADAMANTIA CHLET-SOU¹, John Papapolymerou², Ahmet Ulusoy¹</div> <div>¹Karlsruhe Institute of Technology, ²Michigan State University</div>	EuMC23-3 3D Printed Ceramic Low-Profile GNSS Antenna for SmallSats <div>Maxime Romier¹</div> <div>¹ANYWAVES</div>	EuMC24-3 3D Printed Double Ridged Waveguide Rotman Lens System <div>Karina Hoel¹, Nathan Jastram², Stein Kristoffersen¹, Dejan Filipovic²</div> <div>¹Norwegian Defence Research Establishment (FFI), ²University of Colorado at Boulder</div>
09:30 – 09:50	EuMC21-4 Compact Dual and Wide Band Monopole-Like Antenna Based on SRR for WLAN Applications <div>Nilton Santos-Valdivia¹, Patricia Castillo-Aranibar¹, Alejandro García-Lampérez², Daniel Segovia-Vargas²</div> <div>¹Universidad Católica San Pablo, ²Universidad Carlos III de Madrid</div>	EuMC22-4 Proposal and Demonstration of Power Conversion-Chip/Amplifier Integrated Antenna <div>Shinji Hara¹, Asako Suzuki¹, Hiroshi Hirayama²</div> <div>¹Nagoya University, ²Nagoya Institute of Technology</div>	EuMC23-4 Compact End-Fire Antenna Designs for PicoSat Integration and Other Small Satellite Missions <div>Victoria Gomez-Guillamon Buendia¹, Symon K. Podilchak¹, Salvatore Liberto¹, Dimitris E. Anagnostou¹, George Goussetis¹, Constantin Constantinides¹, Tom Walkinshaw¹, Maarten van der Vorst¹</div> <div>¹Heriot-Watt University, ²The University of Edinburgh, ³Alba Orbital, ⁴ESA-ESTEC</div>	EuMC24-4 Investigation of a Composite Embedded RF Passive Devices <div>Grzegorz Beziuk¹, Kamran Ghorbani¹, Thomas Baum², Kelvin Nicholson²</div> <div>¹RMIT University, ²DST Group, Port Melbourne</div>
09:50 – 10:10	EuMC21-5 Compact Pattern-Switching Patch Antenna <div>Abdullah Haskou¹, Anthony Pesin¹, Ali Louzir¹</div> <div>¹InterDigital, Inc.</div>			EuMC24-5 A Minimally Invasive Monitoring Concept for Plasma-Assisted Surface Treatments in PET Bottles <div>Dennis Pohle¹, Felix Mitschker¹, Jonathan Jenderny¹, Marcel Rudolph¹, Christian Schulz¹, Peter Awakowicz¹, Ilona Rolles¹</div> <div>¹Ruhr University Bochum</div>

WEDNESDAY 08:30 – 10:10

	Beam
	EuMC25 Metamaterials for Circuits and Sensors <div>Chair: Ferran Martín¹</div> <div>Co-Chair: Francisco Medina²</div> <div>¹Universitat Autònoma de Barcelona, ²Universidad de Sevilla</div>
08:30 – 08:50	EuMC25-1 Glide Symmetry to Improve the Bandgap Operation of Periodic Microstrip Defected Ground Structures <div>Boules A. Mouris¹, Armando Fernández-Prieto², Ragnar Thobaben¹, Jesús Martel², Francisco Mesa², Oscar Quevedo-Teruel¹</div> <div>¹KTH Royal Institute of Technology, ²Universidad de Sevilla</div>
08:50 – 09:10	EuMC25-2 Differential CRLH Coupled-Line Unit Cell with High Common Mode Rejection Ratio <div>Mariam Ateyya¹, Amr Safwat¹</div> <div>¹Faculty of Engineering, Ain Shams University</div>
09:10 – 09:30	EuMC25-3 Capacitively-Loaded Slow-Wave Transmission Lines for Sensitivity Improvement in Phase-Variation Permittivity Sensors <div>Jan Coromina¹, Jonathan Muñoz-Enano¹, Paris Véllez¹, Amir Ebrahimi¹, James Scott¹, Kamran Ghorbani¹, Ferran Martin¹</div> <div>¹Universitat Autònoma de Barcelona, ²RMIT University</div>
09:30 – 09:50	EuMC25-4 Implementation of K-Band Mushroom Metamaterial Filter for Satellite Applications <div>Arash Arsanjani¹, Luke Robins¹, Reinhard Teschl¹, Wolfgang Bosch¹</div> <div>¹Graz University of Technology</div>
09:50 – 10:10	EuMC25-5 Compact Size Wideband 0-dB Microstrip Forward Coupler <div>Mohamed Elsheikh¹, Amr Safwat²</div> <div>¹Ain Shams University, ²Faculty of Engineering, Ain Shams University</div>

WEDNESDAY 08:30 – 10:10

ROOM	Polar	
	EuRAD01	
	EuRAD Opening Session	
	Chair: Mayazzurra Ruggiano ¹ , EuRAD Chair	
Co-Chair: Jacco de Wit ² , EuRAD TPC Chair		
¹ Thales Nederland B.V., ² TNO		
08:30 - 08:40	Welcome Address: Opening of the European Radar Conference 2020	
Mayazzurra Ruggiano		
EuRAD Chair		
08:40 - 09:20	Millimeter-Wave and Terahertz Radar Instruments for Planetary, Cometary, Earth Observations, and Security Applications	
Goutam Chattopadhyay ¹		
¹ NASA-Jet Propulsion Laboratory, California Institute of Technology, US		
<p>Radar instruments play a critical role in NASA's planetary, cometary, and Earth observing missions. Sometimes they guide space crafts to the surface of another planet (such as Mars) or a comet and some other times they are used for answering fundamental scientific questions by exploring cometary and planetary bodies, including our own Earth. Until recently, the majority of NASA's radar instruments were below 100 GHz. However, in recent years, there has been a lot of interest in using millimeter-wave and terahertz radars to answer critical scientific questions. One such instrument developed by us is a 183 GHz (G-Band) differential absorption radar providing a new measurement capability of simultaneously measuring water vapor and ice content in clouds in Earth's atmosphere with high precision and spatial resolution. Profiling of water vapor within clouds is a critical requirement to address the key unsolved science questions regarding the processes regulating cloud lifecycle and the transport of water vapor by convection. Another instrument we developed is a 90 GHz (W-Band) frequency modulated continuous wave (FMCW) radar for understanding the origin, dynamics, and evolution of jets from a comet. When deployed, this will provide clues to the formation of comets and therefore the early stages of the Solar System. The same W-band radar is also being planned for investigating plumes on icy moons, such as Europa and Enceladus, which will shed light on subsurface processes and structure on these potentially life-harboring bodies. We are also building a revolutionary in situ radar instrument for short-range mapping of near-surface atmospheric water vapor on Mars. This highly compact and low-power differential absorption radar operates near the 557 GHz water absorption line to measure absolute humidity along its beam path with</p>		
as good as few-ppm level accuracy. This instrument allows us, for the first time, range-resolved absolute humidity estimates on Martian surface. Apart from science instrument radars, we also developed a 670 GHz FMCW radar for imaging at stand-off distances for security applications.		
09:20 - 10:00	One Step Ahead of the Enemy: Innovative Radar Solutions are Decisive for Military Use	
Jorn Bleijs ¹		
¹ Netherlands Defence Materiel Organisation, The Netherlands		
<p>High-quality kill chains are a requirement for the military to timely detect and recognize potential threats and be able to neutralize them before they can successfully complete their mission. Radar technology and effective sensor-weapon integration are essential in this respect. Efforts in these areas resulted in a Dutch configuration to support anti-air warfare operations during the last four decades. This Dutch configuration always has been at the forefront of innovations.</p> <p>Threats are evolving. Think of ballistic missiles and supersonic missiles. Continuous development is necessary to keep ahead of the threat and implement new functionality/capability. For this continuous development, we defined a roadmap for radar and integrated sensor suites for the Dutch armed forces. Various studies are being performed together with TNO and Thales Netherlands collaborating in the Dutch Radar Centre of Expertise (D-RACE), and also with international partners like the US Navy, in order to obtain a future-proof Integrated Air and Missile Defence capability. Multi-band sensor integration will provide the Royal Netherlands Navy with the operational flexibility required to effectively counter future threats.</p> <p>This keynote will elaborate on the importance of radar and integrated sensor suites for future naval operations and the solutions that the Royal Netherlands Navy is aiming for.</p>		

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EYE HOTEL – ★★★ Wijde Begijnestraat 1-4, 3512 AW Utrecht	20 minute by walk	Prepay Flexible	€ 168,- € 183,-	RO RO
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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; however, breakfast is available at the hotel at an extra cost

B&B: Room rate includes breakfast.

WEDNESDAY 10:50 – 12:30

	Mission 2	Expedition	Flash	Glow
	EuMC27 [Focussed Session] Emerging Microwave Technologies in Asia-Pacific Region Chair: Kamran Ghorbani ¹ Co-Chair: Luca Perregrini ² ¹ RMIT University, ² University of Pavia	EuMC28 Novel Wireless Power Transfer and Energy Harvesting Systems Chair: Naoki Shinohara ¹ Co-Chair: Jiafeng Zhou ² ¹ Kyoto University, ² University of Liverpool	EuMC29 Reconfigurable Planar Passive Components Chair: Petronilo Martin-Iglesias ¹ Co-Chair: Anthony Ghiotto ² ¹ ESA ESTEC, ² University of Bordeaux INP	EuMC30 Non-Planar Filters Chair: Richard Snyder ¹ Co-Chair: Cristiano Tomassoni ² ¹ RS Microwave, ² University of Perugia
10:50 – 11:10	EuMC27-1 A Polarization-Insensitive Frequency Selective Surface Based Rasorber with Narrow-Band Absorption Between Two Transmission Bands Mehran Manzoor Zargar ¹ , Archana Rajput ¹ , Kushman-da Saurav ¹ , Shibani Kishen Koul ² ¹ INDIAN INSTITUTE OF TECHNOLOGY JAMMU, ² INDIAN INSTITUTE OF TECHNOLOGY DELHI	EuMC28-1 An Electronically Steerable Millimeter-Wave Reflectarray for Wireless Power Delivery J. Gabriel Buckmaster ¹ , Thomas H. Lee ¹ ¹ Stanford University	EuMC29-1 V02-Based Transmit/Receive Switch Junwen Jiang ¹ , Raafat R. Mansour ¹ ¹ University of Waterloo	EuMC30-1 Compact On-Board Dielectric Filters and Diplexers for High-Power Satellite Applications Luca Pelliccia ¹ , Fabrizio Cacciamani ¹ , Paolo Vallerotonda ¹ , Alessandro Cazzorla ¹ , Francesco Aquino ¹ , Roberto Sorrentino ¹ , Walter Steffè ² , Cristiano Tomassoni ¹ , Jaione Galdeano ¹ , Petronilo Martin-Iglesias ¹ INDUSTRIAL KEYNOTE ¹ RF Microtech Srl, ² Thales Alenia Space Italia, ³ University of Perugia, ⁴ ESA ESTEC
11:10 – 11:30	EuMC27-2 Efficient Design and Experimental Verification of High-Q MPhC BPF for mmWave Applications Erika Katsuno ¹ , Chun-Ping Chen ¹ , Tetsuo Anada ¹ , Shigeki Takeda ² , Zhewang Ma ³ ¹ Kanagawa University, ² Antenna Giken Co., Ltd., ³ Saitama University	EuMC28-2 Evaluation of Simultaneous Wireless Information and Power Transfer with Distributed Antennas Ibrahim Can Sezgin ¹ , Jose-Ramon Perez-Cisneros ¹ , Christian Fager ¹ ¹ Chalmers University of Technology	EuMC29-2 Low-Loss K-Band Photoconductive Switches in SIW Technology Elena Shepeleva ¹ , Mikhail Makurin ¹ , Artem Vilenskiy ² ¹ Samsung R&D Institute Russia, ² Chalmers University of Technology	EuMC30-2 Hybrid Inline TE/TM Mode Dielectric Resonator Filters with Wide Spurious Free Range and Controllable Transmission Zeros Patrick Boe ¹ , Daniel Miek ² , Fynn Kamrath ¹ , Michael Höft ¹ ¹ Christian-Albrechts-Universität zu Kiel
11:30 – 11:50	EuMC27-3 Compact SIW Based Wideband Phase Shifter Loaded with Square Complementary Omega (SCO) Array Karthik Thothathri Chandrasekaran ¹ , Arokiaswami Alphones ¹ , Karim Muhammad Faeyz ¹ , Nasimuddin Nasimuddin ¹ ¹ Nanyang Technological University, ² Agency for Science and Technology (A*STAR)	EuMC28-3 An Ambient-Insensitive Battery-Less Wireless Node for Simultaneous Powering and Communication Giacomo Paolini ¹ , Diego Masotti ¹ , Marco Guermandi ¹ , Mazen Shanawani ¹ , Luca Benini ¹ , Alessandra Costanzo ¹ ¹ University of Bologna	EuMC29-3 Reconfigurable Substrate Integrated Waveguide Circuits Using Dielectric Fluids Matthew Brown ¹ , Carlos Saavedra ¹ ¹ Queen's University	EuMC30-3 Narrow-Band and Low-loss Bandpass Filter for 5G Built of Silica-Based Post-Wall Waveguide Yusuke Uemichi ¹ , Shinnosuke Tsuchiya ¹ , Toru Yamaguchi ¹ , Xu Han ¹ , Osamu Nukaga ¹ , Shuhei Amakawa ¹ , Ning Guan ¹ ¹ Fujikura Ltd., ² Hiroshima University
		EuMC28-4 A 24 GHz Unit Rectenna for Millimeter-Wave Power Transmission Application Hye-Won Jo ¹ , Sol Kim ¹ , ByungKwon Ahn ¹ , Hyunyoung Cho ¹ , Jong-Won Yu ¹ ¹ Korea Advanced Institute of Science and Technology	EuMC29-4 Wideband PCB-to-Connectors Impedance Adapters for Liquid Crystal-Based Low-Loss Phase Shifters Jinfeng Li ¹ ¹ Imperial College London	EuMC30-4 A New Directional Filter Design Huairan Yi ¹ , Zhengxiang Ma ¹ ¹ Futurewei Technologies
	EuMC28-5 Loop Antenna Array System with Simultaneous Operation of OAM Multiplex Communication and Wireless Power Transfer Wataru Wada ¹ , Ryo Ishikawa ¹ , Akira Saitou ¹ , Hisanosuke Miyake ¹ , Haruki Kikuchi ¹ , Hiroshi Suzuki ¹ , Kazuhiko Honjo ¹ ¹ The University of Electro-Communications	EuMC29-5 High-Performance Compact Reflection Type Phase Shifter Operating at 2 GHz Using a Transdirectional Coupler Olivier Occello ¹ , Leonel Tiague ¹ , Marc Margalef-Rovira ¹ , Loïc Vincent ² , Fabien Ndagijimana ³ , Philippe Ferrari ¹ ¹ Univ. Grenoble Alpes, RFIC-Lab, ² Univ. Grenoble Alpes, CIME, ³ Univ. Grenoble Alpes, G2ELab	EuMC30-5 Design of an X/Ku Band Coaxial Overmoded Waveguide Diplexer for High Power Microwaves Jiawei Li ¹ , Guangjian Deng ¹ , Letian Guo ¹ ¹ Northwest Institute of Nuclear Technology	

WEDNESDAY 10:50 – 12:30

	Beam	Mission 1	Quest
	EuMC31 Frequency Selective Surfaces, Reflectors and Metamaterial Antennas Chair: Christian Person ¹ Co-Chair: Thomas Dallmann ² ¹ Telecom Bretagne, ² Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR	EuRAD02 Dual Use & Waveform Design Chair: Stephen Harman ¹ Co-Chair: R. Firat Tigrek ² ¹ Aveillant Limited, ² Eindhoven University of Technology (TU/e)	EuRAD03 Design and Calibration Concepts for Advanced Radar Systems and Subsystems Chair: Peter Gardner ¹ Co-Chair: Claire Migliaccio ² ¹ The University of Birmingham, ² Université Côte d'Azur
10:50 – 11:10	EuMC31-1 Design of a Polarization Rotating FSS for Polarimetric Automotive Radar Measurements Arvid Sims ¹ , Tim Freialdenhoven ² , Thomas Dallmann ² ¹ Keysight Technologies, ² Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR	EuRAD02-1 Peak Sidelobe Level Based Waveform Optimization for OFDM Joint Radar-Communications Musa Furkan Keskin ¹ , R. Firat Tigrek ² , Canan Aydogdu ¹ , Franz Lampel ³ , Henk Wymeersch ¹ , Alex Alvarado ² , Frans M.J. Willems ³ ¹ Chalmers University, ² Eindhoven University of Technology (TU/e)	EuRAD03-1 An overarching strategy for radar antenna design, optimization, and system integration Giorgia Zucchelli ¹ , Rick Gentile ¹ INDUSTRIAL KEYNOTE ¹ The Mathworks
11:10 – 11:30	EuMC31-2 A Ka-Band Polarization Rotating Multilayer Reflector for Polarimetric Radars Tim Freialdenhoven ¹ , Thomas Dallmann ¹ ¹ Fraunhofer FHR	EuRAD02-2 Adaptive Filter Design for Simultaneous In-Band Full-Duplex Communication and Radar Seyed Ali Hassani ¹ , Barend van Liempd ² , André Bourdoux ³ , François Horlin ¹ , Sofie Pollin ⁴ ¹ KU Leuven, ² imec, Leuven, ³ ULB, ⁴ KULeuven	EuRAD03-2 Angle-Dependent Mutual Coupling in Antenna Arrays by Electromagnetic Modelling of Sub-Volumes Ricard Grove ¹ , Poul Leth-Espensen ² , Jørgen Dall ¹ ¹ DTU Space, ² Terma A/S
11:30 – 11:50	EuMC31-3 Gradient Optimization on Third Order Bandpasses for a 24 GHz Metasurface Lens Christoph Kohlberger ¹ , Gernot Hueber ¹ , Christoph Wagner ² , Andreas Stelzer ² ¹ Silicon Austria Labs, ² DICE Danube Integrated Circuit Engineering GmbH & Co. KG, ³ JKU Linz	EuRAD02-3 Design and Measurements of MSK-LFM RadCom System Husileng Bao ¹ , Ziemann Arvid ¹ , Zhongxia Simon He ² ¹ Chalmers University of Technology, ² SenWellen (Shenzhen) Communications Technologies Ltd. Co.	EuRAD03-3 Phase Noise Investigation for a Radar System with Optical Clock Distribution Stephan Kruse ¹ , Meysam Bahmanian ¹ , Pascal Kneuper ² , Christian Kress ³ , Heiko Gustav Kurz ² , Thomas Schneider ¹ , J. Christoph Scheytt ¹ ¹ Heinz Nixdorf Institute, University of Paderborn, ² Volkswagen Aktiengesellschaft, ³ Technische Universität Braunschweig
11:50 – 12:10	EuMC31-4 FR-4 PCB Process-based mmWave Phased Array Antenna Using Planar High-Impedance Surfaces Jae-Young Lee ¹ , Jaehyun Choi ¹ , Dongkwon Choi ¹ , Youngno Youn ¹ , Junho Park ¹ , Wonbin Hong ¹ ¹ Pohang University of Science and Technology (POSTECH)	EuRAD02-4 An Ultrahigh-Resolution Continuous Wave Synthetic Aperture Radar with Photonic-Assisted Signal Generation and Dechirp Processing Ruoming Li ¹ , Wangzhe Li ¹ , Bingnan Wang ¹ , Zhilei Wen ¹ , Yuchen Luan ¹ , Zhenli Yang ¹ , Yang Xing ¹ , Jiyao Yang ¹ , Zhenwei Mo ¹ ¹ Institute of Electronics of the Chinese Academy of Sciences	EuRAD03-4 Increasing the Efficiency and Robustness of Angular Radar Calibration by Exploiting Phase Symmetry André Dürr ¹ , Matthias Linder ¹ , Christian Waldschmidt ¹ ¹ Ulm University
12:10 – 12:30	EuMC31-5 An Equivalent Circuit Diagram for a Hexagonal Ring Frequency Selective Surface Andreas Röhrner ¹ , Georg Strauss ¹ , Thomas F. Eibert ² ¹ Munich University of Applied Sciences, ² Technical University of Munich	EuRAD02-5 Discrete-Phase Sequence Design with Stopband and PSL Constraints for Cognitive Radar Mohammad Alaae-Kerahroodi ¹ , Sumit Kumar ² , Bhavani Shankar Mysore Rama Rao ¹ , Kumar Vijay Mishra ¹ ¹ Interdisciplinary Centre for Security, Reliability and Trust, ² University of Luxembourg	EuRAD03-5 Phase Control Method for Sub-sampling PLL by Varying Phase and Frequency of Clock Signal of S/H Circuit Osamu Wada ¹ , Hiroyuki Mizutani ¹ , Hideyuki Nakamizo ¹ ¹ Mitsubishi Electric Corporation

WEDNESDAY 12:30 – 14:20

<div>Hall 1</div> <div>EuMC32</div> <div>EuMC Interactive Poster Session 2</div> <div>Chair: Jan Geralt bij de Vaate¹</div> <div>Co-Chair: Mark Oude Alink²</div> <div>¹ASTRON, ²University of Twente</div>		<div>EuMC32-11</div> <div>Precision Phase Shift Measurement System in the Frequency Range of 1-18 GHz</div> <div>Anton Widarta¹</div> <div>¹National Metrology Institute of Japan NMIJ/AIST</div>	<div>EuMC32-17</div> <div>Gain Enhancement Technique for On-Chip Monopole Antenna</div> <div>Carmine Mustacchio¹, Luigi Boccia¹, Emilio Arnieri¹, Giandomenico Amendola¹</div> <div>¹Università della Calabria</div>
<div>EuMC32-1</div> <div>Photonic Microwave Oscillator based on an Ultra-stable-laser and an Optical Frequency Comb</div> <div>Michele Giunta¹, Maurice Lessing¹, Jialiang Yu², Marc Fischer³, Matthias Lezius³, Xiaopeng Xie³, Giorgio Santarelli⁴, Yann Le Coq⁵, Ronald Holzwarth¹</div> <div>¹Menlo Systems GmbH, ²Physikalisch-Technische Bundesanstalt (PTB), ³State Key Laboratory of Advanced Optical Communication Systems and Networks, ⁴LP2N, IQCS-CNRS-Universités de Bordeaux, ⁵LNE-SYRTE, Observatoire de Paris</div>	<div>EuMC32-6</div> <div>THz Wave Scattering by Double-Layer Infinite Graphene Strip Grating Without One Strip in Every Layer</div> <div>Mstyslav Kaliberda¹, Leonid Lytvynenko², Sergey Pogarsky¹</div> <div>¹V.N.Karazin Kharkiv National University, ²Institute of Radio Astronomy of the National Academy of Sciences of Ukraine</div>	<div>EuMC32-12</div> <div>Aperture Synthesis Method to Investigate on the Reflection Properties of Typical Road Surfaces</div> <div>Jochen Jebramcik¹, Ilona Rolfes¹, Jan Barowski¹</div> <div>¹Ruhr-University Bochum</div>	<div>EuMC32-18</div> <div>A Single Smart Cut POI Substrate Design for UHF, L and S Band Filters</div> <div>Eric Budaud¹, Thierry Laroche¹, Vincent Barec¹, Alexandre Clairet¹, Marie Bousquet¹, Florent Bernard¹, Raphaël Caulmilone¹, Eric Michoulier¹, Emilie Courjon¹, Isabelle Huyet¹, Brice Tavel¹, Gabrielle Aspar¹, Yann Lamy¹, Ajit Defrasne¹, Alexandre Raveski¹, Sylvain Ballandras¹, Christophe Didier¹</div> <div>¹SOITEC Grenoble, ²frecInsys SASU, ³CEA LETI</div>
<div>EuMC32-2</div> <div>Design and Development of 3.5 THz Schottky-Based Fundamental Mixer</div> <div>Divya Jayasankar¹, Vladimir Drakinskiy¹, Mats Myremark², Peter Sobis³, Jan Stake²</div> <div>¹Research Institutes of Sweden, ²Chalmers University of Technology, ³OmniSys Instruments</div>	<div>EuMC32-7</div> <div>Evaluation of Twin Silver Nanotubes as a Possible Sensor of the Charged Particle Beam Position</div> <div>Daria Herasymova¹</div> <div>¹Institute of Radio-Physics and Electronics NASU</div>	<div>EuMC32-13</div> <div>Hybrid Beamforming Analysis Based on MIMO Channel Measurements at 28 GHz</div> <div>Joerg Eisenbeis¹, Magnus Tingulstad¹, Nicolai Kern¹, Zsolt Kollár², Jerzy Kowalewski¹, Pablo Ramos López³, Thomas Zwick¹</div> <div>¹Karlsruhe Institute of Technology (KIT)</div>	<div>EuMC32-19</div> <div>A Dynamic CAD Model for Phase Change Material (PCM) Switches</div> <div>Ines Bettoumi¹, Cyril Guines¹, Pierre Blondy¹</div> <div>¹XLIM - CNRS - Université de Limoges</div>
<div>EuMC32-3</div> <div>A 122 GHz On-Chip 3-Element Patch Antenna Array with 10 GHz Bandwidth</div> <div>Vincent Lammert¹, Mohamed Hamouda², Robert Weigel¹, Vadim Issakov¹</div> <div>¹FAU Erlangen-Nuremberg / Infineon Munich, ²Infineon Technologies AG, ³FAU Erlangen-Nuremberg, ⁴Infineon Technologies AG / OVGU Magdeburg</div>	<div>EuMC32-8</div> <div>Scattering of Natural Waves of Planar Dielectric Waveguide with PEC Wall by Graphene Strip Grating in THz Range</div> <div>Mstyslav Kaliberda¹, Leonid Lytvynenko², Sergey Pogarsky¹</div> <div>¹V.N. Karazin Kharkiv National University, ²Institute of Radio Astronomy of the National Academy of Sciences of Ukraine</div>	<div>EuMC32-14</div> <div>Angle-Shifted Conformal Array with Multibeam Folded Ground Structures for Wide Coverage</div> <div>Young-Jun Kim¹, Gun-Hark Noh¹, Han Lim Lee¹</div> <div>¹Chung-Ang University</div>	<div>EuMC32-20</div> <div>A Machine Learning-Based Microwave Device Model for Fully Printed V02 RF Switches</div> <div>Shuai Yang¹, Ahmad Khuroo², Weiwei Li¹, Mohammad Vaseem¹, Mohammad Hashmi¹, Atif Shamim¹</div> <div>¹King Abdullah University of Science and Technology (KAUST), ²Jamia Millia Islamia (A Central University), ³Nazarbayev University</div>
<div>EuMC32-4</div> <div>Development of Second-Harmonic Terahertz Gyrotrons with Highly Selective Cavities</div> <div>Ilya Bandurkin¹, Alexey Fedotov¹, Andrey Fokin¹, Mikhail Glyavin¹, Alexey Luchinin¹, Ivan Osharin¹, Dmitriy Radishev¹, Andrey Savilov¹, Andrei Starodubov², Yoshinori Tatematsu³</div> <div>¹Federal research center Institute of Applied Physics of the Russian Academy of Sciences (IAP RAS), ²Saratov State University, ³FIR Center, University of Fukui</div>	<div>EuMC32-9</div> <div>Optimization Algorithms for Accurate FMCW Millimeter-Wave and Terahertz Thickness Measurements</div> <div>Nina Susan Schreiner¹, Michael Bortz², Wolfgang Sauer-Greff¹, Ralph Urbansky², Fabian Friederich¹</div> <div>¹Fraunhofer Institute for Industrial Mathematics ITWM, ²Technische Universität Kaiserslautern</div>	<div>EuMC32-15</div> <div>Angle Estimation of Coherent Targets via Toeplitz Induced Compressed Matrix Method for the Bistatic MIMO Radar</div> <div>evans Baidoo¹, Jurong Hu¹, Bilguun Batbaatar¹, Benjamin Kwakye¹</div> <div>¹Hohai University</div>	<div>EuMC32-21</div> <div>Additive Manufacturing of Coplanar Transmission Lines on Alumina Substrate up to 24 GHz using Laser Assisted Selective Metallization</div> <div>Konstantin Lomakin¹, Li Wang², Alexander Job², Robert Süß-Wolf¹, Jörg Franke², Gerald Gold²</div> <div>¹Friedrich-Alexander University Erlangen-Nürnberg (FAU), ²Friedrich-Alexander Universität Erlangen-Nürnberg</div>
<div>EuMC32-5</div> <div>High Power High Efficiency 475-520 GHz Source Based on Discrete Schottky Diodes</div> <div>Diego Moro-Melgar¹, Oleg Cojocari¹, Ion Oprea¹</div> <div>¹ACST GmbH</div>	<div>EuMC32-10</div> <div>Complex Conductivity Extraction in Monolayer Graphene at Microwave Frequency by Free Space Technique</div> <div>Houssemeddine Krraoui¹</div> <div>¹ESPCI</div>	<div>EuMC32-16</div> <div>A Logarithmic Frequency-Diverse Array System for Precise Wireless Power Transfer</div> <div>Enrico Fazzini¹, Mazen Shanawani¹, Alessandra Costanzo¹, Diego Masotti¹</div> <div>¹University of Bologna</div>	

WEDNESDAY 13:50 – 15:30

	Mission 2	Expedition	Spark	Flash
	EuMC33 Advances on RF Power Amplifier Behavioural Modelling and Characterisation Chair: Gustavo Avolio ¹ Co-Chair: José Carlos Pedro ² ¹ Anteverta MW Maury Microwave, ² Universidade de Aveiro - IT	EuMC34 Recent Advances in RFID and IoT Sensors Chair: Alessandra Costanzo ¹ Co-Chair: Nuno Borges Carvalho ² ¹ University of Bologna, ² University of Aveiro / Instituto de Telecomunicações	EuMC35 Integrated Antennas Chair: Ke Wu ¹ Co-Chair: Symon K. Podilchak ² ¹ Polytechnique Montreal, ² University of Edinburgh	EuMC36 Transmission Lines and Passive Components Chair: Maurizio Bozzi ¹ Co-Chair: Bart Nauwelaers ² ¹ University of Pavia, ² KU Leuven
13:50 – 14:10	EuMC33-1 Accurate and Efficient Modulation Distortion Analysis of Active Components Jan Verspecht ¹ INDUSTRIAL KEYNOTE ¹ Keysight Technologies Inc	EuMC34-1 Intelligent Packaging for Tropical Fruit Management and Ripening Monitoring Cecilia Occhiuzzi ¹ , N. D'Uva, S. Nappi, S. Amendola, C. Gialluca, V. Chiabrando, L. Garavaglia, G. Giacalone, Gaetano Marrocco ² INDUSTRIAL KEYNOTE ¹ Unioversità di Roma "Tor Vergata", ² University of Roma Tor Vergata	EuMC35-1 Unified Integration of Self-Oscillating Mixer-Antenna for Compact Receiver Frontend Srinaga Nikhil Nallandhigal ¹ , Ke Wu ² ¹ Ecole Polytechnique de Montreal, ² POLY-GRAMES	EuMC36-1 TFLE-Thin Film Lumped Elements Reflective and Non-Reflective Filtering Solutions Rafi Hershstig INDUSTRIAL KEYNOTE
14:10 – 14:30	EuMC33-2 An AM-PM Compensation of Differential Power Amplifier using Capacitance Neutralization Takuma Torii ¹ , Masatake Hangai ¹ , Shintaro Shinjo ¹ ¹ Mitsubishi Electric Corporation	EuMC34-2 A Time Dependent Temperature Compensated Limiter for Passive Differential UHF RFID Dominik Mair ¹ , Georg Saxl ¹ , Christof Happ ¹ , Moritz Fischer ¹ , Thomas Ußmüller ¹ ¹ University of Innsbruck	EuMC35-2 Octa Cross-Slot Patch Antenna with Quad-beam Reconfigurability for 5.8 GHz Application TARUN PRAKASH ¹ , Raghvendra Kumar Chaudhary ² , Ravi Kumar Gangwar ² ¹ Indian Institute of Technology (ISM), Dhanbad, ² INDIAN INSTITUTE OF TECHNOLOGY (ISM) DHANBAD	EuMC36-2 Realization of Dual Band Matching Networks Using Cascaded Filters Farzad Yazdani ¹ , Raafat R. Mansour ¹ ¹ University of Waterloo
14:30 – 14:50	EuMC33-3 Emulation of Load Modulated Amplifiers Using Tabulated Load-Pull Data From a Single Amplifier Jose-Ramon Perez-Cisneros ¹ , William Hallberg ² , Christian Fager ¹ , Koen Buisman ¹ ¹ Chalmers University of Technology, ² Qamcom IRP Technology AB	EuMC34-3 Low-IF Interferometric Receiver Architecture for Massive-IoT Wireless Systems Intikhab Hussain ¹ , Ke Wu ² ¹ Ecole Polytechnique de Montreal, ² Polytechnique Montreal	EuMC35-3 Investigation of Integration for OAM Communication Using Loop Antenna Array and Analysis of Alignment Tolerance for Practical Use Haruki Kikuchi ¹ , Akira Saitou ¹ , Hisanosuke Miyake ¹ , Wataru Wada ¹ , Hiroshi Suzuki ¹ , Ryo Ishikawa ¹ , Kazuhiko Honjo ¹ ¹ The University of Electro-Communications	EuMC36-3 A Wideband DC Isolated Substrate Integrated Coaxial Line Transition for System Integration Satya Krishna Idury ¹ , Soumava Mukherjee ¹ ¹ Indian Institute of Technology Jodhpur
14:50 – 15:10	EuMC33-4 On the Power and Beam Dependency of Load Modulation in mmWave Active Antenna Arrays Alberto Brihuega ¹ , Matias Turunen ¹ , Lauri Anttila ¹ , Thomas Eriksson ¹ , Mikko Valkama ¹ ¹ Tampere University of Technology, ² Chalmers University of Technology	EuMC34-4 High-Accuracy 3D SAW RFID Tag Localization Using a Multi-Antenna Mobile Robot Based Synthetic Aperture Approach Pau Caldero ¹ , Matthias Gareis ² , Martin Vossiek ² ¹ Siemens Mobility GmbH, ² Friedrich-Alexander University Erlangen-Nuremberg (FAU)	EuMC35-4 High Gain Beam-Steerable Reconfigurable Antenna using Combined Pixel and Parasitic Arrays Devakumaran Subramaniam ¹ , Thennarasan Sabapathy ¹ , Muzammil Jusoh ¹ , Ping Jack Soh ¹ , Mohamed Nasrun Osman ¹ , Symon K. Podilchak ² , Dominique Schreurs ² , Callum John Hodgkinson ² , Mudrik Alaydrus ² ¹ Universiti Malaysia Perlis, ² University of Edinburgh, ³ KU Leuven, ⁴ The University of Edinburgh, ⁵ Universitas Mercu Buana	EuMC36-4 Millimeter-Wave E-plane Transmission Lines in Multi-layer Substrate Thanh Tuan Nguyen ¹ , Kunio Sakakibara ¹ , Nobuyoshi Kikuma ¹ ¹ Nagoya Institute of Technology
15:10 – 15:30	EuMC33-5 Incorporating Gate-Lag Effects into the Cardiff Behavioural Model Yashar Alimohammadi ¹ , Eigo Kuwata ¹ , Xuan Liu ¹ , Ehsan Azad ¹ , James Bell ¹ , Lei Wu ² , Paul Tasker ¹ , Johannes Benedikt ¹ ¹ Cardiff Univeristy, ² Huawei Technologies Co., Ltd., China	EuMC34-5 Energy Harvesting for Battery-Free Wireless Sensors Network Embedded in a Reinforced Concrete Beam Alassane Sidibe ¹ , Gaël Loubet ² , Alexandru Takacs ¹ , Daniela Dragomirescu ² ¹ LAAS-CNRS, UPS, ² LAAS-CNRS, INSA	EuMC35-5 Ka-Band Coupled-Resonator Filtering Magneto- Electric Dipole Antenna Hossein Sarbandi Farahani ¹ , BEHROOZ REZAAEI ¹ , Wolfgang Bosch ¹ ¹ Graz University of Technology	EuMC36-5 A Design Approach for an Integrated Self-Biased Ka-Band Isolator Wanja M. Gitzel ¹ , Oktay Arikan ¹ , Manuel Heidenreich ¹ , Jörg Topfer ¹ , Arne F. Jacob ¹ ¹ Hamburg University of Technology, ² Ernst-Abbe-Hochschule Jena

WEDNESDAY 13:50 – 15:30

	Glow	Beam	Mission 1	Quest
	EuMC37 Non-Planar Filters and Devices Chair: Giuseppe Macchiarella ¹ Co-Chair: Cristiano Tomassoni ² ¹ Politecnico di Milano, ² University of Perugia	EuMC38 Metasurfaces and FSSs Applications Chair: Pierre Blondy ¹ Co-Chair: Oscar Quevedo-Teruel ² ¹ XLIM, ² KTH Royal Institute of Technology	EuRAD04 Doppler Processing Techniques for Low Reflectivity Targets Characterisation Chair: Ronny Harmanny ¹ Co-Chair: Nerea del Rey-Maestre ² ¹ Thales Nederland B.V., ² University of Alcalá	EuRAD05 Radar Circuits and Systems Chair: Nils Pohl ¹ Co-Chair: Cicero Vaucher ² ¹ Ruhr University Bochum, ² NXP Semiconductors
13:50 – 14:10	EuMC37-1 An Efficient Microwave Filter Design Procedure Based on Space Mapping Juan Carlos Melgarejo Lermas ¹ , Marco Guglielmi ¹ , Santiago Cogollos Borrás ¹ , Vicente Enrique Boria Esbert ¹ ¹ Universitat Politècnica de València	EuMC38-1 Diffractive Metasurfaces for Microwave Beamforming Applications Ryan Stevenson ¹ INDUSTRIAL KEYNOTE ¹ Kymeta Corporation	EuRAD04-1 Radar Measurements for the Assessment of Features for Drone Characterization Jacco de Wit ¹ , Daniel Gusland ² , Roeland Trommel ² ¹ TNO, ² Norwegian Defence Research Establishment (FFI), ³ Thales Nederland B.V.	EuRAD05-1 A Fully Integrated 78 GHz Automotive Radar System-on-Chip in 22nm FD-SOI CMOS Philipp Ritter ¹ , Xiaolei Gai ¹ , Michael Geyer ¹ , Tilman Gloekler ¹ , Thomas Schwarzenberger ¹ , Gregor Tretter ¹ , Yikun Yu ¹ , Guenter Vogel ¹ ¹ Robert Bosch GmbH
14:10 – 14:30	EuMC37-2 Enhancing the Out-of-Band Response of Hybrid Wide-Band Filters in Rectangular Waveguide Joaquín Valencia Sullca ¹ , Marco Guglielmi ¹ , Santiago Cogollos Borrás ¹ , Vicente Enrique Boria Esbert ¹ ¹ Technical university of Valencia	EuMC38-2 Fully Inkjet Printed Dual-Polarization Broadband Tuneable FSS Using Origami “Eggbox” Structure Yepu Cui ¹ , Samantha Van Rijs ¹ , Ryan Bahr ¹ , Manos M. Tentzeris ¹ ¹ Georgia Institute of Technology	EuRAD04-2 Drone Recognition by Micro-Doppler and Kinematic Frederic Barbaresco ¹ ¹ Thales Land & Air System	EuRAD05-2 A Fully Integrated K-Band UWB Radar IC for Collision Avoidance of Drone and Small UAVs Byeongjae Seo ¹ , SeungHwan Jung ² , SangGyun Kim ² , YunSeong Eo ¹ ¹ Kwangwoon University, ² Grit Custom-IC
14:30 – 14:50	EuMC37-3 A Substrate-Less Current Mode Combining Power Module Utilizing Ridge Gap Waveguide Sam Chieh ¹ , Alex Phipps ² , Everly Yeo ¹ ¹ Naval Information Warfare Center Pacific	EuMC38-3 High Gain Arbitrarily-Oriented Linearly-Polarized Leaky-Wave Antenna by Tensorial Impedance Surfaces Amrollah Amini ¹ , Homayoon Oraizi ² ¹ Iran University of Science and Technology, ² Iran University of Science & Technology	EuRAD04-3 Multiple-Bursts Iterative Adaptive Approach For Doppler Ambiguities Resolution From PRF Agile Radars Linda Aouchiche ¹ , Laurent Ferro-Famil ¹ , Jean-Philippe Ovarlez ² ¹ University of Rennes 1, ² ONERA	EuRAD05-3 A Ka-Band Solid-State Doppler Polarimetric Cloud Radar Vadym Volkov ¹ , Dmytro Vavriv ¹ , Volodymyr Vynogradov ¹ , Ievgen Bulah ¹ , Andrii Kravtsov ¹ , Vladyslav Ksenofontov ¹ , Iliia Kulahin ¹ ¹ Institute of Radio Astronomy of National Academy of Sciences of Ukraine
14:50 – 15:10	EuMC37-4 Evaluating Resonant Cavity Surface Treatment Procedures with a New Unloaded Q-Factor Measurement Method Jure Soklič ¹ , Holger Arthaber ¹ ¹ TU Wien	EuMC38-4 Electromagnetic Analysis of a Jigsaw-Shaped FSS for Conformal Application Yan Zhang ¹ , Tao Dong ² , Da Sun ¹ , Yecheng Wang ¹ , Shanwei Lu ¹ ¹ Beihang University, ² Beijing Institute of Satellite Information Engineering	EuRAD04-4 Deep Learning-Based Identification of Human Gait by Radar Micro-Doppler Measurements Vasileios Papanastasiou ¹ , Roeland Trommel ² , Ronny Harmanny ² , Alexander Yarovoy ¹ ¹ TU Delft, ² Thales Nederland B.V.	EuRAD05-4 M-Sequence Radar for High Resolution Ranging with Mixed-Signal Radar Receiver Baseband Using 130 nm SiGe BiCMOS Technology Abdul Rehman Javed ¹ , J. Christoph Scheytt ¹ ¹ University of Paderborn
	EuMC38-5 Additively Manufactured Conformal All-Dielectric Frequency Selective Surface R. Adeline Mellita ¹ , Karthikeyan Sholampettai Subramanian ¹ , Damodharan Perumal ¹ ¹ Indian Institute of Information Technology Design & Manufacturing, Kancheepuram, Chennai 600127, ² National Institute of Technology Tiruchirappalli, Tiruchirappalli 620015	EuRAD04-5 Distinguishing Living and Non-Living Subjects in a Scene Based on Vital Parameter Estimation Manjunath Thindlu Rudrappa ¹ , Reinhold Herschel ¹ , Peter Knott ¹ ¹ Fraunhofer FHR	EuRAD05-5 A Maritime Harmonic Radar Search and Rescue System Using Passive and Active Tags Holger Heuermann ¹ , Thomas Harzheim ¹ , Marc Mühlert ¹ ¹ FH Aachen, University of Applied Sciences	





WEDNESDAY 16:10 – 17:50

	Mission 2	Expedition	Spark	Flash
	EuMC39 Solid State High Power Amplifiers for Satellite and Radar Applications Chair: Markus Mayer ¹ Co-Chair: Bertrand Gerfault ² ¹ Arelis, ² Thales Electron Devices	EuMC40 [Focussed Session] Emerging Antenna Technologies for RFID Applications Chair: Giovanni Andrea Casula ¹ Co-Chair: Riccardo Colella ² ¹ Università degli Studi di Cagliari, ² Institute of Clinical Physiology - National Research Council Italy	EuMC41 SATCOM and mmWave Antennas Chair: Peter De Maagt ¹ Co-Chair: Matthias Geissler ² ¹ ESA-ESTEC, ² IMST GmbH	EuMC42 Planar Power Dividers/Combiners Chair: Bart Nauwelaers ¹ Co-Chair: Petronilo Martin-Iglesias ² ¹ KU Leuven, ² ESA ESTEC
16:10 – 16:30	EuMC39-1 20 W Linearized Q-band Solid State Power Amplifier for Satellite Communication Application Francesco Vitulli ¹ , Andrea Suriani ¹ , Ernesto Limiti ² , Antonino Massari ¹ , Rocco Giofrè ³ ¹ Thales Alenia Space Italia, ² University of Rome Tor Vergata (Italy), ³ Università di Roma Tor Vergata	EuMC40-1 Miniaturized Grid Array Antenna for Body-Centric RFID Communications in 5G S-Band Jack Hughes ¹ , Cecilia Occhiuzzi ² , John Batchelor ¹ , Gaetano Marrocco ² ¹ University of Kent, ² University of Roma Tor Vergata	EuMC41-1 Flight Model 7-Panel Slot-Array Deployable Antenna Measurement Results of MicroX-SAR 100 Kg Class Demonstration Satellite Budhaditya Pyne ¹ , Hirobumi Saito ² , Prilando Riziki Akbar ³ , Koji Tanaka ⁴ , Jiro Hirokawa ⁵ , Takashi Tomura ⁶ ¹ Synspective Inc., ² Japan Aerospace Exploration Agency, ³ Tokyo Institute of Technology	EuMC42-1 Generalized Gysel Power Divider with Arbitrary Power Ratio and Real Termination Impedances Chao Gai ¹ , Yulong Zhao ¹ , Mohamed Helaoui ¹ , Fadhel M. Ghannouchi ¹ ¹ University of Calgary
16:30 – 16:50	EuMC39-2 Design and Characterization of a Ka-Band 40 W RF Chain Based on GH15-10 GaN Technology for Space Solid State Power Amplifier Applications Amel MAATI ¹ ¹ THALES AVS / MIS	EuMC40-2 Millimeter-Wave Chipless RFID Tag for Authentication Applications Raymundo De Amorim Junior ¹ , Etienne Perret ¹ , Romain Siragusa ² , Nicolas Barbot ¹ ¹ Grenoble-inp/LCIS University Grenoble Alpes Valence, France	EuMC41-2 Low-Cost Millimeter-Wave Patch Antenna Array in Package for 5G Communication Applications Xiao-Lan Tang ¹ , Zhang Ju Hou ¹ ¹ Shenzhen Sunway Communication Co. Ltd.	EuMC42-2 Miniaturized Couplers with Combined Microstrip and Slotline Ports Mohamed Elsawaf ¹ , Amr Safwat ² ¹ Ain Shams University, ² Faculty of Engineering, Ain Shams University
16:50 – 17:10	EuMC39-3 L-Band Digital Doherty SSPA Design for Compact SATCOM Terminal Applications Tomiáš Götthans ¹ , Roman Maršálek ¹ , Tomáš Urbanec ¹ , Martin Slanina ¹ , Ondřej Kučera ¹ , Kamil Pesek ¹ , Suat Ayöz ² , Amitabh Chowdhary ³ ¹ Brno University of Technology, ² Honeywell Aerospace, ³ European Space Agency, ESA/ESTEC	EuMC40-3 On Increasing of Read Range of Miniaturized UHF tags Imbolatiana Rakotomalala ¹ , Smail Tedjini ¹ , Riccardo Colella ² , Francesco P. Chietera ³ , Pierre Lemaitre-Auger ⁴ , Luca Catarinucci ⁵ ¹ Grenoble-inp/LCIS University Grenoble Alpes Valence, France, ² Institute of Clinical Physiology - National Research Council Italy, ³ Department of Innovation Engineering, University of Salento	EuMC41-3 A Compact Low-Noise Frontend for Rx/Tx-Integrated SatCom Arrays Anton Sieganschin ¹ , Thomas Jaschke ¹ , Arne F. Jacob ¹ ¹ Hamburg University of Technology	EuMC42-3 Broadband Equal-Split Planar 4-Way Power Divider-Combiner Suitable for High Power Applications Jeremy Furgal ¹ , Kevin Xu ² , Jun H. Choi ² , Jay Lee ¹ ¹ Syracuse University, ² State University of New York at Buffalo
17:10 – 17:30	EuMC39-4 A High Efficiency MMIC X-Band GaN Power Amplifier Mohammed Ayad ¹ , Nicolas Poirtenaud ¹ , Véronique Serru ¹ , Marc Camiade ¹ , Jan Grünenpütt ¹ , Klaus Riepe ² ¹ United Monolithic Semiconductors SAS, ² United Monolithic Semiconductors GmbH	EuMC40-4 A Smart Parking Sensor with Multi-Purpose Antenna for Car Detection and Sensor Charging Moritz Fischer ¹ , Marian Guggenberger ¹ , Thomas Ullmüller ¹ ¹ University of Innsbruck	EuMC41-4 Design of 94-GHz Wideband Waveguide-Fed Patch Antenna and Array in eWLB Package Chuanming Zhu ¹ , Zongming Duan ¹ ¹ The 38th Research Institute of China Electronic Technology Group Corporation	EuMC42-4 Dual-Band Semi-Lumped-Element Power Dividers at UHF/SHF Bands Tadashi Kawai ¹ , Kensuke Nagano ¹ , Akira Enokihara ¹ ¹ University of Hyogo
17:30 – 17:50	EuMC39-5 A 10 W, 35 % Power Added Efficiency 6 to 18 GHz GaN Power Amplifier ahmed gasmi ¹ , Rémy Leblanc ¹ , Bertrand Wroblewski ¹ , François Lecourt ¹ , Julien Poulain ¹ , Adrien Cutivet ¹ , Ahmad Alhajjar ¹ ¹ OMMIC SAS	EuMC40-5 Laser-Fabricated Antennas for RFID Applications Almudena Rivadeneyra ¹ , José F. Salmeron ¹ , Noel Rodriguez ² , Diego P. Morales ¹ , Riccardo Colella ³ , Francesco P. Chietera ⁴ , Luca Catarinucci ⁵ ¹ University of Granada, ² National Research Council (CNR), ³ Department of Innovation Engineering, University of Salento, ⁴ University of Salento	EuMC41-5 5G Wideband Dual-Polarized mm-Wave Antennas and 60-GHz Motion-Recognition mm-Wave Antennas in a Non-mm-Wave Antenna Integrating Packages in a Full-Screen Metal-Framed Phone Huan-Chu Huang ¹ , Ruipeng Li ² ¹ Etheta Communication Technology Co., Ltd., ² Pousen System Technology Co., Ltd.	EuMC42-5 A Dual-Band Balun Architecture With Unequal Port-Terminations Rahul Gupta ¹ , Sabina Kairatova ² , Mohammad Hashmi ² , Galymzhan Nauryzbayev ² ¹ IIT-Delhi, ² Nazarbayev University, Nur-Sultan, Kazakhstan

WEDNESDAY 16:10 – 17:50

	Glow	Beam	Mission 1	Quest
	EuMC43 Non-Planar Devices and Systems Chair: Vicente Enrique Boria Esbert ¹ Co-Chair: Richard Snyder ² ¹ Technical university of Valencia, ² RS Microwave	EuMC44 [Special Session] Silicon-Based Ka-Band Massive MIMO Antenna Systems for New Telecommunication Services Chair: Ulf Johannsen ¹ Co-Chair: Bart Smolders ¹ ¹ Eindhoven Univeristy of Technology,	EuRAD06 Emerging & Industrial Applications Chair: Naruto Yonemoto ¹ Co-Chair: André Bourdoux ² ¹ ENRI/MPAT, ² imec, Leuven	EuRAD07 Radar Scenario Simulations Chair: Stéphane Kemkemian ¹ Co-Chair: Mohammed Jahangir ² ¹ Thales Defence Mission Systems (TDMS), ² University of Birmingham
16:10 – 16:30	EuMC43-1 Ridge-Gap Waveguide Enabled Wireless Power Transfer for Electrical Vehicle Application Walid Dyab ¹ , Mourad Ibrahim ¹ , Ahmed Sakr ² , Ke Wu ³ ¹ Prince Sultan University, ² Faculty of Engineering, Cairo University, ³ Polytechnique Montreal	EuMC44-1 SILIKA: Silicon-Based Ka-Band Massive-MIMO Antenna Systems for New Telecommunication Services Bart Smolders ¹ ¹ Eindhoven University of Technology - TU/e	EuRAD06-1 Millimetre-Wave Radar for Touchless Interaction: Soli in the Pixel 4 Jian Wang ¹ , Jaime Lien ¹ INDUSTRIAL KEYNOTE ¹ Google LLC	EuRAD07-1 Radar Signature Prediction with Shooting-and-Bouncing Rays and Hybrid Method David Prestaux ¹ INDUSTRIAL KEYNOTE ¹ ANSYS
16:30 – 16:50	EuMC43-2 A Compact Ridge Waveguide Four-Port Junction Circulator Guangjian Deng ¹ , Letian Guo ¹ , Jiawei Li ¹ , Wenhua Huang ¹ , Hao Shao ¹ , Shaoyi Xie ¹ ¹ Northwest Institute of Nuclear Technology	EuMC44-2 Antenna Systems for 5G mmWave Radio Access Guy Vandenbosch ¹ ¹ KU Leuven	EuRAD06-2 Background and Clutter Removal Techniques for Ultra Short Range Radar Matthias G. Ehrnsperger ¹ , Maximilian Noll ¹ , Uwe Siart ¹ , Thomas F. Eibert ¹ ¹ Technische Universität München	EuRAD07-2 Radar Target Simulator and Antenna Positioner for Real-Time Over-the-Air Stimulation of Automotive Radar Systems Muhammad Ehtisham Asghar ¹ , Sreehari Buddappagari Jayapal Gowdu ¹ , Florian Baumgärtner ¹ , Sebastian Graf ¹ , Felix Kreutz ² , Andreas Löffler ¹ , Johannes Nagel ¹ , Thomas Reichmann ¹ , Ralf Stephan ¹ , Matthias A. Hein ¹ ¹ Technische Universität Ilmenau, ² Mercedes-Benz AG, ³ dSPACE GmbH, ⁴ Continental AG
16:50 – 17:10	EuMC43-3 A Turnstile OMT Covering a Full Octave using Ridge Waveguide (25–50 GHz) Doug Henke ¹ , Ivan Wevers ¹ , Lewis B. G. Knee ¹ ¹ NRC Herzberg Astronomy and Astrophysics	EuMC44-3 IC Design Aspects for 5G mmWave Systems Christian Fager ¹ , Eduardo Anjos ² , Artem Roev ¹ , Paras-too Taghikhani ¹ , Marianna Ivashina ¹ , Rob Maaskant ¹ , Koen Buisman ¹ , Anders Höök ³ , Dominique Schreurs ¹ , Guy Vandenbosch ⁴ , Marcel Geurts ⁵ ¹ Chalmers University of Technology, ² KU Leuven, ³ Saab AB, ⁴ KULeuven, ⁵ NXP Semiconductors	EuRAD06-3 Standoff Non-Line-of-Sight Vibration Sensing Using Millimeter-Wave Radar Samuel Wagner ¹ , Anh-Vu Pham ¹ ¹ University of California, Davis	EuRAD07-3 Back Scattering of Traffic Participants Based on an Automotive Radar Measurement Sevda Abadpour ¹ , Axel Diewald ¹ , Thomas Zwick ¹ , Mario Pauli ¹ , Sören Marahrens ¹ ¹ Karlsruhe Institute of Technology (KIT)
17:10 – 17:30	EuMC43-4 Stripline Dual-Band Ferrite Circulators Operating on Weak Field Conditions Vincent Olivier ¹ , Laure Huitema ¹ , Bertrand Lenoir ² , Hamza Turki ³ , Christophe Breuil ⁴ , Philippe Poulliguen ⁵ , Thierry Monédière ⁶ ¹ Xlim - UMR 7252 - CNRS- Université De Limoges, ² INOVEDS SAS, ³ DGA (Direction Générale de l'Armement)	EuMC44-4 Signal Processing for mmWave Antenna Systems Ulf Gustavsson ¹ ¹ Ericsson Research	EuRAD06-4 Multi-Phase CW Doppler Radar for Measuring Small Periodic Displacement Jae-Hyun Park ¹ , Jae-Young Sim ¹ , Jong-Ryul Yang ¹ ¹ Yeungnam University	EuRAD07-4 SimROS : A Simulator for the Design of HF Surface Wave Radar. Application to Maritime Target Detection Alain Reineix ¹ , Christophe Guiffaut ¹ , Nicolas Bourry ¹ , Muriel Darces ¹ , Marc Hélier ¹ , Sébastien Reynaud ¹ , et al. ¹ XLIM - CNRS - Université de Limoges, ² Sorbonne Université, ³ CISTEME, ⁴ ONERA, ⁵ IEEA
17:30 – 17:50	EuMC43-5 Broadband 32-Way E-Band Inline Power Combiner for High-Power MMIC Amplifiers Anil Kumar Pandey ¹ ¹ Keysight Technologies	EuMC44-5 The SILIKA Demonstrator Marcel Geurts ¹ , Eduardo Anjos ² , Marzieh SalarRahimi ² ¹ NXP Semiconductors, ² KU Leuven	EuRAD06-5 Sensory Substitution Device for the Visually Impaired Using 122 GHz Radar and Tactile Feedback Pascal Kneuper ¹ , Stephan Kruse ¹ , Björn Luchterhandt ² , Jan Tünnermann ³ , Ingrid Scharlau ² , J. Christoph Scheytt ⁴ ¹ Heinz Nixdorf Institute, University of Paderborn, ² University of Paderborn, ³ University of Marburg	EuRAD07-5 Synthetic Sea-Clutter for Long Integration Processing Sabrina Machhour ¹ , Stéphane Kemkemian ¹ , Pierre-Albert Breton ¹ , Vincent Corretja ¹ ¹ Thales Defence Mission Systems (TDMS)

THURSDAY

						
Room	08:30 – 10:10	10:50 – 12:30		13:50 – 15:30	16:10 – 17:50	EVENING PROGRAMME
Progress	W-23 High Resolution Radar for Automotive					
Mission 1	EuRAD08 Object Classification in Automotive Radars	EuRAD12 [Focussed Session] Radar Interference Cancellation		EuRAD16 Automotive		
Mission 2	EuRAD09 Defence Applications	EuRAD13 [Special Session] Radar and Electronic Warfare		EuRAD17 Advanced Techniques and Innovative Array Configurations for DoA		
Quest	EuRAD10 SAR Processing	EuRAD14 Surveillance and SAR		EuRAD18 SAR Applications		
Expedition	EuMC/EuRAD01 Radar Receivers and Front-Ends	EuMC49 Front-End and Active Module		EuMC54 Low Noise Amplifier and Phased Array Module		
Polar				Closing of the European Microwave Week EuMC/EuMW Closing and Awards Ceremony		
Auditorium	EuMC45 [Special Session] Focus Day: Array Antennas for Radio Astronomy	EuMC/EuRAD02 [Special Session] Focus Day: Active Array Antennas for Space	Technology in Context The Law of Space	EuMC/EuRAD03 [Special Session] Focus Day: Active Array Antennas for Defence		HAM Radio Social 18.00 - 21.00
Spark	EuMC46 Advanced Planar Filter Principles and Technologies	EuMC50 Compact Planar Filtering Devices		W-15 Recent Advances in Micro-Doppler Radar and its Applications		
Flash	EuMC47 Dielectric Measurements	EuMC51 Calibration and Characterisation Techniques		EuMC55 Antenna Characterisation Techniques		
Glow	EuMC48 Microwave Monitoring and Sensing of Biomedical Parameters	EuMC52 Biological Microwave Effects and Imaging Techniques		EuMC56 [Focussed Session] Electromagnetics in Biomedical Applications		
Beam	Tom Brazil Doctoral School of Microwaves The Route to 5G: Design of mmWave Active Array Systems, from RFIC to Signal Processing					
Media arena	EuRAD11 1-Minute Poster Pitch (09:40 - 10:10)	EuMC53 1-Minute Poster Pitch (12:00 - 12:30)		EuMC57 In Recognition: Prof.Dr. A.T. de Hoop		
Round control	Career Platform Career Lounge: Meet Jobs, Build Careers					
BOR 6	Career Platform Job Dating					
loopbrug	Career Platform Company Wall and Job Wall					
Juliana Congress Room 1	W-31 5G and Beyond: Enabling RF Architectures and Technologies for Emerging Wireless Systems					
Hall 1		EuRAD15 Interactive Poster session		EuMC58 Interactive Poster Session		

THURSDAY 08:30 – 10:10

Expedition	Auditorium	Spark	Flash
EuMC/EuRAD01 Radar Receivers and Front-Ends Chair: Massimo C Comparini ¹ Co-Chair: Jens Engelmann ² ¹ Telespazio, Italy & France, ² Thales DIS AIS Deutschland GmbH	EuMC45 [Special Session] Focus Day: Array Antennas for Radio Astronomy Chair: Mark Bentum ¹ ¹ Eindhoven Univeristy of Technology	EuMC46 Advanced Planar Filter Principles and Technologies Chair: Roberto Gomez-Garcia ¹ Co-Chair: Miguel Sanchez-Soriano ² ¹ University of Alcala, ² University of Alicante	EuMC47 Dielectric Measurements Chair: Andrej Rumiantsev ¹ Co-Chair: Xiaobang Shang ² ¹ MPI Corporation, ² National Physical Laboratory (NPL)
08:30 – 08:50 EuMC/EuRAD01-1 A 1.5-40 GHz FMCW Radar Receiver Front-End Mantas Sakalas ¹ , Niko Joram ² , Frank Ellinger ² ¹ Baltic Institute of Advanced Technology, ² Technical University Dresden	EuMC45-1 Aperture Arrays in Radio Astronomy - Overview of Past, Present and Future Radio Telescopes Mark Bentum ¹ ¹ Eindhoven University of Technology (TU/e)	EuMC46-1 Cover-Ended Resonators to Increase Corona Discharge Thresholds in Microstrip Bandpass Filters Aitor Morales-Hernández ¹ , Miguel Sanchez-Soriano ¹ , Stephan Marini ¹ , Vicente Enrique Boria Esbert ¹ , Marco Guglielmi ² ¹ University of Alicante, ² Team - Universitat Politècnica de València	EuMC47-1 Characterization of Permittivity of Liquids-in-Flow with Spherical Dielectric Resonators Georg Sterzl ¹ , Jan Hesselbarth ¹ ¹ University of Stuttgart
08:50 – 09:10 EuMC/EuRAD01-2 Analysis of Time-Interleaved ADC Offset and Gain Mismatch Errors in PMCW Radar Daan Rosenmuller ¹ , Kostas Doris ² , Georgi Radulov ¹ , Marion K. Matters-Kammerer ¹ ¹ Eindhoven University of Technology, ² NXP Semiconductors	EuMC45-2 First In-Flight Results of the NCLE Instrument - A Low Frequency Radio Receiver Exploring the Dark Ages in Lunar Orbit Eric Bertels ¹ ¹ ISIS - Innovative Solutions in Space B.V.	EuMC46-2 Comparative Analysis of Out-of-Band Power Handling Capacities for Lossy Filters Liang-Feng Qiu ¹ , Lin-Sheng Wu ¹ , Bin Xia ¹ , Junfa Mao ¹ ¹ Shanghai Jiao Tong University	EuMC47-2 Microwave Characterisation of the Coefficient of Thermal Expansion and the Thermal Evolution of Electric Conductivity for Metal-lised Substrate Thibault Charlet ¹ , Olivier Tantot ¹ , Nicolas Delhote ¹ , Clément Hallépée ¹ , Serge Verdeyme ¹ , David Nevo ² ¹ Xlim - UMR 7252 - CNRS- Limoges University, ² Thales Alenia Space France
09:10 – 09:30 EuMC/EuRAD01-3 Analogue Baseband Processing for Single Chip Radar Proximity Sensor Maurice van Wanum ¹ , Michael Polushkin ¹ , Raymond van Dijk ¹ ¹ TNO	EuMC45-3 The Mid-Frequency Aperture Array Kristian Zarb Adam ¹ ¹ University of Oxford	EuMC46-3 Co-Designed Quasi-Circulator and Bandpass Filter Andrea Ashley ¹ , Dimitra Psychogiou ¹ ¹ University of Colorado Boulder	EuMC47-3 Solid and Non-Solid Dielectric Material Characterization for Millimeter and Sub-Millimeter Wave Applications Alain Peden ¹ , Daniel BOURREAU ¹ ¹ IMT Atlantique
09:30 – 09:50 EuMC/EuRAD01-4 Active MMIC Circulator Performance in a Phased-Array-Like Environment Laila Marzall ¹ , Shane Verploegh ¹ , Tommaso Cappello ¹ , Zoya Popovic ¹ , Michael Roberg ² ¹ University of Colorado at Boulder, ² Qorvo	EuMC45-4 DISTURB: A 30 MHz to 3 GHz Solar Monitoring Phased Array System David Prinsloo ¹ , Pieter Benthem ¹ , Michiel A. Brentjens ¹ , Paulus P. Krüger ¹ , Dick Boersma ¹ , Lars Venema ¹ , Ronald de Wild ¹ , Richard A. Fallows ¹ , Edo Loenen ¹ , Erwin Platen ¹ , Paul Stewart ¹ , Ludo Visser ¹ , André Bos ¹ , Bert Van den Dord ¹ , Wietse Bouwmeester ² ¹ Netherlands Institute for Radio Astronomy - ASTRON, ² Netherlands Institute for Space Research (SRON), ³ Science [8] Technology Corporation, ⁴ Royal Netherlands Meteorological Institute - KNMI, ⁵ Delft University of Technology	EuMC46-4 3-D Metal Printed Inline Quasi-Elliptic Bandpass Filter Jiayu Rao ¹ , Kenneth Nai ¹ , Jiasheng Hong ¹ ¹ Heriot-Watt University, ² Renishaw PLC	EuMC47-4 Novel Method for Measuring Complex Permittivity of Thin Films at Millimeter Frequencies Yuto Kato ¹ , Masahiro Horibe ¹ ¹ National Institute of Advanced Industrial Science and Technology
09:50 – 10:10 EuMC/EuRAD01-5 A 9 to 12.1 GHz Sub-Sampling AD-PLL Based on a Stochastic Flash TDC and a DCO with a “Folded” Common-Mode Resonator Exhibiting less than 90 fs Jitter [*] Run Levinger ¹ , Evgeny Shumaker ¹ , Aryeh Farber ¹ ¹ Intel Corporation [*] Paper title has been shortened. Please refer to the conference proceedings for the complete title.	EuMC45-5 Coherent Receiver Arrays for Radio Astronomy in the Tera Hertz Regime Jan Geralt Bij de Vaate ¹ ¹ Netherlands Institute for Space Research (SRON)	EuMC46-5 High-Order Fully-Reconfigurable Balanced Bandpass Filters Using Mixed Technology Resonators Dakotah Simpson ¹ , Dimitra Psychogiou ¹ ¹ University of Colorado Boulder	EuMC47-5 New Methods for Improved Accuracy of Broad Band Free Space Dielectric Measurements John Schultz ¹ , Ren Geryak ¹ , James Maloney ² ¹ Compass Technology Group, ² Maloney Solutions

THURSDAY 08:30 – 10:10

	<div>Glow</div>	<div>Mission 1</div>	<div>Mission 2</div>	<div>Quest</div>
	<div>EuMC48</div> <div>Microwave Monitoring and Sensing of Biomedical Parameters</div> <div>Chair: Luciano Tarricone¹</div> <div>Co-Chair: Marco Pasian²</div> <div>¹University of Salento, ²University of Pavia</div>	<div>EuRAD08</div> <div>Object Classification in Automotive Radars</div> <div>Chair: Marlene Harter¹</div> <div>Co-Chair: Frank Gruson²</div> <div>¹Offenburg University Of Applied Sciences, ²Continental AG</div>	<div>EuRAD09</div> <div>Defence Applications</div> <div>Chair: Willem A. Hol</div> <div>Co-Chair: Richard Heusdens¹</div> <div>¹Netherlands Defence Academy</div>	<div>EuRAD10</div> <div>SAR Processing</div> <div>Chair: Krzysztof Kulpa¹</div> <div>Co-Chair: Alicja Ossowska²</div> <div>¹Warsaw University of Technology, ²Valeo Schalter und Sensoren GmbH</div>
<div>08:30 – 08:50</div>	<div>EuMC48-1</div> <div>A High Frequency Dielectrophoresis Cytometer For Continuous Flow Biological Cells Refinement</div> <div>Thomas Provent¹, Audrey Mauvy¹, Rémi Manczak¹, Sofiane Saada¹, Claire Dalmay¹, Barbara Bessette², Fabrice Lalloué², Arnaud Pothier¹</div> <div>¹XLIM Research Institute, Univ. Limoges, UMR CNRS 7252, ²CAPTuR, EA3842 Limoges University</div>	<div>EuRAD08-1</div> <div>Driving a Zero-Road-Fatality Reality</div> <div>Noam Arkind¹</div> <div>INDUSTRIAL KEYNOTE</div> <div>¹Arbe Robotics</div>	<div>EuRAD09-1</div> <div>Gabor Transforms for Compressing RESM Data</div> <div>Andrew Stove¹</div> <div>¹Stove Specialties</div>	<div>EuRAD10-1</div> <div>Enhanced Azimuth Resolution in Synthetic Aperture Radar Using the MUSIC Algorithm</div> <div>AmirHosein Oveis¹</div> <div>¹RaSS Center – CNIT</div>
<div>08:50 – 09:10</div>	<div>EuMC48-2</div> <div>Head Motion and Eyes Blinking Detection: A mmWave Radar for Assisting People with Neurodegenerative Disorders</div> <div>Emanuele Cardillo¹, Gaia Sapienza², Changzhi Li³, Alina Caddemi¹</div> <div>¹University of Messina, ²Tre Ali Onlus, ³Texas Tech University</div>	<div>EuRAD08-2</div> <div>Road User Classification with Polarimetric Radars</div> <div>Julius Tilly¹, Fabio Weishaupt¹, Ole Schumann¹, Jürgen Dickmann¹, Gerd Wanielik¹</div> <div>¹Mercedes-Benz AG, ²TU Chemnitz</div>	<div>EuRAD09-2</div> <div>R&T Activities related to RF Sensor Technologies at the European Defence Agency</div> <div>Roland Krebs¹</div> <div>INDUSTRIAL KEYNOTE</div> <div>¹European Defense Agency</div>	<div>EuRAD10-2</div> <div>Guided Generative Adversarial Network for Super Resolution of Imaging Radar</div> <div>Hyun-Woong Cho¹, Woosuk Kim¹, Sungdo Choi¹, Minsung Eo¹, Seungtae Khang¹, Jongseok Kim¹</div> <div>¹Samsung Advanced Institute of Technology</div>
<div>09:10 – 09:30</div>	<div>EuMC48-3</div> <div>Heartbeat and Respiration Detection Using a Low Complexity CW Radar System</div> <div>Panagiota Kontou¹, Souheil Ben Smida¹, Spyridon Nektarios Daskalakis¹, Symeon Nikolaou¹, Mauro Dragone¹, Dimitris E. Anagnostou¹</div> <div>¹Heriot-Watt University, Edinburgh</div>	<div>EuRAD08-3</div> <div>Short Range Height Classification in FMCW Radar</div> <div>Arun Vijayaraghavan¹, Arie Koppelaar², Francesco Laghezza²</div> <div>¹TU-Delft, ²NXP Semiconductors</div>	<div>EuRAD09-3</div> <div>Looking into the future: NATO Surveillance</div> <div>Rene Thaens¹</div> <div>INDUSTRIAL KEYNOTE</div> <div>¹NATO NCI Agency</div>	<div>EuRAD10-3</div> <div>Spatial-Variant Phase Error Compensation for Widebeam Spotlight Synthetic Aperture Radar</div> <div>Pavel Makarov¹, Ersin Aytac¹, Nurullah Akkaya¹</div> <div>¹Near East University</div>
<div>09:30 – 09:50</div>	<div>EuMC48-4</div> <div>Measuring Vital Signs on Fingertip Using K-Band Spherical Dielectric Resonator</div> <div>Chung-Tse Chang¹, Chin-Lung Yang², Utpal Dey³, Jan Hesselbarth¹</div> <div>¹Department of Electrical Engineering, National Cheng Kung University 1, University Road Tainan City Taiwan, ²National Cheng Kung University, ³Universität Stuttgart</div>	<div>EuRAD08-4</div> <div>Object Detection on Radar Imagery for Autonomous Driving using Deep Neural Networks</div> <div>Ana Stroescu¹, Liam Daniel¹, Dominic Phippen¹, Mikhail Cherniakov¹, Marina Gashinova²</div> <div>¹EESF, University of Birmingham, ²University of Birmingham</div>	<div>EuRAD09-4</div> <div>Formidable Shield: A Dutch perspective</div> <div>Martien Joosten¹</div> <div>INDUSTRIAL KEYNOTE</div> <div>¹Thales Nederland B.V.</div>	<div>EuRAD10-4</div> <div>An Accurate SAR Imaging Method Based on Total Variation & Non-convex Regularization</div> <div>Zhongqiu Xu¹</div> <div>¹Aerospace Information Research Institute, Chinese Academy of Sciences</div>
<div>09:50 – 10:10</div>	<div>EuMC48-5</div> <div>An Adaptive Filter Technique for Platform Motion Compensation in Unmanned Aerial Vehicle Based Remote Life Sensing Radar</div> <div>Victor Lubecke¹, Shekh Md Mahmudul Islam¹, Lana C. Lubecke², Christian Grado¹</div> <div>¹University of Hawaii at Manoa, ²Kalani High School</div>	<div>EuRAD08-5</div> <div>Statistical Image Segmentation and Region Classification Approaches for Automotive Radar</div> <div>Liam Daniel¹, Yang Xiao¹, Edward Hoare¹, Mikhail Cherniakov¹, Marina Gashinova¹</div> <div>¹University of Birmingham</div>	<div>EuRAD09-5</div> <div>Target-Borne ECM Against OFDM-Based Imaging Passive Radars</div> <div>Elisa Giusti¹, Amerigo Capria¹, Marco Martorella²</div> <div>¹Consorzio Nazionale Interuniversitario Telecomunicazioni (CNIT), ²University of Pisa</div>	<div>EuRAD10-5</div> <div>An Accurate Range Model for Airborne CSSAR Ground Moving Target Imaging</div> <div>Yongkang Li¹, Lei Wang¹, Yifeng Wu²</div> <div>¹Northwestern Polytechnical University, ²AVIC Leihua Electronics Technology Research Institute</div>

THURSDAY 10:50 – 12:30

	<div>Auditorium</div>	<div>Expedition</div>	<div>Spark</div>	<div>Flash</div>
	<div>EuMC/EuRAD02</div> <div>[Special Session] Focus Day: Active Array Antennas for Space</div> <div>Chair: Giovanni Toso¹</div> <div>Co-Chair: Natanael Ayllon¹</div> <div>¹European Space Agency</div>	<div>EuMC49</div> <div>Front-End and Active Module</div> <div>Chair: Nathalie Deltimple¹</div> <div>Co-Chair: Ernesto Limiti²</div> <div>¹Bordeaux INP, IMS Laboratory, ²S EE Dept, University of Rome "Tor Vergata", Rome, Italy</div>	<div>EuMC50</div> <div>Compact Planar Filtering Devices</div> <div>Chair: Jerzy Julian Michalski¹</div> <div>Co-Chair: Dimitra Psychogiou²</div> <div>¹SpaceForest, ²University of Colorado Boulder</div>	<div>EuMC51</div> <div>Calibration and Characterisation Techniques</div> <div>Chair: Nick Ridler¹</div> <div>Co-Chair: Ralf Doerner²</div> <div>¹National Physical Laboratory (NPL), ²Ferdinand-Braun-Institut (FBH) Leibniz-Institut für Höchstfrequenztechnik</div>
<div>10:50 – 11:10</div>	<div>EuMC/EuRAD02-1</div> <div>Recent Developments on MMICs for Active Array</div> <div>Thibaut Huet¹</div> <div>¹United Monolithic Semiconductors SAS</div>	<div>EuMC49-1</div> <div>Experimental Results of Advanced Wideband Data Converters for Direct K-Band Software Defined Radio</div> <div>Romain Pilard¹, Julien Duvernay¹, Benjamin Boujon¹, Andrew Glascott-Jones¹</div> <div>¹Teledyne e2v</div>	<div>EuMC50-1</div> <div>Full Planar Interdigital Filter Design Flow</div> <div>Itzhak Shapir¹</div> <div>INDUSTRIAL KEYNOTE</div> <div>¹The Wave Whisperer Microwave Consulting</div>	<div>EuMC51-1</div> <div>Broadband Wafer-Level Characterization of Next-Generation Semiconductors: Requirements, Challenges, and Solutions</div> <div>Andrej Rumiantsev¹</div> <div>INDUSTRIAL KEYNOTE</div> <div>¹MPI Corporation</div>
<div>11:10 – 11:30</div>	<div>EuMC/EuRAD02-2</div> <div>Architecture and Capacity Evolution in Active Antennas for Earth Observation, Telecom, and Deep Space at AIRBUS DS SPAIN</div> <div>Antonio Montesano¹</div> <div>¹Airbus Defence & Space</div>	<div>EuMC49-2</div> <div>Ka-Band TDD Front-End with Gate Shunt Switched Cascode LNA and Three-Stack PA on 22 nm FDSOI CMOS Technology</div> <div>Mikko Hietanen¹, Jere Rusanen¹, Janne P. Aikio¹, Nuutti Tervo¹, Timo Rahkonen¹, Aarno Pärssinen¹</div> <div>¹University of Oulu</div>	<div>EuMC50-2</div> <div>Surface Mountable L- and C-Band Pre-Distorted Filters for Frequency Converters of High Throughput Satellite Systems</div> <div>Paolo Vallerotonda¹, Alessandro Cazzorla², Davide Tiradossi¹, Luca Pelliccia², Roberto Sorrentino¹, Francesco Vitulli¹, et al.</div> <div>¹RF Microtech s.r.l / University of Perugia, ²RF Microtech s.r.l., ³Thales Alenia Space Italia³</div> <div>³For the complete author and affiliation list, please refer to the conference proceedings.</div>	<div>EuMC51-2</div> <div>Meander Type Design for On Wafer Calibration up to 330 GHz</div> <div>Marco Cabbia¹, Marina Deng¹, Sébastien Fregonese², Chandan Yadav¹, Arnaud Curutchet¹, Magali De Matos¹, Didier Céli¹, Thomas Zimmer¹</div> <div>¹University of Bordeaux, IMS laboratory, ²CNRS, IMS Laboratory, ³IMS laboratory, ⁴STMMicroelectronics</div>
<div>11:30 – 11:50</div>	<div>EuMC/EuRAD02-3</div> <div>Additive Manufacturing: Enabling Technology for GEO Active Antennas</div> <div>Esteban Menargues¹, Tomislav Debogovic¹, Mathieu Billod¹, Ignacio Echeveste¹, Francisco Cano¹, Antonio Montesano¹</div> <div>¹SWISSto12, ²Airbus Defence & Space</div>	<div>EuMC49-3</div> <div>Phase-noise reduction through an external high-Q network using a black-box oscillator model</div> <div>Mabel Pontón¹, Franco Ramirez², Amparo Herrera Guardado¹, Almudena Suárez²</div> <div>¹University of Cantabria, ²Universidad de Cantabria</div>	<div>EuMC50-3</div> <div>Vertically Integrated Microwave-Filters Using Functional Via Structures in LTCC</div> <div>Ömer Faruk Yıldız¹, Ole Thomsen², Marc Bochar², Cheng Yang¹, Christian Schuster¹</div> <div>¹Hamburg University of Technology (TUHH), ²KOA EUROPE GmbH</div>	<div>EuMC51-3</div> <div>A CPW Excitation Using a Contactless Dielectric Waveguide Probe for the V-Band</div> <div>Amr Samir¹, Mohamed Basha¹, Ahmed Hegazy¹, Safeddin Safavi-Naeini¹</div> <div>¹University of Waterloo</div>
<div>11:50 – 12:10</div>	<div>EuMC/EuRAD02-4</div> <div>Active antenna development at Thales Alenia Space</div> <div>Christophe Benoist¹, Michael Blum¹, Anne Couarraze¹, Thierry Girard¹, Jérémie Le Guen¹, Benoit Lejay¹, Laurent Levert¹, Madivanane Nadarassin¹, Olivier Perrin¹, Thierry Rostan¹, Julien Rotureau¹, Hassan Solhi¹, Eric Vourch¹</div> <div>¹Thales Alenia Space</div>	<div>EuMC49-4</div> <div>Iterative Learning Control for Signal Separation in Dual-RF Input Doherty Transmitter</div> <div>Jun Peng¹, Weimin Shi², Jingzhou Pang², Fei You¹, Songbai He¹</div> <div>¹University of Electronic Science & Technology of China, ²The Hong Kong University of Science and Technology, ³University College Dublin</div>	<div>EuMC50-4</div> <div>Design and Comparison of Filter Structures in the Millimeter-Wave Frequency Range on Outer- and Inner-Layers of Organic Circuit Boards</div> <div>Andreas Scharl¹, Felix Sepaintner¹, Johannes Jakob¹, David Scholz², Franz Xavier Röhrl¹, Werner Bogner¹, Stefan Zorn²</div> <div>¹DIT Deggendorf Institute of Technology, ²Rohde & Schwarz GmbH & Co. KG</div>	<div>EuMC51-4</div> <div>Quantitative Scanning Microwave Microscopy of Few-Layer Platinum Diselenide</div> <div>xiaopeng wang¹, Kuanchen Xiong¹, Lei Li¹, James C. M. Hwang¹, Xin Jin¹, Gianluca Fabi¹, Marco Farina¹, et al.</div> <div>¹Cornell University, Ithaca, NY, ²Anokiwave, Inc., ³Università Politecnica delle Marche, ⁴Universität der Bundeswehr München, ⁵IHP-Leibniz Institute for Innovative Microelectron</div> <div>⁶For the complete author list, please refer to the conference proceedings.</div>
<div>12:10 – 12:30</div>	<div>EuMC/EuRAD02-5</div> <div>Airbus UK Active Antenna Developments, Challenges and the Future</div> <div>Sonya Amos¹, Glyn Thomas¹, Steve McLaren², Carolina Tienda-Herrero², David Dupuy²</div> <div>¹Airbus Defence & Space, ²Airbus Defence and Space</div>	<div>EuMC49-5</div> <div>A Decade Bandwidth Mixers Based on Planar Transformers and Quasi-Vertical Schottky Diodes Implemented in GaAs MMIC Technology</div> <div>Nikolai Drobotun¹, Daniil Danilov², Alexey Drozdov²</div> <div>¹Tomsk State University of Control Systems and Radioelectronics (TUSUR), ²MICRAN, Research and Production Company</div>	<div>EuMC50-5</div> <div>Miniaturized Signal-Interference Bandpass Filters Using Resonant RF Signal Paths</div> <div>Dimitra Psychogiou¹, Roberto Gómez-García²</div> <div>¹University of Colorado, Boulder, ²University of Alcalá, Madrid</div>	<div>EuMC51-5</div> <div>Dispersion in Millimeter-Wave and THz Dielectric Waveguides: Modeling, Measurement and Performance Limitations</div> <div>Joren Vaes¹, Patrick Reynaert¹</div> <div>¹KU Leuven ESAT-MICAS</div>

THURSDAY 10:50 – 12:30

	Glow	Mission 1	Mission 2	Quest
	<div>EuMC52 Biological Microwave Effects and Imaging Techniques</div> <div>Chair: Katia Grenier¹</div> <div>Co-Chair: Juan-Mari Collantes²</div> <div>¹LAAS-CNRS, ²UPV/EHU</div>	<div>Mission 1</div> <div>EuRAD12 [Focussed Session] Radar Interference Cancellation and Waveform Agility</div> <div>Chair: Stefan Brüggewirth¹</div> <div>Co-Chair: Christoph Fischer²</div> <div>¹Fraunhofer Institute for High Frequency Physics and Radar Techniques (FHR), ²Hensoldt Sensors GmbH</div>	<div>Mission 2</div> <div>EuRAD13 [Special Session] Radar and Electronic Warfare</div> <div>Chair: Sue Robertson¹</div> <div>Co-Chair: Mayazzurra Ruggiano²</div> <div>¹EW Defence Ltd, ²Thales Nederland B.V.</div>	<div>Quest</div> <div>EuRAD14 Surveillance and SAR</div> <div>Chair: Volker Ziegler¹</div> <div>Co-Chair: Willem A. Hol</div> <div>¹Airbus Defence and Space GmbH</div>
10:50 – 11:10	<div>EuMC52-1 Novel challenges and available solutions for in situ real time SAR (Specific Absorption Rate) assessment in any environment and up to millimeter waves</div> <div>Gwenaél Gaborit¹, Lionel DUVILLARET¹</div> <div>INDUSTRIAL KEYNOTE</div> <div>¹Kapteos S.A.S.</div>	<div>EuRAD12-1 FMCW-Interference of Frequency Agile OFDM Radars</div> <div>Christina Krill¹, Benedikt Schweizer¹, Simon Stephany¹, David Werbunat¹, Christian Waldschmidt¹</div> <div>¹Ulm University</div>	<div>EuRAD13-1 Cognitive Electronic Warfare (EW) as a Training Aid</div> <div>Warren du Plessis¹, Nicholas Osner¹</div> <div>¹University of Pretoria</div>	<div>EuRAD14-1 Next Generation AESA Radar Architectures</div> <div>Chris Mountford¹</div> <div>INDUSTRIAL KEYNOTE</div> <div>¹Leonardo UK</div>
11:10 – 11:30	<div>EuMC52-2 A Coplanar Waveguide System for Drug Delivery Mediated by Nano-electroporation: an Experimental and Numerical Study</div> <div>Laura Caramazza¹, Alessandra Paffi¹, Micaela Liberti¹, Francesca Apollonio¹</div> <div>¹Department of Information Engineering, Electronics and Telecommunications, Sapienza University of Rome</div>	<div>EuRAD12-2 PMCW Waveform Cross-correlation Characterization and Interference Mitigation</div> <div>André Bourdoux¹, Marc Bauduin¹</div> <div>¹IMEC</div>	<div>EuRAD13-2 A brief introduction to Electronic Warfare and the AOC</div> <div>Sue Robertson¹</div> <div>¹EW Defence Ltd</div>	<div>EuRAD14-2 Small UAV-Based High Resolution SAR using Low-Cost Radar, GNSS/RTK and IMU Sensors</div> <div>Jan Svedin¹, Anders Bernland¹, Andreas Gustafsson¹</div> <div>¹Swedish Defence Research Agency (FOI)</div>
11:30 – 11:50	<div>EuMC52-3 Generating Bipolar Nanosecond Pulsed Electric Field using Open Circuit Transmission Line Technique and Avalanche Transistors</div> <div>Ilan Wyn Davies¹, Christopher P. Hancock¹</div> <div>¹Bangor University</div>	<div>EuRAD12-3 Radar Waveform Coexistence: Interference Comparison on Multiple-Frame Basis</div> <div>Jeroen Overdevest¹, Francesco Laghezza¹, Feike Jansen¹, Alessio Filippi¹</div> <div>¹NXP Semiconductors</div>	<div>EuRAD13-3 Collecting Intelligence from Modern Radar Systems</div> <div>David Stupples¹</div> <div>¹London City University</div>	<div>EuRAD14-3 Recent L-C- and X-Band MetaSensing Airborne SAR Campaigns for Emerging Applications</div> <div>Karlus Macedo¹, Gerard Masalias¹, Alex Coccia¹, Adriano Meta¹</div> <div>¹MetaSensing</div>
11:50 – 12:10	<div>EuMC52-4 7T MRI Loop Antenna for Carotid Imaging</div> <div>Lars Hinge¹, Nicolai Mortensen¹, Vitaliy Zhurbenko¹, Vincent Öltman Boer¹, Wenjun Wang¹</div> <div>¹Technical University of Denmark, ²Copenhagen University Hospital Hvidovre</div>	<div>EuRAD12-4 Interference Avoidance and Mitigation in Automotive Radar</div> <div>Mouhammad Alhumaidi¹, Markus Wintermantel¹</div> <div>¹Continental AG</div>	<div>EuRAD13-4 MicroESM: broadening the application of passive radar detection</div> <div>John Roe¹</div> <div>¹Esroe Ltd</div>	<div>EuRAD14-4 The SWALIS Project: First Results for Airborne Radar Measurements in Ka-Band</div> <div>Jean-Claude Kokou KOUIM¹, Stéphane Méric¹, Eric Pottier¹, Guy GRUNFELDER²</div> <div>¹Institut d'Électronique et de Télécommunications de Rennes, Insa Rennes, ²Institut d'électronique et de télécommunications de Rennes, IETR, ³CNRS, Institut d'Électronique et de Télécommunications de Rennes, UMR-6164</div>
12:10 – 12:30	<div>EuMC52-5 Intracellular Delivery of Graphene Oxide Quantum Dots for Bio-Imaging and Ferric Ion Sensing Based on Bulk Acoustic Wave Resonator</div> <div>Miaosen Zhang¹, Shan He¹, Xuexin Duan¹, Wei Pang¹, Yanyan Wang¹</div> <div>¹Tianjin University</div>	<div>EuRAD12-5 Analysis of Automotive Radar Interference Mitigation for Real-World Environments</div> <div>Mate Toth¹, Johanna Rock², Paul Meissner¹, Alexander Melzer¹, Klaus Witrisal¹</div> <div>¹Infineon Technologies AG, Graz University of Technology, ²Graz University of Technology, ³Infineon Technologies Austria AG</div>	<div>EuRAD13-5 Microwave Photonics as an Emerging Technology to enhance EW receivers</div> <div>David Lázaro Loscos¹</div> <div>¹Indra</div>	<div>EuRAD14-5 Direct Ocean Surface Velocity Measurement for Chinese Gaofen-3 SAR Satellite</div> <div>Lai Liu¹, Mihai Detcu¹, Qingjun Zhang¹, Gottfried Schwarz², Yadong Liu¹, Jie Liu¹</div> <div>¹Beijing Institute of Spacecraft System Engineering, China Academy of Space Technology, ²Remote Sensing Technology Institute, German Aerospace Center (DLR)</div>

THURSDAY 12:30 – 14:10

Hall 1

EuRAD15

EuRAD Interactive Poster Session

Chair: Jacco de Wit¹

Co-Chair: Mark Oude Alink²

¹TNO, ²University of Twente

12:30 – 13:50

Technology in Context

Frans von der Dunk

"The Law of Space"

Room: Aditorium

Refer to p. 27 for more information.

EuRAD15-1

On the Needlessness of Signal Bandwidth for Precise Holographic Wireless Localization

Melanie Lipka¹, Stefan Brückner¹, Erik Sippel¹, Martin Vossiek¹

¹FAU Erlangen-Nuremberg

EuRAD15-5

A Radar Target Simulator for Generating Synthesised and Measured Micro-Doppler-Signatures of Vulnerable Road Users

Johannes Iberle¹, Patrick Rippl¹, Thomas Walter¹

¹University of Applied Sciences Ulm

EuRAD15-9

Scalable 2×2 MIMO Radar with BPSK Data Communication at 79 GHz

Wael A. Ahmad¹, Arzu Ergintav¹, Maciej Kucharski¹, Dietmar Kissinger¹, Herman Jalli Ng¹

¹IHP - Leibniz-Institut für innovative Mikroelektro-nik, ²Ulm University

EuRAD15-13

Series-Fed Single-Layer Ring Resonator Antenna Array with Wide Fan-Beam and High Gain

Hyunyoung Cho, Hye-Won Jo¹, ByungKwon Ahn¹, Ju-Ik Oh¹, Jong-Won Yu¹

¹Korea Advanced Institute of Science and Technology

EuRAD15-2

Dynamic Estimation of Vital Signs with mmWave FMCW Radar

Guigeng Su¹, Nikita Petrov², Alexander Yarovoy¹

¹Delft University of Technology, ²TU Delft

EuRAD15-6

RCS-Enhancement for Improving the Detectability of Bikes in Road Safety Applications

Corentin Charlo¹, Stéphane Méric², Raphaël Gillard¹

¹Institut d'Électronique et de Télécommunications de Rennes, Insa Rennes, ²IETR, INSA

EuRAD15-10

Deep Neural Network Detection for Pulsed Radar-Embedded M-PSK Communications

Christopher Liu¹, Ric Romero²

¹USN, ²Naval Postgraduate School

EuRAD15-14

High Permittivity CPW-SIW Power Divider for Antenna Feed Networks in Airborne Phased Arrays Applications

Diego Lorente Catalan¹, Alicja Schreiber¹, Markus Limbach¹, Hector Esteban Gonzalez², Vicente Enrique Boria Esbert²

¹German Aerospace Center (DLR), ²Universidad Politécnica de Valencia

EuRAD15-3

Further Investigation of Two-Way Classification for Activities of Daily Living

Ronny G. Guendel¹

¹Delft University of Technology

EuRAD15-7

A Cognitive FMCW Radar to Minimize a Sequence of Range-Doppler Measurements

Marco Altmann¹, Peter Ott¹, Nicolaj C. Stache¹, Dmitrii Kozlov¹, Christian Waldschmidt²

¹Hochschule Heilbronn, ²Ulm University

EuRAD15-11

Vibrating Antenna Doppler Radar

Nathan Chordas-Ewell¹, Kevin Xu¹, Ravi Kadlimalatti¹, Adly T. Fam¹, Jun H. Choi¹

¹The State University of New York at Buffalo

EuRAD15-15

Novel Noise-Tolerant Method for Extracting Target Resonances Using Pulse Radar

Mihail Georgiev¹, Paul Rice², Jian-Kang Zhang¹

¹McMaster University, ²Patriot One Technologies

EuRAD15-4

Human Walking Detection by Cascaded Deep Neural Networks Classifying Micro-Doppler Signals

Jihoon Kwon¹, Nojun Kwak², Junho So³

¹Hanwha Systems, ²Seoul National University, ³Agency for Defense Development

EuRAD15-8

A Novel Velocity Estimation Algorithm for TDM-MIMO Based Automotive Radar

Ben Wang¹, Dejian Li¹, Dapeng Lao¹, Jiamin Chen¹

¹Hisilicon Technologies Co., Ltd.

EuRAD15-12

A New Radar Based On Panel Active Array

Jia Fang¹

¹cet38

EuRAD15-16

Avoiding Interference in Multi-Emitter Environments: A Reinforcement Learning Approach

Serkan Ak¹, Stefan Brüggewirth¹

¹Fraunhofer Institute for High Frequency Physics and Radar Techniques (FHR)

THURSDAY 13:50 – 15:30

	Auditorium	Expedition	Flash	Glow
	EuMC/EuRAD03 [Special Session] Focus Day: Active Array Antennas for Defence Chair: Peter Knott ¹ Co-Chair: Patrick Langlois ² ¹ Fraunhofer FHR, ² EDA	EuMC54 Low Noise Amplifier and Phased Array Module Chair: Almudena Suarez Rodriguez ¹ Co-Chair: Jean-François Villemazet ² ¹ University of Cantabria, ² Thales Alenia Space France	EuMC55 Antenna Characterisation Techniques Chair: Nuno Borges Carvalho ¹ Co-Chair: Olof Bengtsson ² ¹ Instituto de Telecomunicações, Universidade de Aveiro, ² Ferdinand-Braun-Institut (FBH)	EuMC56 [Focussed Session] Electromag-netics in Biomedical Applica-tions Chair: Maarten Paulides ¹ Co-Chair: Desmond T.B. Yeo ² ¹ Eindhoven University of Technology (TU/e), ² GE Global Research
13:50 – 14:10	EuMC/EuRAD03-1 Research progress of intelligent active phased array radar Jun Sun ¹ ¹ Nanjing Research Institute of Electronics Technology	EuMC54-1 A Full Ka-Band GaN-on-Si Low-Noise Amplifier Dristy Parveg ¹ , Mikko Varonen ¹ , Mikko Kantanen ¹ ¹ VTT Technical Research Centre of Finland	EuMC55-1 Preliminary Characterization of the Digitally Formed Beams of PHAROS2 Phased Array Feed Giuseppe Pupillo ¹ , Alessandro Navarrini ¹ , Andrea Melis ¹ , Raimondo Concu ¹ , Pierluigi Ortu ¹ , Pasqualino Marongiu ¹ , Giovanni Naldi ¹ , Simone Rusticelli ¹ , Andrea Saba ¹ , Alessandro Scalambra ¹ , Luca Schirru ¹ , Adelaide Ladu ² , Tonino Pisanu ² , Enrico Urru ² ¹ INAF - IRA, ² INAF - OAC, ³ ASI	EuMC56-1 Ultra-High Field MRI RF Transmit Coil Arrays Carel van Leeuwen ¹ , Bart Steensma ¹ , Alexander Raaijmakers ¹ ¹ University Medical Center Utrecht
14:10 – 14:30	EuMC/EuRAD03-2 Digital Frontends for Multi-Func-tional RF Systems Michael Brandfass ¹ ¹ Hensoldt Sensors GmbH	EuMC54-2 A High Linearity W-Band LNA With 21-dB Gain and 5.5-dB NF in 0.13 µm SiGe BiCMOS Huanbo Li ¹ , Jixin Chen ¹ , Debin Hou ¹ , Wei Hong ¹ , Pingin Yan ¹ ¹ Southeast University	EuMC55-2 Characterization and Calibration Challenges of a K-Band Large Scale Active Phased-Array Antenna with a Modular Architecture Naimeh Ghafarian ¹ , Wael Abdel-Wahab ¹ , Amir Raeesi ¹ , Ehsan Haj Mirza Alian Aminabad ¹ , Ardeshir Palizban ¹ , Ahmad Ehsandar ¹ , Milad Khaki ¹ , Mohammad-Reza Nezhad-Ahmadi ¹ , Safieddin Safavi-Naeini ¹ ¹ University of Waterloo	EuMC56-2 Non-Invasive Brain Stimulation: From Field Modeling to Neuronal Activation Rob Mestrom ¹ , Debby Klooster ¹ , Elles Raaijmakers ¹ , Maarten van Rossum ¹ , Martijn van Beurden ¹ , Paul Boon ² ¹ Eindhoven University of Technology, ² Ghent University
14:30 – 14:50	EuMC/EuRAD03-3 Naval and ground-based multi-mission AESA radars Simon van den Berg ¹ ¹ Thales Nederland B.V.	EuMC54-3 A MMIC Low-Noise Amplifier Realized with Two Different Gate Length GaN-on-Si Technologies Lorenzo Pace ¹ , Patrick Ettore Longhi ¹ , Walter Cicco-gnani ¹ , Sergio Colangeli ¹ , Rémy Leblanc ² , Ernesto Limiti ¹ ¹ University of Rome "Tor Vergata", ² OMMIC SAS	EuMC55-3 A Low Complexity Approach for Calibration and Characterization of a Millimeter-Wave Phased-Array Transceiver-Antenna Module Mehdi Salehi ¹ , Safieddin Safavi-Naeini ² , Mohammad-Reza Nezhad-Ahmadi ¹ ¹ Sinclair Technologies, ² University of Waterloo	EuMC56-3 7T MRI Fractionated Dipole Antenna for CarotidImaging Nicolai Mortensen ¹ , Lars Hinge ² , Vitaliy Zhurbenko ³ , Vincent Oltman Boer ³ ¹ Technical University of Denmark, ² DTU, ³ DRMCR
14:50 – 15:10	EuMC/EuRAD03-4 AESA Radar for Space Situational Awareness – about the status of GESTRA Helmut Wilden ¹ , C. Kirchner ¹ , Andreas R. Brenner, Thomas Eversberg ² ¹ Fraunhofer FHR, ² German Aerospace Center (DLR)	EuMC54-4 G-Band Frequency Converters in 130 nm InP DHB Technology Ahmed Hassona ¹ , Vessen Vassilev ¹ , Herbert Zirath ¹ ¹ Chalmers University of Technology	EuMC55-4 A Reproducible Semi-Virtual Test-Drive for Analysis of Car-to-Car/ Car-to-X Diversity Performance at 5.9 GHz in Noisy Fading Condi-tions Anton Dobler ¹ , Olha Voitsun ¹ , Stefan Lindenmeier ¹ ¹ University of the Bundeswehr Munich	EuMC56-4 Simulation Comparison of Bird-cage Coil and Metamaterial Liner for MRI at 3T and 4.7T Adam Maunder ¹ , Nicola De Zanche ¹ , Ashwin Iyer ¹ ¹ University of Alberta
15:10 – 15:30	EuMC/EuRAD03-5 AESA Radar Development at Lincoln Lab David Conway ¹ ¹ MIT Lincoln Laboratory	EuMC54-5 Millimetre-Wave Active Phased Array SiP Module for UE Devices in 5G Communications Wenyao Zhai ¹ , Hari Krishna Pothula ² , Morris Repeta ² , David Wessel ² , Wen Tong ² ¹ Huawei Technologies, ² Huawei Technologies CO., LTD	EuMC55-5 A Preliminary Study on Uncer-tainty of NB-IoT Measurements in Reverberation Chambers Anouk Hubrechsen ¹ , Vincent Neylon ² , Kate Remley ² , Robert Jones ² , Robert Horansky ² , Sander Bronckers ² ¹ Eindhoven University of Technology (TU/e), ² Natio-nal Institute of Standards and Technology	EuMC56-5 PNS Estimation of a High Performance Head Gradient Coil by a Coupled Electromagnetic Neurodynamic Simulation Method Yihe Hua ¹ , Desmond T.B. Yeo ¹ , Thomas KF Foo ¹ ¹ GE Global Research

THURSDAY 13:50 – 15:30

	Media Arena	Mission 1	Mission 2	Quest
	EuMC57 [Special Session] In Recogni-tion: Prof.Dr. A.T. de Hoop Chair: Peter Zwamborn ¹ Co-Chair: Arnold van Ardenne ² ¹ TNO Defense, Safety and Security, ² ASTRON (retired)	EuRAD16 Automotive Chair: André Bourdoux ¹ Co-Chair: Noam Arkind ² ¹ imec, Leuven, ² Arbe Robotics	EuRAD17 Advanced Techniques and Innovative Array Configura-tions for Direction of Arrival Estimation Chair: Laurent Ferro-Famil ¹ Co-Chair: Francois Le Chevalier ² ¹ University of Rennes 1, ² TU Delft	EuRAD18 SAR Applications Chair: Debora Pastina ¹ Co-Chair: Mikhail Cherniakov ² ¹ University of Rome La Sapienza, ² Universi-ty of Birmingham
13:50 – 14:10	EuMC57-1 A few Introductory remarks Arnold van Ardenne ¹ ¹ ASTRON (retired)	EuRAD16-1 Channel Influence for the Analysis of Interferences Between Auto-motive Radars Lizette Lorraine Tovar Torres ¹ , Maximilian Steiner ¹ , Christian Waldschmidt ¹ ¹ Universitat Ulm	EuRAD17-1 An IEEE 802.15.4 Wireless Half-Cubic Node Based on a Switched-Beam Antenna for Indoor Direction of Arrival Estimation Alessandro Cidronali ¹ , Giovanni Collodi ¹ , Matteo Lucarelli ¹ , Stefano Maddio ¹ , Marco Passafiume ¹ , Giuseppe Pelosi ¹ ¹ University of Florence	EuRAD18-1 Realistic SAR Implementation for Automotive Applications Hasan Iqbal ¹ , Andreas Löffler ¹ , Mohamed Nour Mejdoub ¹ , Frank Gruson ¹ ¹ Continental AG
14:10 – 14:30	EuMC57-2 To have “(De) Hoop” in Difficult Times Guy Vandenbosch ¹ ¹ KU Leuven	EuRAD16-2 Automotive Radar Interference Mitigation via Multi-Hop Coop-erative Radar Communications Canan Aydogdu ¹ , Musa Furkan Keskin ¹ , Henk Wymeersch ¹ ¹ Chalmers University of Technology	EuRAD17-2 Improving an IEEE 802.15.4 Based Direction of Arrival Estimation System Reliability in a Real Case Scenario Exploiting a Smart Multichannel Approach Alessandro Cidronali ¹ , Giovanni Collodi ¹ , Matteo Lucarelli ¹ , Stefano Maddio ¹ , Marco Passafiume ¹ , Giuseppe Pelosi ¹ ¹ University of Florence	EuRAD18-2 Space-Variant Phase Error Estima-tion and Correction for Auto-motive SAR Masoud Farhadi ¹ , Reinhard Feger ¹ , Johannes Fink ² , Thomas Wagner ² , Markus Gonser ² , Jürgen Hasch ² , Andreas Stelzer ² ¹ Johannes Kepler University Linz, ² Robert Bosch GmbH
14:30 – 14:50	EuMC57-3 Time-domain Antenna Engineering – A Story About Scientific Affinity Ioan Lager ¹ ¹ Delft University of Technology	EuRAD16-3 An Efficient Sparse Sensing Based Interference Mitigation Approach For Automotive Radar Tai Fei ¹ , Honghao Guang ¹ , Yuliang Sun ¹ , Christopher Grimm ¹ , Ernst Warsitz ² ¹ HELLA GmbH & Co. KGaA,	EuRAD17-3 Selecting the best DOA estimates among estimates obtained using Toeplitz matrix approximation and general covariance matrix Volodymyr Vasylyshyn ¹ ¹ Kharkiv national Air force university	EuRAD18-3 Ego-Motion Estimation for a Sen-sor Platform by Fusion of Radar and IMU Data Patrick Wallrath ¹ , Reinhold Herschel ¹ ¹ Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR, ² Fraunhofer FHR
14:50 – 15:10	EuMC57-4 The Cagniard-deHoop Method of Moments (CdH-MoM) – A New Time-Domain Integral-Equation Technique Based on EM Reciprocity and the Cagniard-deHoop Method Martin Stumpf	EuRAD16-4 Over-the-Air Vehicle-in-the-Loop Test System for Installed-Perfor-mance Evaluation of Automotive Radar Systems in a Virtual Environment Sreehari Buddappagari Jayapal Gowdu ¹ , Ehtisham Asghar Muhammad ¹ , Johannes Nagel ¹ , Ralf Stephan ¹ , Matthias A. Hein ¹ ¹ TU Ilmenau, ² Mercedes-Benz AG	EuRAD17-4 A Discriminant-Based RMSE Improvement Technique for Classical Prony Method in Small Array Radars Atsushi Yoshizawa ¹ , Shigenori Uchida ¹ ¹ Sony Corp.	EuRAD18-4 Azimuth Ambiguity Discrimination Using Doppler Spectrum of the Compressive Sensing-Based SAR Image with Downsampled PRF Ryogo Horiuchi ¹ , Takehiro Hoshino ¹ , Noboru Oishi ¹ , Kei Suwa ¹ ¹ Mitsubishi Electric Corporation
15:10 – 15:30	EuMC/EuRAD03-5 AESA Radar Development at Lincoln Lab David Conway ¹ ¹ MIT Lincoln Laboratory	EuRAD16-5 A Roadside Camera-Radar Sensing Fusion System for Intelligent Transportation Lefei Wang ¹ , Zhaoyu Zhang ¹ , Xin Di ¹ , Jun Tian ¹ ¹ Fujitsu Research and Development Center Co., Ltd, China	EuRAD17-5 Direction of Arrival Estimation using the Generalized SPICE Criterion Adham Sakhnini ¹ ¹ Centre for Mathematical Sciences, Lund University	EuRAD18-5 Spatial Mapping of Material Properties utilizing FMCW Near Field Radar Scans Sebastian Pawliczek ¹ , Reinhold Herschel ¹ , Nils Pohl ¹ ¹ Ruhr University Bochum, ² Fraunhofer FHR

THURSDAY 14:30 – 16:20

Hall 1

EuMC58

EuMC Interactive Poster Session 3

Chair: Sander Bronckers¹
Co-Chair: Mark Oude Alink²
¹Eindhoven University of Technology, ²University of Twente

EuMC58-1
Design of Wideband Frequency Selective Absorber Based on Multilayer Structures

YE Han¹, Longjie Xu¹, Hanjing Xu¹, Siyu Xie¹
¹Nanjing University of posts and telecommuni-cation

EuMC58-6
GaN-FET Class-E Amplifier for 60-MHz Radar

Frederick Raab¹
¹Green Mountain Radio Research

EuMC58-11
Cross-Polarization Chipless Tag for Orientation Sensing

Nicolas Barbot¹, Olivier Rance¹, Etienne Perret¹
¹Grenoble Alpes University

EuMC58-16
A 79-GHz Automotive Wide-Beam Patch Antenna With I-Shaped Parasitic Elements

Guan-Ren Su¹, Eric S. Li¹, Jia-Chang Chen¹, Ting-Wei Kuo¹, Yu-You Lin¹, Kuo-Sheng Chin²
¹National Taipei University of Technology, ²Chang Gung University

EuMC58-2
A 2.5 GHz Tunable Negative Varactor of Inductance Using Re-configurable Non-Foster Circuit

Ngoc Duc Au¹
¹Soongsil University

EuMC58-7
A High Efficiency Compact Class F GaN MMIC Power Amplifier for 5G Applications

Rachit Joshi¹, Min-Hsin Liu¹, Shawn S. H. Hsu¹
¹National Tsing Hua University

EuMC58-12
Anti-Aliasing Digital Predistor-tion for Nonuniform-Sampling-Rate Concurrent Dual-Band Transmitters

Long Chen¹, Wenhua Chen¹, Youjiang Liu², Zhenghe Feng¹
¹Tsinghua University, ²China Academy of Enginee-ring Physics

EuMC58-17
Hemishperical Coverage Antenna using Pattern Reconfiguration of Electronically Steerable Parasitic Array Radiator and Microstrip Patch

ByungKwon Ahn¹, Hyunyoung Cho¹, Hye-Won Jo¹, Ju-Ik Oh¹, Jong-Won Yu¹
¹Korea Advanced Institute of Science and Technology

EuMC58-3
Design of a Cloak with Diago-nally Slotted Square Patch for TE and TM Scattering Reduction

Archana Rajput¹, Mehran Manzoor Zargar¹, Kushmanda Saurav¹, Shibam Kishen Koul²
¹INDIAN INSTITUTE OF TECHNOLOGY JAMMU, ²Indian Institute of Technology Delhi

EuMC58-8
Reliable Structural Failure Detection in Eye Bolts using Reflectometry Signals

H. V. H. Silva Filho¹, D. C. P. Barbosa¹, M. S. Coutinho¹, M. T. de Melo¹, R. G. M. dos Santos¹, Ignacio Llamas Garro²
¹Universidade Federal de Pernambuco, ²Centre Tecnològic de Telecomunicacions de Catalunya

EuMC58-13
A Complementary Series-Parallel Resonant Circuit Pair and Its Application in Linearization of Power Amplifiers

Zeji Gu¹
¹Ampleon USA

EuMC58-18
Antenna Library for IoT Devices with Antenna Boosters

Jaume Anguera¹
¹Fractus Antennas and Universitat Ramon Llull

EuMC58-4
A Compact Load-Modulation Amplifier for Improved Efficiency Next Generation Mobile

Ahmed Abdulkhaleq¹, Maan Yahya², Yasir Al-Yasir³, Naser Ojaroudi Parchin¹, Maryam Sajedin¹, Syed Muhammad Syed Anera¹, Ashwain Rayit¹, Issa Elfer-gani¹, Raed A. Abd-Alhameed¹, Jonathan Rodriguez²
¹Saras Technology, ²Northern Technical University, ³University of Bradford, ⁴Instituto de Telecomu-nicações

EuMC58-9
Integrated System with En-hanced Performances to Recover Energy from Microstrip Circuits

Miguel Sanchez-Soriano¹, Yves Quéré², Cédric Quendo¹
¹University of Alicante, ²University of Brest

EuMC58-14
Technique for Load-Independent Millimeter-Wave Output Power Monitoring for Mass-Volume Testing

Matthias Saurer¹, Vadim Issakov¹, Oliver Frank¹
¹Infineon Technologies

EuMC58-19
Analysis and Optimization of Packaged Floating-Ground RF Power GaN-HEMTs

Sophie Paul¹, Wolfgang Heinrich¹, Olof Bengtsson¹
¹Ferdinand-Braun-Institut (FBH)

EuMC58-5
A 65 W Power Amplifier without Load Modulation to Achieve 50% Efficiency at 8 dB Power Back-Off over 1.8-2.5 GHz

Paul Saad¹, Rui Hou¹, Richard Hellberg¹, Bo Berglund¹
¹Ericsson AB

EuMC58-10
An Efficient Wireless Power Transfer for Retinal Prosthesis using Artificial Intelligent Algorithm

Nam Ha-Van¹, Lam Vu Tung¹
¹Soongsil University

EuMC58-15
A Microstrip Filtering Patch Antenna with Asymmetric Gain Response

Yun Wu¹, Jinhao Dai¹, Liang Sun¹, Yi Wang², Yunlong Lu¹, Jifu Huang³
¹Institute of Physics, Chinese Academy of Sciences (IOP, CAS), ²University of Birmingham, ³Ningbo University

Enjoy:

Don't miss the Week's last opportunity to enjoy an insightful walk between the posters of Thursday's session.

THURSDAY 16:10 – 17:50

ROOM

Polar

EuMW03
EuMW/EuMC Closing Session

Chair: Frank E. van Vliet¹, General Chair
Co-Chair: Wim van Cappellen², EuMC Chair
¹TNO, ²ASTRON

16:10 – 16:20

Session Welcome
Frank E. van Vliet
General Chair

17:40 – 17:50

Closing Remarks and Invitation to EuMW 2021 in London
Frank E. van Vliet, Nick Ridler¹
¹EuMW 2021 General Chair

16:20 – 16:50

Laser Communications: A Game Changer
Laurent Grouès¹
¹Deputy HO EDRS - SpaceDataHighway, Airbus Defence & Space, Germany

Laser communications are changing the way we think about connectivity. A quick dive into the end to end systems architectures of the future. The exciting new applications and markets which the new technology will unlocked. This keynote will address Laser Communications emerging technology, the challenges and opportunities ahead. Laser Communications are disrupting the connectivity solutions landscape and will bring a considerable differentiator to the early adopters.

16:50 – 17:10

Awards Ceremony
Marion K. Matters-Kammerer
Awards and Prizes Chair

17:10 – 17:40

New Frontiers for Wave Engineering Using Metamaterials
Andrea Alù¹
¹CUNY Advanced Science Research Center, Photonics Initiative, US

Metamaterials are engineered materials with properties that go well beyond what offered by nature, providing unprecedented opportunities to tailor and enhance the control of waves. In this talk, I discuss our recent activity at microwaves and THz frequencies, showing how suitably tailored meta-atoms and their arrangements open exciting avenues for wave manipulation, including metasurfaces with enhanced wavefront manipulation, and magnet-free nonreciprocity and topological phenomena. Insights into the underlying physics and new devices based on these concepts will be presented.

FRIDAY

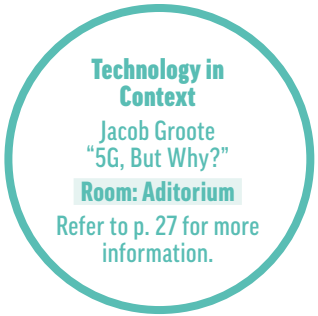
Room	08:30 – 10:10			13:50 – 15:30		EVENING PROGRAMME
	08:30 – 10:10	10:50 – 12:30		13:50 – 15:30	16:10 – 17:50	
Progress				EuRAD25 Closing Session		
Mission 1	EuRAD19 MIMO Radar	EuRAD22 Automotive Radar MIMO Processing				
Mission 2	EuRAD20 Passive Radars	EuRAD23 Target Characterisation with Radar				
Quest	EuRAD21 New Radar Concepts	EuRAD24 [Special Session] Civilian Radar Research and Development in China				
Expedition	S-02 Cognitive Radar Signal Processing			S-01 Introduction to MIMO Radar		
Auditorium	5G Forum 5G: From Technology to Business		Technology in Context 5G, But Why?	5G Forum 5G: From Technology to Business		
Flash	W-21 Recent Advances in Topologies, Technologies and Practical Realizations of Microwave Sensors					
Glow	W-30 Recent Advances on Microwave Filters					
BOR 2	W-32 Practical Aspects of Running a Microwave Laboratory and How to Make Good Measurements Every Time					
Transitzone A			EuRAD Seated Lunch			
Transitzone B			5G Forum and WS/SC Seated Lunch			

FRIDAY 08:30 – 10:10

Mission 1		Mission 2		Quest	
EuRAD19 MIMO Radar		EuRAD20 Passive Radars		EuRAD21 New Radar Concepts	
Chair: Andreas Stelzer ¹ Co-Chair: Matthew Ritchie ² ¹ Johannes Kepler University Linz, ² UCL		Chair: María-Pilar Jarabo-Amores ¹ Co-Chair: Nathan Goodman ² ¹ University of Alcalá, ² University of Oklahoma		Chair: Daniel O'Hagan ¹ Co-Chair: Pierfrancesco Lombardo ² ¹ Fraunhofer FHR, ² Sapienza University of Rome	
08:30 – 08:50		EuRAD20-1 Airborne Targets Detection by UAV-Embedded Passive Radar		EuRAD21-1 Cognitive approaches to detection of small targets	
André Dürr ¹ , Benedikt Schnee ¹ , Dominik Schwarz ² , Christian Waldschmidt ¹ ¹ Ulm University		Benjamin GABARD ¹ , Valentine WASIK ¹ , Olivier RABASTE ¹ , Thierry DELOUES ¹ , Dominique POULLIN ¹ , Hervé JEULAND ¹ ¹ ONERA		Ellis Humphreys ¹ , Michael Antoniou ¹ , Christopher Baker ¹ , William Stafford ² ¹ University of Birmingham, ² BAE Systems	
08:50 – 09:10		EuRAD20-2 Comparing Phase-Locked and Non-Phase-Locked Architectures for Dual-Channel DVB-S Passive Radar		EuRAD21-2 Co-Engineering of a Radar System with Mixed Grey Wolf Optimizer: Application to Concealed Object Classification	
Ricard Grove ¹ , Jørgen Dall ¹ ¹ DTU Space		Octavio Cabrera ¹ , Pierfrancesco Lombardo ¹ , Fabiola Colone ¹ , Carlo Bongioanni ¹ ¹ Sapienza University		Julien Marot ¹ , Claire Migliaccio ² , Jérôme Lanteri ³ , Paul Lauga ¹ , Salah Bourennane ¹ ¹ Institut Fresnel, Aix Marseille Université, ² Université Côte d'Azur, ³ Université Cote d'Azur - CNRS, ¹ Inst. Fresnel, Aix Marseille Université	
09:10 – 09:30		EuRAD20-3 Characterization of Single Frequency Networks for Passive Radar Applications		EuRAD21-3 Millimeter- and Submillimeter-Wave Differential Absorption Radar	
Harun Cetinkaya ¹ , Sandra Nowok ¹ , Reinhold Herschel ¹ ¹ Fraunhofer FHR		Volker Winkler ¹ , Steffen Lutz ¹ , Michael Brandfass ¹ ¹ Hensoldt Sensors GmbH		Ken Cooper ¹ , Richard Roy ¹ , Jose V. Siles ¹ , Matthew Lebsock ¹ , Luis Millan ¹ , Raquel Rodriguez-Monje ¹ , Robert Dengler ¹ , Omkar Pradhan ¹ , Leslie Tamparai ¹ , Brian Drouin ¹ ¹ Jet Propulsion Laboratory, California Institute of Technology	
09:30 – 09:50		EuRAD20-4 Passive DVB-T SAR Phenomenology: First Results from a Bistatic Campaign		EuRAD21-4 Passive Radio Imaging of Hybrid Radar System for Security Inspections	
David R. Sanchez-Jacome ¹ , Salvatore Maresca ² , Carsten Rockstuhl ¹ , Paolo Ghelfi ¹ , Antonella Bogoni ¹ ¹ Karlsruhe School of Optics and Photonics, Karlsruhe Institute of Technology, Karlsruhe, Germany, ² Scuola Superiore Sant'Anna - TECIP, ¹ PNTLab, Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT), Pisa, ¹ TeCIP Institute, Scuola Superiore Sant'Anna, Pisa		George Atkinson ¹ , Michael Antoniou ¹ , Mikhail Cherniakov ¹ ¹ University of Birmingham		Naruto Yonemoto ¹ ¹ ENRI/MPAT	
09:50 – 10:10		EuRAD20-5 A DVB-T Passive Radar 3D-Detection Approach Based on Non-Coherent Spatial Integration		EuRAD21-5 The Application of Performance Metrics to Staring Radar for Drone Surveillance	
Rabia Zainab Syeda ¹ , Timofey Savelyev ² , Martijn van Beurden ¹ , Bart Smolders ¹ ¹ Eindhoven University of Technology, ² Radarxense BV		Nerea del Rey-Maestre ¹ , María-Pilar Jarabo-Amores ¹ , David Mata-Moya ¹ , Anabel Almodóvar-Hernández ¹ , Pedro José Gómez-del-Hoyo ¹ ¹ University of Alcalá		Mohammed Jahangir ¹ , Bashar Ahmad ² , Christopher Baker ³ ¹ University of Birmingham, ² Aveillant Limited, ³ The University of Birmingham	

FRIDAY 10:50 – 12:30

	Mission 1	Mission 2	Quest
	EuRAD22 Automotive Radar MIMO Processing Chair: Reinhard Feger ¹ Co-Chair: Kevin Cinglant ² ¹ Johannes Kepler University Linz, ² ZF	EuRAD23 Target Characterisation with Radar Chair: Christopher Baker ¹ Co-Chair: Jacco de Wit ² ¹ University of Birmingham, ² TNO	EuRAD24 [Special Session] Civilian Radar Research and Development in China Chair: Cheng Hu ¹ Co-Chair: Alexander Yarovoy ² ¹ Beijing Institute of Technology, ² TU Delft
10:50 – 11:10	EuRAD22-1 High Angle Resolution Automotive Radar Based on Simultaneous 12 Tx Doppler-Multiplex MIMO Nadjah Touati ¹ , Christian Sturm ¹ ¹ Valeo Schalter und Sensoren GmbH	EuRAD23-1 Physics Based Radar Simulation Thijs van Putten ¹ , Rogier van Aken ¹ , Michael Phillips ¹ INDUSTRIAL KEYNOTE ¹ Siemens Digital Industries Software	EuRAD24-1 Probabilistic Deep Models for Radar Target Recognition Bo Chen ¹ ¹ Xidian University
11:10 – 11:30	EuRAD22-2 Fast Chirp MIMO Radar System using Doppler Offset Orthogonal Codes Takaaki Kishigami ¹ , Kenta Iwasa ¹ , Tomohiro Yui ¹ , Hidekuni Yomo ¹ , Akihiko Matsuoka ¹ , Junji Satou ¹ ¹ Panasonic Corporation	EuRAD23-2 Towards Safe Autonomous Driving: Challenges of Pedestrian Detection in Rain with Automotive Radar Dagmar Steinhäuser ¹ , Thomas Brandmeier ¹ , Patrick Held ¹ , Bernhard Thöresz ¹ ¹ Technische Hochschule Ingolstadt	EuRAD24-2 Entomological Radar Signal Processing and Experimental Validation Cheng Hu ¹ , Weidong Li ¹ , Rui Wang ¹ ¹ Beijing Institute of Technology
11:30 – 11:50	EuRAD22-3 Millimeter-Wave Automotive Radar using Extrapolation for Improved Angular Resolution Cristian-Alexandru Alistarh ¹ , Laura Anitori ² , Symon K. Podilchak ³ , John Thompson ⁴ , Pascual David Hilario Re ⁵ , Mathini Sellathurai ⁶ , George Goussetis ⁷ , Jaesup Lee ⁸ ¹ Heriot-Watt University, ² TNO, ³ The University of Edinburgh, ⁴ Heriot Watt University, ⁵ Samsung Advanced Institute of Technology	EuRAD23-3 High Resolution 802.11Ax-Based Passive Radar for Human Movement Monitoring Hasan Can Yildirim ¹ , Laurent Storrer ¹ , François Rottenberg ² , Jérôme Louveaux ² , Philippe De Doncker ³ , François Horlin ⁴ ¹ Université Libre de Bruxelles, ² Université catholique de Louvain	EuRAD24-3 Coherent Multidimensional Agility Radar Signal Processing Wen-Qin Wang Wang ¹ ¹ University of Electronic Science & Technology of China
11:50 – 12:10	EuRAD22-4 Kalman Tracking in Driver Assistance Systems - Collision Warning for Vulnerable Road Users Simon Hüsges ¹ , Christoph Degen ¹ ¹ Hochschule Niederrhein University of Applied Sciences	EuRAD23-4 Refraction Compensation for Non-Destructive Testing of Fibre-Composite Materials André Froehly ¹ , Reinhold Herschel ¹ ¹ Fraunhofer FHR	EuRAD24-4 The State-of-the-Art of Terahertz Technologies and Applications Weidong Hu ¹ ¹ Beijing Institute of Technology
12:10 – 12:30	EuRAD22-5 Automatic Delay and Phase Mismatch Calibration in FMCW MIMO Radar Adrian Figueroa ¹ , Niko Joram ¹ , Frank Ellinger ¹ ¹ TU Dresden	EuRAD23-5 Size estimation of space debris models from their RCS measured in anechoic chamber Selenia Ghio ¹ , Marco Martorella ² ¹ Consorzio Nazionale Interuniversitario Telecomunicazioni (CNIT), ² CNIT - University of Pisa	EuRAD24-5 Microwave photonics Radar Technology Wangzhe Li ¹ ¹ Institute of Electronics of the Chinese Academy of Sciences



FRIDAY 13:50 – 15:10

ROOM	Progress
	EuRAD25 EuRAD Closing Session Chair: Mayazsurra Ruggiano ¹ , EuRAD Chair Co-Chair: Jacco de Wit ² , EuRAD TPC Chair ¹ Thales Nederland B.V., ² TNO
13:50 – 14:30	Multi-Band Functionally Integrated Multi-Function Radar Sensor Suites Winston van Oosterhout ¹ ¹ Thales Nederland B.V., The Netherlands Current and future naval missions are evolving. The operational scene that we know today is likely to change at an increasing pace: technological developments occur not only in defense mission systems, but also in threats that rely on the very same developments. This means that future missions have a high level of uncertainty, increasing the naval challenges that we know today. Naval combat systems call for developments that are designed around the expectation for the unexpected. One of the answers to overcome such uncertainty, is the extension of today’s multi-function radar systems to multi-band, functionally integrated sensor suites. With scalability in the genes, reconfigurability is the extension to deploy the benefits that multi-band radar sensor suites have to offer. This is further augmented by the incremental capability upgrades that have emerged with radar systems which have a large dependency on software defined functionalities. This talk shows developments that Thales has undertaken in the Dutch radar ecosystem to provide an answer in the radar and adjacent domains to overcome the challenges that are foreseen in the naval domain. A sneak preview is given of the suite architectural setup, main subsystems and underlying technologies to highlight the benefits of multi-band functionally integrated multi-function radar sensor suites.
14:30 – 14:50	Awards Ceremony Marion K. Matters-Kammerer Awards and Prizes Chair
14:50 – 15:10	Closing Remarks and Invitation to EuRAD 2021 in London Mayazsurra Ruggiano, James Watts ¹ ¹ EuRAD 2021 Chair

Welcome from the Workshop and Short Courses Chair

The Workshops and Short Courses program is one of the major scientific components of the European Microwave Week. In this year edition, despite the difficulties due to the Corona virus pandemic and the necessity to re-organize the conference, we are pleased and proud to be able to offer a wide range of workshops and short courses, covering all most relevant topics in the microwave field, ranging from classical to upcoming technology areas. A total of 32 workshops and short courses will be presented throughout the entire week, and will cover topics of interest to both experts as well as junior scientists entering the amazing microwave world.

Short courses offer the possibility to get acquainted with a new topic while workshops will get you up to speed on a specific subject through a hand-picked set of lectures given by the best scientists and “microwave practitioners” in the field. Upcoming technologies and applications like 5G and full-duplex communications, quantum computing, as well as automotive radar and micro-Doppler target classification, will be presented by world recognized experts in the field. A large number of workshops will also address technological topics like GaN, CMOS, SiGe as well as THz-technologies. Fundamental knowledge is provided in short courses on circuit design and high power amplifiers, MIMO and cognitive radar

fundamentals. Workshops and short courses on practical measurements methodologies and filter design will also be presented. Each workshop and short course is individually endorsed by one or two of the conferences within the 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.

The workshop and short courses program is distributed throughout the entire week. Workshops that focus on topics relevant to 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. Please note that upon registration to one WS/SC, you will receive not only the proceedings of that workshop, but of all workshops and short courses presented during the entire week. These will be available for download via a weblink provided after registration to one of the WS/SC. The material will be available for download from 2 to 31 January 2021.

We are very grateful to all the organizers, presenters and authors of the

workshop and short course materials for their hard work. It is thanks to their outstanding spirit and dedication to this field and to this conference that the European Microwave Week 2020 has survived the pandemic.

I would like to thank the whole EuMW2020 team and my collaborator Sofia Kotti who supported me in the organization of the workshops and short courses for their hard work and dedication to this conference. Despite all difficulties of this pandemic year, it was a real pleasure and a source of fun to be able to work, organize and re-organize this conference with you all. Thanks for making the microwave field so lively and exciting.

Finally, I would like to encourage everyone working in this field to become part of our community and join us in organizing future European Microwave Conferences. There is so much to learn from this community, even beyond microwaves!



LAURA ANITORI
Workshop and Short Courses Chair
TNO, The Netherlands



SOFIA KOTTI
Workshop, Short Courses Co-Chair
TNO, The Netherlands

SUNDAY 08:30 – 17:50

Fundamentals of Microwave PA Design

Chair: Paolo Colantonio¹

Co-Chair: Franco Giannini¹

¹University of Roma Tor Vergata

Room: Auditorium

Semiconductor Power Amplifiers are key components in radio frequency and microwave transmitter systems. They have received a great deal of attention and development effort over the last decades and are still a hot topic in research area. This short course aims to provide a comprehensive overview of all aspects of fundamental semiconductor microwave power amplifier design. It is an introductory course, aimed at graduate engineers who have moved into the field of RF design, as well as to microwave designers who aim to deeply understand the power amplifier basic concepts. This short course features a range of presentations and will provide a comprehensive overview and basic understanding on recent important progress and novel state-of-the-art achievements in semiconductor power amplifiers. Very recent advances in semiconductor amplifiers and their applications will also be covered.

Starting from the fundamental concepts on semiconductor devices, the core of a power amplifier design, the theoretical foundations of a power amplifier design are discussed. It will include fundamental concepts and

state-of-the-art results on actual designs of a range of semiconductor power amplifiers using existing foundries. The load pull technique is also addressed and focused on the designer perspective.

The presentations will also cover a variety of advanced topics, and will provide the attendees with a clear overview of the main streams of current and important research trends worldwide in this field, as the Doherty architecture and the more recent load modulation power amplifier design concepts.

The short course will also focus on the major challenges, such as stability (small and large signal) and how to address these in amplifier design. Finally, accounting for the linearity issue, a basic overview on linearization techniques and their adoption to properly mitigate the amplifier distortion effects will conclude the short course.

S-03
EuMIC

PROGRAMME

Semiconductor Devices for PAs

Ilcho Angelov¹
¹Chalmers University of Technology

PA Theoretical Foundation

Franco Giannini¹
¹University of Roma Tor Vergata

Design and Model Oriented Load Pull Techniques

Marco Pirola¹
¹Politecnico di Torino

The Doherty Power Amplifier

Paolo Colantonio¹
¹University of Roma Tor Vergata

Load Modulated PAs

Steve Cripps¹
¹Cardiff University

X-Parameters High-Power PAs Modeling for System Level Analysis

Alessandro Cidronali¹
¹University of Florence

Linear and Nonlinear Stability Analysis of Power Amplifiers

Giorgio Leuzzi¹
¹University of L'Aquila

Linearization Techniques Overview

Pere L. Gilabert¹, Gabriel Montoro¹
¹Universitat Politècnica de Catalunya

Design of a C-band Single-Stage Hybrid 100W GaN PA

Francesco Scappaviva¹, Davide Resca¹
¹MEC srl

SUNDAY 08:30 – 17:50

High Performance GaN MMICs

Chair: Rüdiger Quay¹

Co-Chair: Farid Medjdoub²

¹Fraunhofer IAF, ²University of Lille

Room: Mission 1

GaN technologies are ongoing drivers for system advancements. The workshop gives an overview of the progress of important Gallium Nitride MMIC technologies available to the microwave and RF community for frequencies from 400 MHz to 200 GHz. Important industrial major vendors of GaN MMICs do contribute. Eight international speakers will give their view to the evolution of important applications such as sensing, defence, data com, and 5 and 6G with emphasis on IC technology. Their roadmaps will be provided to enable the audience to estimate the progress of MMIC on a global scale. Further, the research progress with respect to higher frequency scaling beyond commercial technologies are addressed. The first talk by Qorvo addresses various self-configuring and frequency

reconfigurable GaN design techniques with applications to power amplifiers, switches, limiters and self-interference rejection. The UMS presentation will present the recent development of GaN power technologies addressing X to Q bands. The link with applications like space and 5G applications will be emphasized through different demonstrators, some of them being complete System-In-Package. The paper by Win will provide an overview of WIN Semiconductor's GaN platforms used in wireless Infrastructure and satellite communications. Device-level RF performance data will be presented along with select MMIC results from several customers. The talk by Ommic will review how scaled down GaN /Si fully complements sub 40-nm CMOS to meet the stringent specifications

and cost budget of mmW 5G base stations, handsets and backhaul links. The presentation by Wolfspeed will discuss size, power density, and efficiency the demands, focus on key developments to enable MMICs for backhaul and satcom, and present examples of designs. The talk by Fraunhofer will discuss several design approaches for enhancing the performance of GaN-based amplifier MMICs for applications above 100 GHz. The presentation by Sumitomo introduces real GaN HEMT 5G basestation PAs in terms of performance, reliability, and cost competitiveness. The final speaker will give a talk on the impact of GaN with a European defense perspective.

W-03
EuMIC

PROGRAMME

Self-Configuring, Adapting and Reconfigurable GaN MMICs

Charles Campbell¹

¹Qorvo

Recent Development of GaN Power Technology Applied to RF Sensors

Didier Floriot¹

¹United Monolithic Semiconductors

WIN GaN HEMT Platforms

David Danzilio¹

¹Win Semiconductors

State-Of-The-Art mmW GaN/Si MMICs

Marc Rocchi¹

¹Ommic

Design of High Performance Microwave and Millimeter Wave GaN HPAs

Jeremy Fisher¹

¹Wolfspeed

Design of GaN Power Amplifier MMICs Operating Beyond 100 GHz

Maciej Ćwikliński¹

¹Fraunhofer IAF

GaN HEMT Power Amplifier Technologies for 5G Basestations

Kazutaka Inoue¹

¹Sumitomo

Perspectives using GaN Devices in Defense Systems

Jean-Marc Tanguy¹

¹French MOD

SUNDAY 08:30 – 17:50

Sub-mmWave On-Wafer Measurements

Chair: Viktor Krozer¹

Co-Chair: Ralf Doerner¹

¹Ferdinand-Braun-Institut (FBH)

Room: Spark

The workshop focuses on on-wafer device characterisation techniques, methodologies, and modelling for device operating well beyond 100 GHz. Many of these aspects have entered into focus due to the increased interest in electronic and photonic devices, circuits, and systems for communications and sensing applications. The presentations will present effects especially important at mm-wave and sub-mm-wave frequencies, potential pitfalls and how to overcome those when performing on-wafer measurements. The workshop will cover electronic and photonic approaches to on-wafer characterisation of active and passive devices, will enlighten broadband measurement capabilities, and will present not only small-signal characterisation, but also large-signal, noise, and power characterisation techniques.

On-wafer antenna measurement systems and photonic approaches to on-wafer optoelectronic device characterisation will be discussed.

W-06
EuMIC

PROGRAMME

Uncertainties in On-Wafer Measurements at mm- and Sub-mm-Wave Frequencies

Uwe Arz¹

¹Physikalisch Technische Bundesanstalt (PTB)

A Practical Guide for Verifying On-Wafer Measurement System Integrity at sub-mm-Wave Frequencies

Ralf Doerner¹, Andrej Rumiantsev²

¹Ferdinand-Braun-Institut (FBH), ²MPI Corporation

Guidelines for the Design of Calibration Substrates, Including the Suppression of Parasitic Modes, Influence of Microwave Probes and Crosstalk Effects up to W-Band

Gia Ngoc Phung¹

¹Physikalisch Technische Bundesanstalt (PTB)

Broadband 220 GHz VNA Calibration and Measurement Techniques

Steve Reyes¹

¹Anritsu

Impact of Calibration Uncertainties on Device Modelling

Tom Keinicke Johansen¹

¹Technical University of Denmark

On-Wafer Noise Measurements Above 110 GHz

Mikko Kantanen¹

¹Millimeter Wave Laboratory of Finland – MilliLab

Micromachined Wafer Probes with Integrated Detectors for Power Measurements

Robert Weikle, II¹

¹University Virginia / Dominion Inc.

Sub-THz Load-Pull Techniques

Marco Spirito¹

¹Delft University of Technology

On-Wafer Antenna and Photomixer Measurements up to 750 GHz

Guillaume Ducournau¹

¹University of Lille

Non-Contact Probing for On-Chip Characterization of mm-Wave and THz Devices

Kubilay Sertel¹

¹The Ohio State University / TeraProbes

SUNDAY 08:30 – 17:50

Integrated Doherty PAs for Cellular and mmWave Applications

Chair: Rocco Giofrè¹

Co-Chair: Joseph Staudinger²

¹University of Roma Tor Vergata, ²NXP Semiconductors

Room: Expedition

The ability of the Doherty architecture of operating at high efficiency at significant output power back-off has led the RF and microwave community to re-discover its concept and adapt it to the requirements of modern high frequency transmitters both for terrestrial and space applications. In the former case, upcoming 5th generation cellular (5G) represents a keen area of interest for both academia and industry. Required power levels are such that both Si- and III-V-based technologies can be viable semiconductor platforms to implement highly performing integrated DPAs. On the other hand, under the pressure of the evolving mobile cellular networks (e.g. 5G), satellite-based communications are asked to significantly improve their performance to remain competitive. Therefore, they are evolving towards high throughput satellites (HTS) adopting spectral efficient digital modulation schemes and multi-beam active antennas. In this context,

the implementation of high efficiency and linearity DPAs in GaN technology has potential significantly change the landscape. This workshop aims to report about recent progress on integrated Doherty PAs for both cellular (sub 6GHz) and mm-wave applications, starting from the assessment of the scenarios, in both ground and space applications, to the system level evaluation, also describing advanced experimental characterization techniques at device/circuit level, and actual MMIC Doherty implementations on state-of-art GaN-based and Si-based semiconductor technologies.

W-11
EuMIC

PROGRAMME

Challenges and Opportunities of 5G mm-Wave Power Amplifiers from an Industrial Point of View

Maurizio Pagani¹, Renato Lombardi¹

¹Huawei Italy

GaN Enabling Technology for mm-Wave Applications

Rémy Leblanc¹

¹OMMIC Foundry

Advanced GaN Power Amplifier MMICs for Millimeter-Wave Applications

Keigo Nakatani¹, Shintaro Shinjo¹

¹Mitsubishi Electric Corporation

Is GaN Doherty PA Ready for Space Applications?

Vittorio Camarchia¹

¹Politecnico di Turin

Sub 6 GHz Power Amplifiers for 5G – An Ericsson Prospective

Vincenzo Carrubba¹

¹Ericsson

High Power RF GaN Doherty Design from Technology to Circuit

Cédric Cassan¹

¹NXP Semiconductors

GaN-on-SiC Integrated Power Amplifiers for 5G Multi-User Massive MIMO Applications

Jangheon Kim¹, Abdulrhman M.S. Ahmed¹

¹Wolf speed

DPA Solutions for Sub 6 GHz 5G mMIMO (With Emphasis on Si Based Solutions)

John Gajadharsing¹, Jean-Jacques Bouny¹

¹Ampleon The Netherlands BV

SUNDAY 08:30 – 17:50

Advanced RF Technologies for 5G

Chair: Florinel Balteanu¹

Co-Chair: Andrei Grebennikov²

¹Skyworks Solutions, ²Sumitomo Electric Group

Room: Mission 2

5G is supposed to transform our world, creating an ecosystem where everyone is connected to everything, all the time. Worldwide adoption of 3G/4G smartphones and the transition to 5G has been the main engine behind semiconductor industry with a very active research area. Mobile cellular subscribers are expected to reach more than 6 billion by 2020 and 5G LTE will bring high data capacity as low latency using sub-6GHz and mm-Wave spectrum. The workshop presents the current status of 5G RF technologies and techniques to deliver an over gigabit-per-second data rate and low latency. The high speed wireless ecosystem which includes 5G LTE and WiFi 6 (802.11ax) will be deployed in the near future and will use two frequency domains: sub 6GHz frequency domain and mm-Wave spectrum. Mm-Wave will be used initially to increase the capacity for backhaul 5G networks and allow low latency. From this prospective and

the concurrently deployment for 5G LTE New Radio (NR) with the actual 4G LTE will increase the complexity for 5G RF Front End Modules (RF FEMs) and will be covered in this workshop.

W-17
EuMIC/
EuMC

PROGRAMME

5G New Radio Design Challenges

Laurent Noel¹, Dominique Brunel¹

¹Skyworks Solutions Inc.

Industrial RF SOI and BiCMOS Technologies Targeting 5G Wireless Market

Frederic Ganesello¹

¹ST Microelectronics

Design and Integration of Multiband High Efficiency Linear PA Modules for 5G

Alexandre Giry¹

¹LETI

5G Front Module for Mobile Applications

Florinel Balteanu¹

¹Skyworks Solutions

High Efficiency and Wideband GaN PA Techniques for Sub-6 GHz 5G Base-Station Applications

Shuichi Sakata¹, Shintaro Shinjo¹

¹Mitsubishi Electric Corporation

Do SOI Technologies Bring Added Value for New Connectivity Challenges?

Didier Belot¹

¹CEA-LETI

Advanced Modeling and Characterization Techniques for mm-Wave Antenna Arrays

Koen Buisman¹, Christian Fager¹

¹Chalmers University of Technology

The 5G NR Signals Impact on the RFLPA Envelope Impedance and Bias Network Design

Sergio Pires¹, Jan-Willem van Velzen¹

¹Ampleon

Fully Tunable mm-Wave Solutions in Advanced BiCMOS Technology

Gaëtan Prigent¹

¹University of Toulouse

Technical Challenges and Trends for 4G/5G Acoustic Filters

Marie Bousquet¹

¹CEA LETI

SUNDAY 08:30 – 12:30

Wireless Power Transmission Recent Research Advances

Chair: Nuno Borges Carvalho¹

Co-Chair: Alessandra Costanzo²

¹Universidade de Aveiro, ²University of Bologna

Room: Flash

This workshop will be devoted to present the recent research advances in the area of Wireless Power Transmission, the work herein presented will be devoted mainly to radiative wireless power transmission and will address the new advancements in the area, spanning from European, Asian and American speakers.

It is expected to address the most recent results in these area and the approaches followed to increase significantly the end to end energy efficiency.

The presentations will address also some of the recent advances when combining wireless power with information, and discuss some of these ideas of Simultaneous Wireless Information and Power Transmission as an enabler of long-range radiative wireless power application.

W-27
EuMC

SUNDAY 08:30 – 17:50

Recent Advances in Additive Manufacturing of Microwave Components

Chair: Maurizio Bozzi¹

Co-Chair: Cristiano Tomassoni²

¹University of Pavia, ²University of Perugia

Room: Quest

Additive Manufacturing (AM) is becoming a very popular technology in several fields. It originated as a solution for fast prototyping of objects mainly used in the mechanical engineering area. In the last years, this technology has found many additional applications, including the manufacturing of microwave/millimetre-wave components.

Several AM technologies are currently available. The material used for the manufacturing can be very different, ranging from plastic to metal and ceramics. Plastic and ceramic objects can be used directly as dielectric material or as a support to be subsequently metallized.

The application of AM to microwave/millimetre-wave components requires special attentions to some particular aspects. As an example, in the manufacturing of microwave filters, small manufacturing tolerances, minimum surface roughness, and low surface resistivity are of key importance.

This workshop offers an overview of the latest developments in the use of AM for the implementation of microwave components. The use of several AM technologies will be shown and compared. Different applications including sensors, filters, high power components, etc. will be considered. Solutions adopted to improve the component performance will be illustrated. Manufactured components and their applications will be presented.

A time slot will be devoted to questions and open discussion, involving all speakers and the attendees.

W-29
EuMC

PROGRAMME

Towards a Common Metrology Paradigm for Wireless Power

Paul Jaffe¹

¹U.S. Naval Research Laboratory

Novel Beam Forming Technology for High Efficiency and Safe Wireless Power Transfer

Naoki Shinohara¹

¹Kyoto University

Emerging Developments on Integrated SWIPT Receivers

Steven Claessens¹

¹KU Leuven

System and Circuit-Level Design for RF Energy on Demand in Industrial IoT

Alessandra Costanzo¹

¹University of Bologna

SWIPT – Combining Wireless Power with Backscatter Communications

Nuno Borges Carvalho¹

¹Universidade de Aveiro

PROGRAMME

Additive Manufacturing of New Classes of Filters with Non-Conventional Geometries

Cristiano Tomassoni¹

¹University of Perugia

Microwave and Millimetre-Wave 3D Printed Waveguide Filters

Yi Wang¹

¹University of Birmingham

Additive Manufacturing Applied to Reconfigurable Microwave Filters

Nicolas Delhote¹

¹University of Limoges

Development of All Metal RF Components Via Selective Laser Melting

Oscar Antonio Peverini¹

¹CNR-IEIT

Inkjet-/3D-/4D-Printed “Sero-Power” Wireless Ultrabroadband Modules for IoT, SmartAg and Smart Cities Applications

Manos M. Tentzeris¹

¹Georgia Institute of Technology

High Power 3D Printed Parts: From Multipactor to Thermal Aspects

Petronilo Martín-Iglesias¹

¹European Space Agency

Implementation of Microfluidic Sensors by Additive Manufacturing

Maurizio Bozzi¹

¹University of Pavia

Polymer-Based 3D Printing for Earth Observation Satellite Payload Front Ends

Stepan Lucyszyn¹

¹Imperial College London

SUNDAY 13:50 – 17:50

Advanced Measurement Techniques for Next Generation Communication Systems

Chair: Dominique Schreurs¹

Co-Chair: Antonio Raffo²

¹University of Leuven, ²University of Ferrara

Room: Flash

The workshop focuses on recent advances in large-signal measurement techniques for microwave applications. In particular, starting from the main issues that hinder measurement accuracy under nonlinear high-frequency operation of devices, circuits, and systems, the speakers will present the state-of-the-art performance of ultra wideband instrumentation and will discuss actual measurement scenarios of interest for next generation communication systems.

The challenges related to ultra wideband measurements will be clearly discussed by particularly explaining how measurement techniques that represent an acceptable solution for large-signal characterization under CW excitation lose meaning when actual modulated signals are considered. Moreover, the importance of performing accurate measurements will be highlighted in connection of using large-signal microwave measurements for the extraction of behavioral models. These models, whose uncertainty almost coincides with measurement uncertainty, allow the designer to simplify the design flow and thereby reducing the time and cost related to multiple foundry runs.

This workshop will represent a unique and amazing opportunity for the attendees to discuss their doubts about state-of-the-art measurement and modelling techniques with some of the most important scientists in the field.

W-02
EuMIC/
EuMC

PROGRAMME

Traceability for Large-Signal Measurement Applications

Dylan Williams¹

¹National Institute of Standards and Technology

Characterizing Modulation Distortion of Active Devices in the Frequency Domain

Jan Verspecht¹

¹Keysight Technologies

Wideband Modulated Load-Pull for Design Validation and Verification

Mauro Marchetti¹

¹Anteverta-mw

Behavioural Model Generation for Advanced Microwave Transistors

Paul Tasker¹

¹Cardiff University

MONDAY 08:30 – 12:30

From Device Characterisation to Amplifier Design: Advanced Large Signal Measuring, Fast and Accurate Modelling, and Reliable Designing

Chair: Steve Dudkiewicz¹

Co-Chair: Osman Ceylan¹

¹Maury Microwave

Room: Flash

The wireless telecommunications industry has responded to our insatiable demand for high-speed streaming with the development of 4G LTE and 5G communications systems. These systems use complex and high-order modulation schemes with high peak-to-average ratios (PAPR) in order to meet the needed high-speed cellular data rate within a given limited bandwidth. Therefore, highly optimized and engineered RF amplifiers are needed to achieve adequate linearity and high efficiency also at the deep back-off power levels.

Device characterization and modeling is the first and most important step for high-performance power amplifier design. Accurate modeling of a high-power RF solid-state device requires extended large signal analysis in a wide frequency range, including several harmonics and wide operation range, such as Class-C, B, and AB. Today's rapidly changing and competitive wireless telecommunication technology world also needs reduced time from development to market. Therefore, preparing a reliable and verified device model and designing a power amplifier should be done precisely in a short time.

In this short course, fundamentals of high-power RF device characterization techniques, basics of Load-Pull, calibration methods, high-speed nonlinear measurement methods with harmonics, Enhanced Poly Harmonic (EPHD) model extraction from measured data, and high power RF amplifier design with EPHD model will be introduced. High-power transistors for sub-6 GHz applications and mmW devices are considered in the sessions.

S-07
EuMIC/
EuMC

PROGRAMME

Fundamentals of Large Signal Characterization and High-Power Amplifier Design Considerations

Osman Ceylan¹

¹Maury Microwave

Wideband Active Load-Pull and Baseband Control

Mauro Marchetti¹

¹Anteverta-mw

mmW Device Characterization and Modeling

Alireza Shamsafar¹

¹Ampleon BV

Modeling of High-Power RF Transistors and Applications

Mitra Gilasgar¹

¹Ampleon BV

Behavioural Models and EPHD Modeling

Wissam Saabe¹

¹AMCAD Engineering (France)

MONDAY 08:30 – 17:50

High-Power Microwave Industrial Applications

Chair: Zoya Popovic¹

Co-Chair: Vadim Yakovlev²

¹University of Colorado, ²Worcester Polytechnic Institute

Room: Beam

W-07
EuMC

This workshop addresses the increasing industrial applications of high-power microwaves. In 2009, the IEEE MTT-S IMS Workshop “Recent Advances in Microwave Power Applications and Techniques (RAM-PaNT)” received significant interest among IMS attendees and won the “Best Quality Workshop” Award. The RAMPAnT Workshop was designed as an inauguration forum that introduced the MTT community to microwave energy applications in science and industry. For the past 10 years, topics related to this Workshop have gradually increased in scope. This Workshop proposed for the EuMW2020 will review the recent advancements in industrial and scientific applications of high-power microwave technology. The discussions will cover well-established systems and processes as well as new trends and emerging applications: beyond

well-known microwave heating of food products, they include powder metallurgy (include sintering of particulate materials), microwave-assisted chemistry, microwave plasma generation, manufacturing of nanomaterials and composites (including microwave-assisted 3D printing), waste-to-fuel conversion, etc. Topics that support many of the applications, such as advanced multiphysics modeling and accurate characterization of material parameters, will also be discussed. The Workshop includes ongoing developments of solid-state technology and prospects of the use of solid-state generation in high-power applications for more flexibility and control.

PROGRAMME

High Power Industrial Microwave Applications and Market Trends

Jens Hofmann¹

¹MUEGGE GmbH

Review of Systems and Processes in Microwave Power Drying Applications

Peter-A. Püschner¹

¹Püschner GmbH

Microwave-Induced Plasma – From Academia to Industry

Kostyantyn Achkasov¹

¹Consultant

Field-Assisted Manufacturing of Materials

Bala Vaidhyanathan¹

¹Loughborough University

Microwave Assisted Metallurgy Using Hybrid Systems

Paolo Veronesi¹

¹University of Modena and Reggio Emilia

Principles and Practice of High-Power In-Cavity SSPA Combining

Zoya Popovic¹

¹University of Colorado

The Challenge of Scaling-Up Microwave Assisted Technologies

Marilena Radoiu¹

¹Microwave Technologies Consulting

Development of Solid-State Technology and Its Impact on Microwave Power Engineering

Klaus Werner¹

¹pink RF

Advanced Multiphysics Simulation of Microwave Power Processes and Systems

Vadim Yakovlev¹

¹Worcester Polytechnic Institute

Measurement of Temperature-Dependent Complex Permittivity of Materials

José M. Catalá-Civera¹

¹Universidad Politècnica De València

In Situ Monitoring of High-Power Microwave Material Processing

Sébastien Vaucher¹

¹EMPA - Swiss Federal Laboratories for Material Science and Technology

MONDAY 08:30 – 12:30

Antenna/Modules in Package for mmWave for 5G

Chair: Rajesh Mandamparambil¹

Co-Chair: Rob Maaskant²

¹NXP, ²Chalmers University of Technology

Room: Spark

W-08
EuMC

This combined Workshop/Short Course addresses the key challenges in terms of material, process and testing of IC packages. Advanced packaging level approaches will be discussed, allowing packaging of different semiconductor compounds (Si, GaN), as well as multi-die System-in-Package solutions. A complete chip-package co-design flow will be explored which allows improvement of RF performance and power efficiency. An overview of the latest material developments in the mmw/ RF domain will be presented. Challenges on mmW packaging especially on antennas integration will be discussed. Phased array antenna modules for 5G is an important driver and their pros and cons will be shared.

PROGRAMME

Analysis of 5G mmW Use Cases and Its Implications on Phased Array Antenna Module Realizations

Thomas Emanuelsson¹

¹Gapwaves AB

Needs and Challenges in Packaging for mm-Wave Antennas

Stefania Monni¹

¹TNO

Advanced pPackaging Approaches for 5G and mm-Wave Applications

Tanja Braun¹

¹Fraunhofer IZM

Innovative Packaging Material Developments for RF Applications

Ruud de Wit¹

¹Henkel

mmWave Reference Design Flow and Correlation with Measurements

Mart van Gijssel¹

¹Keysight Technologies

MONDAY 08:30 – 12:30

Advanced Applications of In-Band Full-Duplex Technology

Chair: Kenneth E. Kolodziej¹

Co-Chair: Taneli Riihonen²

¹MIT Lincoln Laboratory, ²Tampere University

Room: Auditorium

Many wireless systems could benefit from the ability to transmit and receive on the same frequency at the same time, which is known as In-Band Full-Duplex (IBFD) and/or Simultaneous Transmit and Receive (STAR). This technology could lead to enhanced spectral efficiency for future wireless networks, such as fifth-generation New Radio (5G NR) and beyond, and/or could enable capabilities and applications that were previously considered impossible, such as IBFD with phased array systems. In this workshop, experts from academic and federal research institutions will discuss advanced applications of IBFD that move beyond basic communication systems. Presentations will contain details and measured results that encompass military, radar and multiple-input multiple-output (MIMO) applications.

PROGRAMME

Omni- and Directional Approaches to In-Band Full-Duplex Systems

Kenneth E. Kolodziej¹

¹MIT Lincoln Laboratory

Robust Transceiver Design for Full-Duplex Relay-Assisted MIMO Systems

Aydin Sezgin¹

¹Ruhr-University Bochum

Joint Radar and Communication Using In-Band Full-Duplex Technology

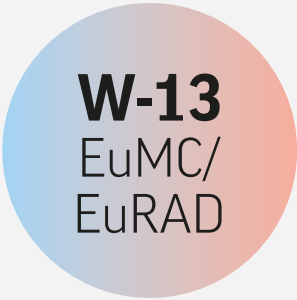
Sofie Pollin¹, Seyed Ali Hassani¹

¹KU Leuven

Simultaneous Transmit and Receive Radios Beyond Full-Duplex Communications

Taneli Riihonen¹

¹Tampere University



MONDAY 08:30 – 17:50

Measurements at mmWave and Terahertz Frequencies of Three Measurement Quantities: S-Parameters, Power, and Complex Permittivity of Dielectric Materials

Chair: Xiaobang Shang¹

Co-Chair: Nick Ridler¹

¹National Physical Laboratory (NPL)

Room: Glow

There is a rapid increase in exploitation of the millimetre-wave and submillimeter-wave spectrum, driven by demands from diverse applications including wireless backhaul links for 5G mobile networks, radar sensors for advanced or autonomous vehicles, space deployed radiometers for remote sensing of climate change, security imaging (e.g. terahertz body scanners), and medical diagnosis. Advancement in these applications has led to an increased demand for accurate and traceable electrical measurements for devices and integrated circuits operating at these high frequencies.

This workshop will review the latest developments that are taking place for the three electrical measurement quantities, namely S-parameters, power and complex permittivity of dielectric materials, at millimetre-wave and terahertz frequencies. Most of these activities are undertaken in a recent European Metrology Programme for Innovation and Research (EMPIR) project, 18SIB09 TEMMT, which involves 19 partners globally. The workshop consists of 14 proposed talks and will present the current state of the art of the measurements, specifically,

- i Waveguide S-parameter measurements up

- to 1.5 THz
- ii Planar S-parameter measurements up to 1.1 THz
- iii Calibration technique for power measurements at D-band (110-170 GHz)
- iv Material characterizations at millimetre-wave and terahertz frequencies using free-space method, TDS, open and closed resonators techniques.

Calibration and verification techniques of these measurements, together with measurement uncertainties, will also be covered in the workshop.



PROGRAMME

Considerations for Calibrating and Measuring Using Vector Network Analysers at Millimetre and Submillimetre Wavelengths

Nick Ridler¹

¹National Physical Laboratory (NPL)

Vector Network Analysis and Waveguide Interfaces to 1.5 THz

Jeffrey Hesler¹

¹Virginia Diodes Inc.

On-Wafer Traceable Mixed-Mode S-parameter Calibration

Djamel Allal¹

¹LNE

Nanorobotic On-Wafer Probe Station Under Scanning Electron Microscope

Kamel Haddadi¹

¹University of Lille

Numerical Modelling of On-Wafer Scattering Parameter Measurements

Thomas Flisgen¹

¹Ferdinand-Braun-Institut (FBH)

Development of Probing-System for Accurate On-Wafer Measurements up to 1.1 THz

Faisal Mubarak¹

¹VSL

Enabling Over Temperature S-Parameter Measurement Confidence to THz Frequencies

Anthony Lord¹, Gavin Fisher¹

¹FormFactor

Practical Steps to Improve On-Wafer S-Parameters High Frequency Measurements

Robin Schmidt¹

¹Keysight Technologies

Calibration of RF Power at 110-170 GHz

Gia Ngoc Phung¹

¹Physikalisch-Technische Bundesanstalt (PTB)

Measurement of Electrical Properties of Materials in the Frequency Range up to 110 GHz

with the Help of Fabry-Perot Resonator

Marcin Wojciechowski¹, Jerzy Krupka¹

¹GUM (Central Office of Measures)

Uncertainties and Error Analysis of Material Parameter Extraction Methods

Alireza Kazempour¹

¹METAS

Free-Space Broadband Measurements of THz Dielectric Properties and Material Data From the TEMMT Project

Mira Naftaly¹

¹National Physical Laboratory (NPL)

Material Characterization by Closed Resonator Method and In-Situ On-Wafer Measurement Method for 6G Application

Masahiro Horibe¹

¹National Metrology Institute of Japan (NMIJ) / National Institute of Advanced Industrial Science and Technology (AIST)

MONDAY 08:30 – 17:50

Microwave Wearable Circuits and Systems for Biomedical Applications

Chair: Milica Popović¹

Co-Chair: Alessandra Costanzo²

¹McGill University Montreal, ²University of Bologna

Room: Expedition

Microwave techniques are being increasingly exploited to realize next generation biomedical sensors able to be less invasive than traditional ones. Furthermore the exploitation of novel materials for their realizations, such as textiles and flexible substrates, enable their use in wearable solutions.

This workshop presents a significant number of research activities in this field from different countries and continents, spanning from materials characterization, by microwave techniques, to circuit-level realization up to the system level implementation, with in depth analysis of the signal processing challenges to enable real-time monitoring of the sensors. Some significant implementations are presented, such as systems for wearable breast cancer diagnosis, temperature measurements and liquids detection.

W-28
EuMC

PROGRAMME

Challenges and Complexity of Dielectric Tissue Characterisation

Martin O'Halloran¹

¹National University of Ireland

Recent Progress in Microwave Breast Tissue Screening with Time-Domain Radar

Milica Popović¹, Lena Kranold¹

¹McGill University Montreal

Fast, 2D Microwave Tomographic Breast Imaging Utilizing a Discrete Dipole Approximation-Based Reconstruction Algorithm

Paul Meaney¹, Samar Hosseinzadegan², Andreas Fhager², Mikael Persson²

¹Thayer School of Engineering at Dartmouth, ²Chalmers University of Technology

Backscattering Communication for Biomedical Sensors Readout

Nuno Borges Carvalho¹

¹Universidade de Aveiro

Microwave Passive Sensing for Wearable Applications

Alessandra Costanzo¹, Francesca Benassi¹, Diego Masotti¹

¹University of Bologna

Muscle Rupture Detection with Microwave Techniques

Andreas Fhager¹

¹Chalmers University of Technology

Wearable Wireless Thermometers for Internal Body Temperature Measurements

Zoya Popovic¹, Robert Streeter¹

¹University of Colorado

MONDAY 13:50 – 17:50

Multibeam Antennas and Beamforming Networks

Chair: Piero Angeletti¹

Co-Chair: Giovanni Toso¹

¹European Space Agency

Room: Auditorium

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 course presents design principles and state-of-the-art in Multi-Beam Antennas (MBAs) and Beam-Forming Networks (BFNs) covering both theoretical and practical aspects. The covered topics include:

Overview of Multibeam Antennas and system requirements.

- Satellite Communication Systems;
- Wireless Communications;
- RADARs.

Multibeam Array Antennas

- Linear and Planar Direct Radiating Arrays (based on Periodic or Aperiodic lattices)
- Reflector-based architectures (Single-Feed-per-Beam, Multiple-Feed-per-Beam)

- Lens-based architectures (free space and constrained)

Analog Beamforming Networks

- Corporate divider/combiners;
- Blass and Nolen matrices;
- Butler matrices.

Digital Beamforming Networks

Overview of some Operational Multibeam Antennas/BFNs

- MBAs for Spaceborne Narrowband and Broadband Satellite Communication Systems
- MBAs for Wireless Communications

On-going European Developments and Current Design and Technological Challenges

S-10
EuMC

MONDAY 13:50 – 17:50

Intuitive Microwave Filter Design with EM Simulation

Chair: Daniel Swanson¹

¹DGS Associates LLC

Room: Flash

Microwave filters are one of the basic building blocks in RF systems along with amplifiers, mixers and oscillators. At some point, you may be called on to design or specify a filter, even though you are not a filter design expert. Luckily, there is simple design method for narrow band filters that is easy to learn and quite universal. It can be applied to any lumped element or distributed topology and any manufacturing technology except SAW/BAW. And, the method is valid

for bandwidths from a fraction of a percent up to 20 percent or more.

This short course is a “no math” approach to filter design that requires only simple algebra and no knowledge of complex filter synthesis techniques. The root of the design flow is based on Dishal's method, with the addition of EM simulation for accuracy and port tuning for updates to the filter geometry. The basic design method can also be expanded to include cross-coupled filters

and multiplexers.

Two design flow examples have been prepared for this short course. The first is a high Q cavity combine bandpass filter and the second is a microstrip combine bandpass filter. The design flow can be realized using software from many different vendors. Example project files will be made available to attendees.

MONDAY 13:50 – 17:50

From Enabling GaN Technology to High-Performing Space-Borne SSPAs at mmWave

Chair: Rocco Giofrè¹

Co-Chair: Paolo Colantonio¹

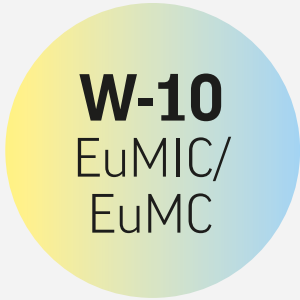
¹University of Roma Tor Vergata

Room: Spark

The development for next generation Very High Throughput Satellites (vHTS) systems, will make use of Ka/Q/V gateways, where the forward payload link will operate in K-band. This kind of spacecraft will offer high capacity, large number of users and communication volumes (1 Terabit/s per satellite), with lower cost per GBPS, increasing the flexibility being the the satellite capacity allocated only when-&-where it is needed. Traditionally, demand for high power levels at high frequencies has been satisfied by using TWTAs as amplifying device; this is because SSPA technology was unable to attain similar performance levels. However, technological advancements such as linearization, miniaturisation, and the use of different materials such as GaN, have levelled the playing field open the actual possibility

to replace TWTAs with SSPAs.

This workshop aims to report about recent progress on millimetre wave GaN-based SSPAs for space applications, starting from the assessment of the scenarios, in both ground and space segments, to the actual SSPA design, realization and tests, also describing state-of-art GaN semiconductor technologies.



TUESDAY 08:30 – 17:50

Digital Predistortion for 5G MIMO Wireless Transmitters

Chair: Anding Zhu¹

Co-Chair: Pere L. Gilabert²

¹University College Dublin, ²Universitat Politècnica de Catalunya

Room: Juliana 2

In the existing cellular base stations, to guarantee linearity, digital predistortion (DPD) is widely used to compensate for the nonlinear distortion generated by RF power amplifiers (PAs). In 5G, particularly in wide-band millimetre wave transmitters, the conventional DPD is no longer workable. With increasing demands for higher data rates, the signal bandwidth will continue to increase. At millimetre wave bands, the modulation signal bandwidths can reach hundreds of MHz or even multi-GHz and the peak to average power ratio of the signal may well exceed 10 dB. This requires not only very high sampling rates for digital signal processing but also sophisticated DPD models to compensate the nonlinearity, that leads to high power consumption and high cost. In the meantime, to increase power efficiency

and meet demands for high capacity, dense networks of base stations will be deployed and transmitters with multiple antennas (e.g., with massive MIMO architectures) and multiple power amplifiers will be used. In these transmitters, the output power of each PA will be significantly reduced compared to that in the existing high-power base stations, which leaves limited headroom for digital predistortion in terms of power and cost budget. New digital compensation solutions for linear and nonlinear distortion compensation of ultra-wideband or multi-band 5G systems will be required. In addition, due to multiple antennas and PAs are used in MIMO transceivers, characterization and compensation of coupling effects between the antenna array and the PAs must be addressed.

In this workshop, we will discuss the requirement of 5G wireless transmitters and related modelling and system design challenges that we are facing. Particular emphasis will be given to MIMO system architectures, digital compensation model selection, feedback loop data acquisition, model extraction algorithms and various system architecture, and model order reduction techniques. System characterisation, theoretical analysis, experimental test and hardware/software system implementation issues will also be discussed.



PROGRAMME

Space Initiatives at European Level

Fabio Vitobello¹

¹REA

SSPAs for High-Throughput Satellites: Challenges and Solutions

Václav Valenta¹

¹European Space Agency

The Space Market Needs in Term of SSPAs and HPAs for 5G Application

François Bouscasse¹

¹Airbus Defence

MiGaNSOS: Millimetre Wave Gallium Nitride Space Evaluation and Application to Observation Satellites

Ernesto Limiti¹

¹University of Roma Tor Vergata

Design of High Efficiency Power Amplifier Based on GaN Technology for Ka-Band

Rocco Giofrè¹, Paolo Colantonio¹

¹University of Roma Tor Vergata

Ka-Band HPA MMICs for Cryosat-2 Follow-On Mission (CS2-F0)

Chiara Ramella¹, Corrado Florian²

¹Politecnico di Torino, ²University of Bologna

PROGRAMME

DPD Requirement and Development for 5G: Industrial Perspective

John Wood¹

¹Wolfspeed

Beam-Oriented Digital Predistortion for Massive MIMO Transmitter

Wenhua Chen¹

¹Tsinghua University

Digital Predistortion for 5G Beam-Forming Architectures

Chao Yu¹

¹Southeast University

Digital Predistortion for 5G MIMO Transmitters: OTA-Based Data Acquisition

Anding Zhu¹

¹University College Dublin

Linearizing Strongly Nonlinear Systems: DPD Methods and Application to mmWave Active Arrays

Mikko Valkama¹

¹Tampere University

A Circuit Model to Behavioural Model Volterra-Based Approach: Parameters Estimation and Linearization Procedures for DPD Design

Maria J. Madero Ayora¹, Juan A. Becerra¹

¹Universidad de Sevilla

Model Order Reduction Techniques for Digital Predistortion Linearization of NR-5G Amplification Architectures

Pere L. Gilabert¹

¹Universitat Politècnica de Catalunya

Power Consumption Reduction Techniques for Digital Predistortion of Broadband RF Power Amplifiers

Yue Li¹

¹University College Dublin

Distortion-Aware Precoding for Massive MIMO Downlink

Sina Rezaei Aghdam¹

¹Chalmers University of Technology

TUESDAY 13:50 – 17:50

Advanced mmWave Radar System Solutions for Industrial and Consumer Sensing Applications

Chair: Vadim Issakov¹

Co-Chair: Amelie Hagelauer²

¹Otto-von-Guericke University Magdeburg, ²University Bayreuth

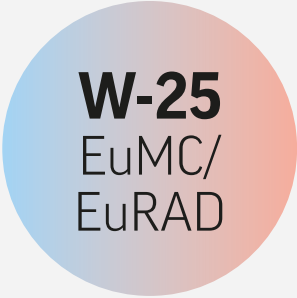
Room: Beam

The amount of new applications based on millimeter-wave radar sensors is continuously growing. Driven by the demand for cost reduction, module size reduction, lower power consumption and complexity of usage for the end user, several trends can be observed recently. First, the operating frequencies keep on increasing, enabling integration of antenna arrays in package and on-chip. Secondly, the increasing level of integration enables advanced functionality. Finally, with the emerging applications operated from a battery, ultra-low-power operation is required.

In this workshop, we discuss these recent trends and give examples of radar systems at mm-wave frequencies providing system-level solutions. The first talk presents solution for wearable FMCW sensors at 60GHz with extreme hardness for thru-the-fire scenarios. Next, by means of advanced state machine, an ultra-low-power radar solution at 24GHz is shown for presence detection. Further, cost-reduction and system level optimization techniques towards software-defined radar are presented. Next, highly-integrated 3D sensing solution at 60GHz is discussed for collaborative robotics applications.

Afterwards, challenges and solutions for realization of systems on chip and in package for FMCW radar above 300GHz and substrate antennas are discussed. Finally, we present fully-integrated solutions for consumer and industrial sensing applications at 60GHz with antenna in package and 122GHz with antenna on chip.

In this workshop we have a good mixture of industry (Infineon, Staal Technologies, Inxpect, InnoSent, Uhnder) and academia (FAU Erlangen, TU Hamburg, Uni Magdeburg). As well, we have contributions from three different countries (The Netherlands, Germany and Italy) by industry experts and recognized speakers in the field of radar circuits and systems.



WEDNESDAY 08:30 – 17:50

Quantum Computing for Electrical Engineers

Chair: Fabio Sebastiano¹

¹Delft University of Technology/QuTech

Room: Fluor

Quantum computing promises to solve problems that are intractable even by the most powerful supercomputers. Progress in quantum computing has recently gained great attention from the media, as it is gaining momentum thanks to the involvement of both key industries and an ever-growing academic research community.

This short course aims at providing electrical engineers with the background knowledge to understand what a quantum computer is and how it works. Furthermore, it will show the current and future trends in quantum computing. At the same time, the fundamental role of electrical engineers in building such wonderful machines will be addressed, by stressing the need for electrical and microwave engineering to build a large-scale quantum computer.

The course consists of 7 talks from experts in the field, organized in three main themes: quantum-computing fundamentals, physical platforms for quantum processors, and electronic interfaces for quantum computers. The first two talks will introduce the basic notions of quantum computing and present relevant quantum algorithms. Next, we will dive into the most promising solid-state

physical implementations of quantum processors, i.e. those based on the spin of electrons trapped in quantum dots (third talk) and those based on superconducting circuits (fourth talk). Finally, the requirements and the challenges for the implementation of the electronic interface for quantum processors will be discussed, both in terms of microwave engineering (fifth talk) and in terms of cryogenic integrated-circuit solutions (sixth and seventh talk).



PROGRAMME

Design Considerations on Wearable Through-The-Fire Radar

Natalia Alexandrovna Antonyuk¹

¹Staal Technologies B.V.

Ultra-Low Power Radar Based Presence Detection

Fabian Lurz¹, Alexander Koelpin²

¹Friedrich Alexander University of Erlangen-Nürnberg, ²Technical University Hamburg (TUHH)

A System Perspective on State-Of-The-Art mm-Wave Radar Sensors

Markus Gardill¹

¹University of Würzburg

mm-Wave Radar-Based 3D Sensing for Collaborative Robotics

Aleksey Dyskin¹

¹Inxpect

Highly-Integrated Radar Transceiver at 320 GHz for Near-Field Sensing

Marco Dietz¹, Robert Weigel¹

¹Friedrich Alexander University of Erlangen-Nürnberg

Fully-Integrated System-In-Package Solutions for Industrial and Consumer Applications

Vadim Issakov¹, Mohamed Hamouda², Ismail Nasr²

¹Otto-von-Guericke University Magdeburg, ²Infineon Technologies

PROGRAMME

What is Quantum Computing All About?

Carmen G. Almudever¹

¹Delft University of Technology/QuTech

Quantum Algorithms

Ronald de Wolf¹

¹QuSoft, CWI

Two Decades of Quantum Computation with Quantum Dots

Menno Veldhorst¹

¹QuTech

The Superconducting Transmon Qubit as a Nonlinear Microwave Resonator

Daniel Sank¹

¹Google

Microwave Engineering for Preparation, Control, and Readout of Quantum Processors

Marc Almendros¹

¹Keysight Technologies

Towards Scalable Control of Superconducting Quantum Processors

Joseph Bardin¹

¹University of Massachusetts Amherst/Google

A Scalable Integrated Microwave Signal Generator for Qubit Control: From Specifications to Cryo-CMOS Implementation and Qubit Testing

Masoud Babaie¹

¹Delft University of Technology

WEDNESDAY 08:30 – 12:30

High Power Amplification for Space Applications

Chair: Iain Davies¹
Co-Chair: Natanael Ayllon¹
¹European Space Agency

Room: Spark

A one day short course introducing the important topic of High Power Amplification in space-borne environments. The aim of the workshop is to provide a general overview of solid-state power amplifiers (SSPAs) and travelling wave tube amplifiers (TWTAs), their architecture, component technologies, and use in space applications in the fields of Telecommunications, Navigation and Earth Observation. The course will outline the main drivers in designing SSPAs and TWTAs in terms of performance, and the provisions made to ensure the high level of reliability required in space. The space environment will be discussed, in relation to its influence on electronic components. The need for research and development at both architectural and technological levels will also be discussed, in order to deliver increased efficiency and output power whilst at the same time reducing volume, mass and cost for satellite applications. A view on market perspective and future trends will be given by a notable industry expert.

PROGRAMME

General Introduction to HPAs for Space Applications

Natanael Ayllon¹
¹European Space Agency

TWTA Architecture, Building Blocks & Technologies

Roberto Dionisio¹
¹European Space Agency

SSPA Architecture, Building Blocks & Technologies

Iain Davies¹
¹European Space Agency

Space Environment and Its Influence in Electronics

Cesar Boatella Polo¹
¹European Space Agency

Reliability Aspects of Space-Borne Amplifiers

Jouni Lähti¹
¹European Space Agency

Future Trends and Market Perspective

Jean-François Villemazet¹
¹Thales Alenia Space



WEDNESDAY 08:30 – 17:50

High-Efficiency Linear Power Amplifiers for High Bandwidth, High PAR Signals

Chair: Olof Bengtsson¹
Co-Chair: Zoya Popovic²
¹Ferdinand-Braun-Institut (FBH), ²University of Colorado

Room: Juliana 2

Achieving power amplifiers (PAs) with high efficiency and good linearity is challenging if the amplified signals have wide instantaneous bandwidths (>100MHz) and high peak-to-average power ratios (PAPR > 10dB). Examples of such signals include multi-carrier concurrent signals, both closely and widely spaced, and band-limited noise-like signals, typical of 5G and other multi-carrier aggregated signal applications. This workshop focuses on current trends in achieving high efficiency when amplifying such signals at microwave and millimeter-wave carrier frequencies. The topics that are covered include PA architectures and design, such as Doherty, balanced and supply-modulated PAs, both analog and digital linearization techniques and how such amplifiers perform and are analyzed in systems such as massive MIMO. The workshop speakers are well established researchers in industry and academia, and come from Sweden, Germany, Spain, Portugal, China and the USA.

PROGRAMME

A Bandwidth Extension Technique for Power Amplifiers Employing Large PAPR Signals

Paul Saad¹
¹Ericsson

Doherty PA Solutions for Wideband Signals and Considerations for Improved DPD Linearizability

Joseph Staudinger¹
¹NXP Semiconductors

Energy-Efficient GaN PA MMIC for Massive MIMO

Wenhua Chen¹
¹Tsinghua University

Linearization of Wideband Transmitters for Multi-Band igh PAPR Signal Transmission

Siqi Wang¹, Wenhui Cao¹
¹Chalmers University of Technology

Simultaneous Linearity and Efficiency Improvements Using Broadband Supply Modulation

Maxwell Duffy¹, Gregor Lasser²
¹Northrop Grumman, ²University of Colorado

Efficiency Degradation in Concurrent-Band Power Amplifiers

José Carlos Pedro¹
¹Universidade de Aveiro

Multi-Band Doherty and Broadband Load-Modulated Balanced PAs for 5G

Anding Zhu¹
¹University College Dublin

Analog Linearization of High-Efficiency PAs for Broadband Signals

Taylor Barton¹, Zoya Popovic¹
¹University of Colorado

Discrete Level Supply Modulation with Large Dynamic Wideband Signals

Olof Bengtsson¹
¹Ferdinand-Braun-Institut (FBH)



WEDNESDAY 13:50 – 17:50

Automotive Radar Networks and Sensor Fusion

Chair: Christian Waldschmidt¹

Co-Chair: Martin Vossiek²

¹University of Ulm, ²Friedrich Alexander University of Erlangen-Nürnberg

Room: Progress

Today's vehicles are typically equipped with a number of radars sensor and other sensors for driver assistance and more sophisticated functions. These sensors may be used to set up a network of radars in large variety of different approaches. Those sensors can be netted coherently or incoherently and on very different levels of the signal processing chain. All approaches lead to networks with very different properties. On higher signal processing layers, the radar data is fused with other sensors like video or lidar. The workshop will present fundamentals, concepts and practical examples of such networks and functions building on them. The first two presentations discuss the fundamentals of radar networks at 77 GHz, whereas the later talks focus on applications and functions.

W-14
EuRAD

PROGRAMME

Concepts for Automotive Radar Networks

Benedikt Meinecke¹, Christian Waldschmidt¹

¹University of Ulm

Many Eyes See Better Than Just a Few - Novel Solutions, Challenges and Potential of Automotive Radar Networks

Marcel Hoffmann¹, Martin Vossiek¹, Mark Christmann², Peter Guldén²

¹Friedrich Alexander University of Erlangen-Nürnberg, ²Analog Devices/Symeo GmbH

Loosely Coupled Automotive Radar Sensor Network

Tobias Schmid¹, Felix Müller¹, Martin Fink¹, Robert Korn¹, Jürgen Hasch¹

¹Robert Bosch GmbH

Vulnerable Road User Detection by Camera-Radar Fusion

Dariu Gavrilă¹

¹Delft University of Technology

Pre-Processing and Neural Network Co-Design for Automotive Radar Perception

Gennady Benderman¹

¹Daimler AG

Platooning Application Using Connected Automation and Sensor Fusion

Clara Otero Perez¹, Gerardo Daalderop¹

¹NXP Semiconductors

THURSDAY 08:30 – 12:30

High Resolution Radar for Automotive

Chair: Feike Jansen¹

Co-Chair: Christian Waldschmidt²

¹NXP Semiconductors, ²University of Ulm

Room: Progress

Automotive radars are a popular sensor technology to implement Advanced Driver Assistance Systems (ADAS) such as blind spot detection and automatic emergency braking (AEB) due to their robustness and adverse weather tolerance. At the same time, these radars fall short with respect to cameras and lidars in the field of direction of arrival resolution. Hence, the application of radar for heterogeneous sensor fusion and the application of artificial intelligence as found in highly automated driving applications is challenging. In this workshop several ways to realize high resolution automotive radars based upon different approaches using either synthetic or real aperture concepts as well as various aspects of these radars regarding weather dependence, radar to radar interference mitigation and artificial intelligence will be presented.

W-23
EuRAD

PROGRAMME

Realizing High Resolution Radars

Feike Jansen¹, Francesco Laghezza¹

¹NXP Semiconductors

Effects and Compensation of Phase Errors in Automotive SAR

Reinhard Feger¹, Masoud Farhadi¹

¹Johannes Kepler University Linz

High-Resolution Imaging for Automotive Radars

Jianping Wang¹

¹Delft University of Technology

Artificial Intelligence in High-Resolution Radars – Challenges and Necessity

Martin Kunert¹

¹Robert Bosch GmbH

Let's get Real about Imaging Radar

Arunesh Roy¹

¹Uhnder

Classification of Threats and the Benefits of High Resolution

Noam Arkind¹

¹Arbe

THURSDAY 08:30 – 17:50

5G and Beyond: Enabling RF Architectures and Technologies for Emerging Wireless Systems

Chair: Roberto Gómez-García¹

Co-Chair: Xun Luo², Nuno Borges Carvalho³

¹University of Alcalá, ²University of Electronic Science and Technology of China, ³Instituto de Telecomunicações, Universidade de Aveiro

Room: Juliana Congress Room 1

Future wireless systems will require a paradigm shift in how their supporting transceiver modules will be configured to provide all the flexible functionalities required by them. Also, it is expected that upcoming 5G wireless networks, known as more than an extension to 4G, can be hybridized with other wireless applications, such as IoT, in co-integrated wireless-communications/sensing platforms. As a result, fully-renewed RF modules enabled by more-advanced RF subsystems and technologies will be required. In this workshop, novel solutions for the key RF constituent blocks of wireless-transceiver architectures in the context of 5G and beyond, complete modules, enabling technologies, and multi-functional platforms hybridizing 5G-communications/IoT-sensing applications are presented. In the first two talks, modern configurations of power amplifiers in the context of 5G and emerging wireless-communications systems will be covered. Research themes in this area include novel digital power amplifiers

for polar and quadrature transmitter modules, advanced linearization techniques, and innovative Doherty IQ power amplifiers and their demonstration in complete phase-array-enabled transmitters with gain compensation in the millimeter-wave range. In the third presentation, main technological challenges involved in the realization of 5G wireless systems at the millimeter-wave range are addressed from a system-level viewpoint. Here, a 28 GHz front-end-module in SOI CMOS is characterized and evaluated for different modulations (e.g., 256 QAM and OFDM), as required by flexible wireless-communications modules. All-digital transceiver architectures based on FPGA implemenatitons and system solutions for all-digital radio-over-fiber testbeds in the context of 5G-and-beyond applications are expounded in the fourth and fifth talks. The topic of 5G-system characterization is further addressed in the sixth talk, where behavioral models of active antenna arrays consisting on active nonlinear elements

in the context of 5G mMIMO systems are proposed, and the associated practical-laboratory tests for multi-sine excitations are conducted. In the last two talks, enabling technologies and novel architectures of 5G/IoT multi-functional platforms are presented. First, inkjet-/3D-printed antennas, interconnects, “smart” encapsulation and packages, RF electronics, microfluidics and sensors fabricated on glass, PET, paper and other flexible substrates are introduced as a system-level solution for advanced millimeter-wave modules for 5G+ communication, energy harvesting and sensing applications. Finally, as a recent research field, the potential of batteryless sensing based on wireless power transfer (WPT) and backscattering by recycling present RF power for 5G/IoT applications is discussed. Experimental proof-of-concept designs featuring advanced performance over the state-of-the-art solutions are shown for demonstration purposes.

PROGRAMME

Energy-Efficient PAs for 5G and Beyond

Wenhua Chen¹, Guansheng Lv¹, Xin Liu¹, Dehan Wang¹, Fadhel Ghannouchi²

¹Tsinghua University, ²University of Calgary

Wideband Microwave/mm-Wave Transmitter for 5G and Beyond

Xun Luo¹

¹University of Electronic Science and Technology of China

Design Challenges of mm-Wave Front-Ends for 5G and Beyond

Vadim Issakov¹

¹Otto-von-Guericke University Magdeburg

All-Digital Transceivers for 5G and Beyond Communications Systems

Arnaldo Oliveira¹

¹Universidade de Aveiro

Investigation of Beyond-5G Wireless Communication Systems Using an All-Digital Radio-Over-Fiber Testbed

Christian Fager¹

¹Chalmers University of Technology

Advanced Techniques for 5G System Characterization

Nuno Borges Carvalho¹

¹Universidade de Aveiro

Inkjet-/3D-/4D-Printed Wireless Ultra-Broadband Modules for 5G+, IoT, SmartAg and Smart Cities Applications

Manos M. Tentzeris¹

¹Georgia Institute of Technology

Batteryless Sensing for 5G/IoT Applications Based on WPT and Backscattering

Ke Wu¹

¹Ecole Polytechnique Montréal

THURSDAY 13:50 – 17:50

Recent Advances in Micro-Doppler Radar and its Applications

Chair: Lorenzo Cifola¹

Co-Chair: Francesco Fioranelli²

¹Thales Nederland B.V., ²Delft University of Technology

Room: Spark

The combination of machine learning techniques and radar-based sensing opens new research opportunities for a vast range of applications in the domain of automatic target recognition. Specifically, the intelligent use of radar micro-Doppler signatures has become an exciting area of research in fields such as automotive, human gestures and activities, unmanned aerial vehicles (drones), amongst others. Based on the information provided by micro-Doppler signatures, several processing techniques have been developed, either based on available target models or on the definition and extraction of handcrafted features. However, these “model-driven” approaches have been very recently challenged by the explosion of methods based on artificial intelligence and deep learning, often inspired from work by the image and audio processing community. Interesting research questions arise from the application of “data-driven” approaches to the problems of radar-based target

classification. What is the best domain/format of radar data for classification in a given application? What is the best neural network architecture to work with radar data which are neither images nor speech or audio? How to get enough radar data to train deep neural networks and how to make their decision process fully explainable? And the list of outstanding research questions could continue. To address some of these questions it is desirable to have an overview of the state of the art of available techniques and related results. This workshop will discuss recent outcomes from the research activities of the speakers in a wide and diverse range of applications, such as analysis and classification of human movements, gait, and activities indoor and outdoor; characterization of the signatures of small drones; exploitation of micro-Doppler information generated by multistatic/distributed radar sensing; generation of reliable synthetic data from a small set of experimental radar data.

PROGRAMME

Radar, Micro-Doppler, Models, Data: What is Driving Classification?

Lorenzo Cifola¹, Francesco Fioranelli²

¹Thales Nederland B.V., ²Delft University of Technology

Analysis and Classification of Drones Based on Radar Micro-Doppler

Jacco de Wit¹

¹TNO

Multistatic C-UAV Micro-Doppler Analysis

Matthew Ritchie¹

¹UCL

The Challenge of Training Deep Neural Networks for RF Applications with Low Sample Support

Sevgi Zubeyde Gurbuz¹

¹The University of Alabama

W-31
EuMC

W-15
EuRAD

FRIDAY 08:30 – 12:30

Cognitive Radar Signal Processing

Chair: Joseph R. Guerci¹

Co-Chair: Augusto Aubry²

¹Information Systems Laboratories San Diego, ²University of Naples “Federico II”

Room: Expedition

Cognitive radar refers to an emerging signal processing paradigm which is envisioned as the core of the next generation of active surveillance systems. The key idea behind cognition is to take as much as possible inspiration from the human brain, as well as from the behaviour of other echolocating mammals, that continuously learn and react to stimulations from the surrounding environment according to four basic processes: perception-action-cycle, memory, attention, and intelligence. This short course is organized as follows.

In the first part, the cognitive radar architecture is introduced providing basic concepts and definitions as well as explaining the analogies with the biological counterpart. Hence, some notional examples revealing the potentiality of this paradigm to boost conventional radar systems are illustrated. In the second part, advanced radar waveform design algorithms are presented. In particular, the focus will be on: A-techniques capable to mitigate undesired effects

produced by signal-dependent interference in radar system; B-strategies that enable spectral compatibility with surrounding licensed emitters. In both cases, the key performance metric is detection probability and the environment awareness provided by the cognitive architecture plays a pivotal role. In the third part, results on bio-inspired radar signal processing techniques are illustrated, focusing on advanced joint waveform and guidance control design techniques for target rendezvous.

Finally, recent results delivering space-frequency awareness to the surveillance system (as required by the perception-action-cycle) and based on 2-D spectrum sensing techniques are shown. Practical examples with Software-Defined-Radio (SDR) equipment are illustrated to complement the theoretical aspects of the tutorial.

S-02
EuRAD

PROGRAMME

Cognitive Radar Architecture

Joseph R. Guerci¹

¹Information Systems Laboratories San Diego

Advanced Radar Waveform Design Techniques

Augusto Aubry¹

¹University of Naples “Federico II”

Bio-Inspired Radar Systems

Alessio Balleri¹

¹Cranfield University

Spectrum Sensing Algorithms

Vincenzo Carotenuto¹

¹University of Naples “Federico II”

FRIDAY 08:30 – 12:30

Recent Advances in Topologies, Technologies and Practical Realizations of Microwave Biosensors

Chair: Benjamin Potelon¹

Co-Chair: Enrique Bronchalo²

¹Université de Bretagne Occidentale, ²Universidad Miguel Hernández de Elche

Room: Flash

The fast-growing emergence of IoT, together with the increased ability for systems to process high volumes of data (AI, Machine Learning, Big data...) has opened the way and enhanced the needs for a new generation of sensors. Indeed, the constant seek for continuous, live data has appealed a new paradigm where coping with a high volume of data is no longer a problem as long as those data are reliable. In this context, microwave sensors can usually exhibit interesting features such as non-invasiveness, continuous measuring, and of course the ability to track structural, chemical, mechanical or physical properties specifically linked to RF waves. This workshop proposes to focus on the recent advances on the design of microwave sensors from the topological, technological and practical realizations aspects, together with the benefits for various applications, including biomedical and industrial fields.

W-21
EuMC

PROGRAMME

RF/Microwave Non-Invasive Blood Glucose Sensing: An Overview of the Limitations, Challenges & State-Of-The-Art

Volkan Turgul¹

¹University of Westminster

Strategies to Enhance the Sensitivity in Planar Microwave Sensors and Application to Biosensing

Ferran Martín¹, Paris Vélez¹, Jonathan Muñoz-Enano¹, Jan Coromina¹, Marta Gil²

¹Universitat Autònoma de Barcelona, ²Universidad Politécnica de Madrid

MEMS Based Sensors and Devices

Said Al-Sarawi¹

¹The University of Adelaide

Radio Frequency Sensors & Lab-On-Chip Technologies: New Opportunities for Biomedical Diagnosis

Arnaud Pothier¹

¹XLIM – Limoges University

Single and Coupled Microwave Resonators as Glucose Concentration Sensors

Carlos Gabriel Juan¹, Benjamin Potelon², Cédric Quendo², Enrique Bronchalo¹, José M. Sabater-Navarro¹

¹Universidad Miguel Hernández de Elche, ²Université de Bretagne Occidentale

FRIDAY 08:30 – 12:30

Recent Advances on Microwave Filters

Chair: Giuseppe Macchiarella¹

Co-Chair: Cristiano Tomassoni²

¹Politecnico di Milano, ²University of Perugia

Room: Glow

Over the past decade, there has been a spectacular increase in demand for cellular communication and satellite-based services. This has been the singular reason in pushing the state-of-the-art of wireless systems to achieve even higher communication capacity within the constraints of the available frequency spectrum. Therefore, frequency allocations are regarded as a natural resource. Filters and multiplexing networks play a critical role in maximizing the effective use of the available bandwidth to achieve the highest capacity for a diverse range of traffic scenarios, and are deemed as critical elements of these communication systems. This half-day workshop aims to provide the attendees with an overview of current trends in the development of high performances filters conceived for satellite and wireless (5G) applications. The speakers will outline the application potentials, the design challenges and the proposed solutions, covering all the steps from the synthesis up to the technological

implementation. This will allow the audience to explore in deep the opportunities offered by the presented solutions.

W-30
EuMC

PROGRAMME

Advanced Design of Waveguide Filters with Transmission Zeros

Giuseppe Macchiarella¹

¹Politecnico di Milano

Miniaturization of High-Performance Filters

Cristiano Tomassoni¹

¹University of Perugia

Novel Topologies of Waveguide Filters for High Power Space Applications

Vicente Boria¹

¹Universitat Politècnica de Valencia

Modern Tunable Filtering Components with Multi-Functional and Multi-Configurable Capabilities

Roberto Gómez-García¹, Dimitra Psychogiou²

¹University of Alcalá, ²University of Colorado

FRIDAY 08:30 – 15:30

Practical Aspects of Running a Microwave Laboratory and How to Make Good Measurements Every Time

Chair: Frank E. van Vliet¹

Co-Chair: Diogo Ribeiro¹

¹TNO

Room: BOR 2

This workshop addresses best practices when running a successful microwave laboratory: from regulatory compliance to the more practical side of performing accurate measurements. The workshop will cover the accreditation experience from both the perspective of the laboratory manager and the accreditation official. The importance of understanding regulatory procedures and accurate record keeping will be covered as well. Procedures that ensure that every microwave measurement is accurate are also key to the success of any microwave laboratory and will be an important focus of the workshop. The workshop presenters will outline the practical steps required to perform accurate and repeatable microwave measurements. For example, often the best way of avoiding time-consuming problems in microwave measurement setups is to employ good maintenance and usage practices to extend the life of connectors, cables and other microwave components. Even the simplest

of procedures can eliminate many microwave-measurement pitfalls and help smooth the operation of your microwave laboratory. This workshop will not only be based on the typical set of presentations, it will go beyond the theory, beyond the traditional examples in slides, and provide a practical and interactive component. “Hands-on” demonstrations will be offered to the extent possible. Finally, the workshop will touch on changes in the analysis of uncertainties that will be required to support the future needs of the microwave industry as it evolves and touch on some new software tools designed to support these changes.

W-32
EuMIC/
EuMC

PROGRAMME

Practical Aspects of Running a Microwave Laboratory

Dylan Williams¹, Bart Schrijver²

¹National Institute of Standards and Technology, ²Keysight Technologies

VNAs, Scattering-Parameters and Calibrations

Jamie Lunn¹

¹Rohde & Schwarz

Power and Electrical-Phase Calibrations

Bart Schrijver¹

¹Keysight Technologies

Spectrum Analyzers and VSAs

Jon Martens¹

¹Anritsu

METAS VNA Tools

Michael Wollensack¹

¹Federal Institute of Metrology METAS

Microwave Uncertainty Framework

Dylan Williams¹

¹National Institute of Standards and Technology

FRIDAY 13:50 – 17:50

Introduction to MIMO Radar

Chair: Frank Robey¹

Co-Chair: Vito Mecca¹, Daniel Rabideau¹

¹MIT Lincoln Laboratory

Room: Expedition

S-01
EuRAD

Recent advances in the technologies associated with phased array apertures, digital waveform generators, and signal processing have enabled a broad class of Multiple-Input Multiple-Output (MIMO) radar techniques. In the last decade and a half, the MIMO radar nomenclature has been applied to various signaling and processing techniques that employ multiple, independent radiating transmitter elements that work cooperatively with multiple, independent receiver elements. This tutorial is intended to provide an overview of the principles of MIMO radar with an emphasis on applications and beamforming techniques for phased array radar systems.

First, this tutorial will briefly review the history of developments in the fields of radar, communication and control theory that led to the emergence of the “MIMO radar” taxonomy in the early 2000’s. An overview of MIMO radar will be provided covering the broad class of MIMO-enabling waveforms, comparisons with traditional single-input

radar systems, and the various canonical forms of MIMO radar in the published literature. Second, this course will expand upon waveform design approaches for MIMO radars. A coherent MIMO radar signal model will be presented that illustrates the utility of spatio-temporal signal processing for phased array systems – including a posteriori transmit beamforming. Then, performance of MIMO radar systems will be explored in the areas of parameter estimation, track and search rates, and requirements and cost for hardware implementations. Finally, several examples of MIMO radar operation will be presented spanning pulsed-Doppler, airborne GMTI, automotive radar and high frequency over-the-horizon radar applications.

PROGRAMME

Introduction to MIMO Radar

Frank Robey¹, Vito Mecca¹, Daniel Rabideau¹

¹MIT Lincoln Laboratory

Rohde & Schwarz Tutorial Seminars and Technical Workshops

Date: Tuesday 12th to Thursday 14th January 2021

Location: Juliana 4

FREE TO ATTEND
Due to the COVID-19 pandemic, this program is only preliminary. Final details are expected to be available from December 2020. For more information, details and registration:
<http://www.rohde-schwarz.com/eumw>

ROHDE & SCHWARZ

Make ideas real



TUTORIAL SEMINARS – RF BASICS IN TEST AND MEASUREMENT

The Rohde & Schwarz seminars covering RF basics in test and measurement will familiarize you with the elementary aspects of signal generators, spectrum analyzers and network analyzers. You will learn how to benefit from the tremendous flexibility of our T&M equipment when designing RF and

mmWave circuits. The seminar on real-time spectrum analysis will introduce the methods for debugging RF and mmWave circuits in the time and frequency domains and demonstrates the great benefits for analysis of every mmWave engineer’s complex circuitries.

Using vector network analyzers for component testing and applying various calibration techniques allows highly precise characterization of RF and mmWave components, which are necessary for mmWave designs and digital communications systems.

TUESDAY, 12TH JANUARY 2021

09:30 – 11:00 Fundamentals of signal generators and oscillators (YIG versus VCO)

11:15 – 12:45 Fundamentals of spectrum analysis

WEDNESDAY, 13TH JANUARY 2021

09:30 – 11:30 Introduction to digital signals and digital modulation

11:45 – 13:15 Real-time spectrum analysis embedded in advanced spectrum analyzers

THURSDAY, 14TH JANUARY 2021

09:30 – 10:30 Fundamentals of vector network analysis

10:45 – 12:15 Calibration in vector network analysis

TECHNICAL WORKSHOPS

TUESDAY, 12TH JANUARY 2021, 13:30 TO 16:15

Modern RF frontend design and testing

Workshop chair: Markus Lörner, Market Segment Manager RF & Microwave Components, Rohde & Schwarz

5G is real. The focus is now on improving the system and enhancing it to mmWave. This drives growing integration in components and the creation of more efficient designs to minimize form factor, improve energy efficiency and ultimately drive overall costs down. Multifunction RF components such as beamformers are used in 5G mmWave as well as in satellite communications and defense applications. The high density of RF frontends for massive MIMO systems calls for unprecedented energy efficiency in order to minimize the physical size while ensuring stable temperature conditions. This workshop will provide an overview of the latest technologies and requirements of RF frontends, focusing on the topics of improved efficiency and enhanced integration. Experts from the test and measurement world and industry partners will provide solutions that meet demanding requirements.

WEDNESDAY, 13TH JANUARY, 2021, 13:30 TO 16:15

Millimeterwave and THz technology for 5G and beyond

Workshop chair: Dr. Taro Eichler, Market Segment Manager Wireless Communications, Rohde & Schwarz

Millimeterwave and THz technology are seen as key components for beyond 5G and 6G systems. The utilization of the radio spectrum between 30 GHz and 300 GHz is intended to resolve the spectrum crunch and to enable ultra-broadband mobile communications up to the terabit-class range. Since highly integrated frontends including array antennas will be implemented, advanced over-the-air testing methods with an extreme extended frequency range up to 500 GHz will become mandatory. Furthermore, the use of extremely wideband channels up to several GHz will become a challenge in terms of broadband signal generation and signal analyzers. This workshop gives an overview of recent developments in the area of broadband mmWave and THz communications systems with a special focus on radio channel and OTA measurements as well on hardware implementation issues.

MathWorks Hands-on Workshops

Date: Tuesday 12th, to Thursday 14th January 2021
Location: Juliana 3



ACCELERATE THE PACE OF YOUR ENGINEERING AND SCIENCE

Join one or more of the 90-minute MathWorks hands-on workshops on Tuesday, Wednesday, and Thursday (September 15, 16, 17) at the European Microwave Week. Topics include: using MATLAB® for designing and testing 5G and WLAN systems, antenna and antenna array design and optimization for radar applications, modeling RF propagation effects in urban scenarios, using Software Defined Radios (SDR) for rapid prototyping and over-the-air testing, plus

lots more! These workshops do not require familiarity with MATLAB. Bring your own laptop to get a hands-on experience and rapidly get started under the supervision of MathWorks experts. . There will be 3 different session each day. Please sign up to our workshops here: <https://www.mathworks.com/EUMW-2020-workshops.html> These workshops are free to attend for everyone who has registered for European Microwave Week.

- Highlights
- 5G, LTE, WLAN, and Bluetooth Wireless Standards Made Easy
 - AI Driven Antenna Optimization and Platform Integration
 - RF Propagation and Ray Tracing in Urban Scenarios
 - Modeling Tracking Scenarios and Simulating Radar Detections

TUESDAY, 12TH JANUARY 2021

10:00 – 11:30	5G, LTE, WLAN, and Bluetooth Wireless Standards Made Easy
13:00 – 14:30	Modeling the RF Frontend of a Wireless System
15:00 – 16:30	Masterclass: Testing Your Software Defined Radio Algorithm on Real Hardware

WEDNESDAY, 13TH JANUARY 2021

10:00 – 11:30	Antenna and Antenna Array Design and Prototyping Using MATLAB®
13:00 – 14:30	AI Driven Antenna Optimization and Platform Integration
15:00 – 16:30	RF Propagation and Ray Tracing

THURSDAY, 14TH JANUARY 2021

10:00 – 11:30	Introduction to Radar System Simulation
13:00 – 14:30	Modeling Tracking Scenarios and Simulating Radar Detections
15:00 – 16:30	Machine Learning & Deep Learning Applied to Radar Target Classification

Keysight PathWave Workshops

Date: Wednesday, 13th January 2021
Location: Juliana 1



PROGRAMME

TIME: 10:00 – 12:00

Modeling Non-Linear RF Design - Unifying Circuit Design with System Design

The evolving RF system requirements are pushing the use of Spread-sheet custom templates to their limits. At the same time, fragmented design flows for RF system and circuit design restrict the final validation options.

With PathWave Advanced Design System (ADS), you can easily design your circuits; with complex modulation schemes, it becomes even more important to verify your design against System specifications. PathWave System Design (formerly known as SystemVue) is a multi-domain modeling implementation and verification platform for electronic system-level (ESL) design. It allows system architects and algorithm developers to cross traditional baseband and RF boundaries and provides a verification platform for RF circuit designers to innovate the physical layer (PHY) of next generation wireless communications systems and to prevent costly hardware integration delays downstream.

- In this workshop you will learn about:
- Extracting behavioral models from your circuit designs in the form of X-parameters and Fast Circuit Envelope (FCE) models and how to simulate them at the system level
 - System level verification against golden standards using Virtual Test Benches (VTBs) in ADS
 - How to linearize a Power Amplifier designed in ADS using the Digital Pre-Distortion (DPD) design capabilities in PathWave System Design

TIME: 13:00 – 15:00

Integrated Electromagnetic Analysis - Enabling PCB-Chip-Package Co-Design for RF & mm-Wave Applications

The level of integration of RF and mm-wave systems is increasing, which has an impact on the electrical properties and system parameters. Furthermore, RF applications are typically combined with non-RF digital sections such as CPU, DSP, control circuits and power distribution networks. As a result, it is insufficient to model chip, package and PCB separately, as unwanted coupling effect of both RF and high-speed digital signals may not be captured.

During this workshop we will present a complete chip-package co-design flow, which allows improvement of RF performance and power efficiency. By designing concurrently, silicon, package and system can be optimized and validated with fewer iterations before tape-out. This flow has been validated on GlobalFoundries' 22FDX process which targets mm-Wave designs.

ADS enables EM-circuit analysis of any selected portion of the PCB to identify and fix sources of interference before building hardware board turns. We will show an integrated Electromagnetic (EM) solution, RFPro, with automatic net, ground and component extractions from an imported ODB++ layout.

IHP Workshop: “High Performance SiGe BiCMOS Technology Platform for leading edge RF and Photonic ICs”

Date: Thursday, 14th January 2021
Location: Juliana 2

FREE TO ATTEND
For further information
and to register for this work-
shop please email:
Anna Sojka-Piotrowska: sojka@ihp-microelectronics.com



FAMILIARISE YOURSELF WITH IHP’S TECHNOLOGIES

The Workshop delivers firsthand information and opportunities about IHP’s technologies, services and integrated circuits. IHP’s offerings are very suitable for highly demanding applications such as wireless and broadband communication, medical technology, aerospace, mobility, wireless security and industrial automation.

PROGRAMME

09:30 – 09:40	Welcome and Introduction – R.F. Scholz	10:40 – 11:10	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 e.g.: Integrated HBTs with cut-off frequencies of up to 500 GHz, Through Silicon Vias, Localized Backside Etching	11:40 – 12:10	IP portfolio and customized IP block offerings via IHP Solutions – M. Petri Through IHP Solutions, customers have access to the whole range of IHP’s IP portfolio e.g.: building blocks, cores, integrated analog devices, complex digital processors, wireless sensor networks, embedded security or application software solutions.
09:40 – 10:10	MM-Wave Packaging and Heterogeneous Integration – M. Wietstruck In this talk, the latest developments for mm-wave packaging and heterogeneous integration at IHP will be presented: BiCMOS embedded Through-Silicon Vias (TSV), wafer-level interconnection technologies and a novel wafer-level packaging technology.	11:10 – 11:40	Space evaluation of two BiCMOS technologies SGB25RH and SG13RH – J. Kroel SGB25RH is already fully evaluated against ESCC standards and the technology is EPPL listed. The evaluation of SG13RH supported by the ESA component group consists of different activities and this overview gives an overall status of the progress.	12:10 – 12:20	Introduction Demonstrators: SRS Radar, UWB Localization, Broadband SDR, 5G – R.F. Scholz
10:10 – 10:40	Next generation THz SiGe-BiCMOS technology and future perspectives - tbd Recently IHP demonstrated first results for a SiGe-BiCMOS technology featuring transit frequencies fT and maximum oscillation frequencies fmax both exceeding 0.5 THz. Status and future perspective of these developments will be discussed.			12:20 – 13:30	Lunch & Demo Session

EuMW MicroApps 2020

Date: Tuesday 12th, to Thursday 14th January 2021
Location: MicroApps Theatre, Exhibition Hall

**Free Admission
with Exhibition and Conference
Badges**



TAKE 20 MINUTES TO LEARN SOMETHING NEW

Welcome to the tenth annual European Microwave Week (EuMW) Microwave Application Seminars (MicroApps), sponsored by Rohde & Schwarz and Horizon House. MicroApps will be held from Tuesday 12th – Thursday 14th January 2021 in the MicroApps Theatre, which is located within 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.

- 2020 MicroApps highlights include:
- Keynote talks by known experts in the RF/microwave industry
 - Industry workshops
 - A variety of practical application topics describing novel products and processes.

Once finalized, a complete agenda will be posted on www.eumweek.com and published in the official EuMW Show Guide. Additional printed copies will also be available

on site at the EuMW registration desks.





MicroApps admission is free for both exhibition-only and conference badges. Also included is a complimentary web download of the papers presented and bottled water.

We look forward to seeing you at EuMW 2020 in the MicroApps Theatre.





EXHIBITOR WORKSHOP MATRIX

Room		
TUESDAY 12 TH JANUARY 2021		
Juliana 3	10:00 – 16:30 MathWorks	
Juliana 4	09:30 – 12:45 Rohde & Schwarz Tutorial Seminars	13:30 – 16:15 Rohde & Schwarz Workshops
WEDNESDAY 13 TH JANUARY 2021		
Juliana 1	10:00 – 12:00 Keysight Technologies Workshops	13:00 – 15:00 Keysight Technologies Workshops
Juliana 3	10:00 – 16:30 MathWorks	
Juliana 4	09:30 – 13:15 Rohde & Schwarz Tutorial Seminars	13:30 – 16:15 Rohde & Schwarz Workshops
THURSDAY 14 TH JANUARY 2021		
Juliana 2	09:30 – 13:30 IHP	
Juliana 3	10:00 – 16:30 MathWorks	
Juliana 4	09:30 – 12:15 Rohde & Schwarz Tutorial Seminars	

SUNDAY

					
Room	08:30 – 10:10	10:50 – 12:30	13:50 – 15:30	16:10 – 17:50	EVENING PROGRAMME
Mission 1	W-03 High Performance GaN MMICs				
Mission 2	W-17 Advanced RF Technologies for 5G				
Quest	W-29 Recent Advances in Additive Manufacturing of Microwave Components				
Auditorium	S-03 Fundamentals of Microwave PA Design				
Expedition	W-11 Integrated Doherty PAs for Cellular and mmWave Applications				
Flash	W-27 Wireless Power Transmission Recent Research Advances		W-02 Advanced Measurement Techniques for Next Generation Communication Systems		
Spark	W-06 Sub-mmWave On-Wafer Measurements				

MONDAY

						
Room	08:30 – 10:10	10:50 – 12:30		13:50 – 15:30	16:10 – 17:50	EVENING PROGRAMME
Mission 1	EuMIC02 D-Band to H-Band Amplifiers			EuMIC05 ICs for mmWave Beamforming Systems	EuMIC08 ICs for Communication and Sensing	
Mission 2	EuMIC03 GaN MMIC Power Amplifiers			EuMIC06 Advances in mmWave and High Power Technologies	EuMIC09 Advanced Solutions for Integrated Power Amplifiers	
Quest	EuMIC04 Receivers and LNAs			EuMIC07 Oscillators and Switches	EuMIC10 Nonlinear Modelling	
Expedition	W-28 Microwave Wearable Circuits and Systems for Biomedical Applications					
Polar		EuMIC01 EuMIC Opening				
Auditorium	W-13 Advanced Applications of In-Band Full-Duplex Technology		Technology in Context Network Threats	S-05 Multibeam Antennas and Beamforming Networks		
Spark	W-08 Antenna/Modules in Package for mmWave for 5G			W-10 From Enabling GaN Technology to High-Performing Space-Borne SSPAs at mmWave		
Flash	S-07 From Device Characterisation to Amplifier Design: Advanced Large Signal Measuring, Fast and Accurate Modelling, and Reliable Designing			S-10 Intuitive Microwave Filter Design with EM Simulation		
Glow	W-18 Measurements at mmWave and Terahertz Frequencies of Three Measurement Quantities: S-Parameters, Power, and Complex Permittivity of Dielectric Materials					
Beam	W-07 High-Power Microwave Industrial Applications					
Off-site						Automotive Forum Networking Dinner 18:30 - 22:00
Off-site						EuMIC Get-Together 18.30 - 21.00

TUESDAY



Room	08:30 – 10:10	10:50 – 12:30	13:50 – 15:30	16:10 – 17:50	EVENING PROGRAMME
Mission 1	EuMIC11 Transceiver and Transmitter ICs	EuMIC13 Foundry Panel	EuMC07 Wireless Communication Systems	EuMC14 Microwave and mmWave Systems	
Mission 2	EuMC01 Power Amplifiers for Sub 6 GHz Application		EuMC08 Power Amplifiers Based on III-V & CMOS Technologies for 5G	EuMC15 Doherty and Load Modulated Power Amplifier Structures	
Quest	EuMIC/EuMC01 Silicon Integrated Sub-mmWave Circuits		EuMC09 Terahertz Electronic Devices	EuMC16 Terahertz Photonic Devices and System	
Expedition	EuMIC12 Design and Characterisation Techniques		EuMC10 MIMO and 5G Antennas	EuMC17 Phased and Transmit Arrays	
Polar			EuMIC14 1-Minute Poster Pitch (13:50 - 14:10)	EuMIC16 EuMIC Closing Session	
Auditorium	Automotive Forum Automotive Radar: Waveforms, Architectures, AI and Interference		Technology in Context Philosophical Lecture	Automotive Forum Automotive Radar: Waveforms, Architectures, AI and Interference	
Spark	EuMC02 Array Antennas		EuMC11 Waveguide and Horn Antennas	EuMC18 5G Antenna Systems	
Flash	EuMC03 Advanced Packaging Components and Techniques		EuMC12 Advanced Packaging Solutions for mmWave Applications	EuMC19 3D-Printing Technologies	
Glow	EuMC04 Theoretical and Computational Electromagnetics		EuMC13 Numerical Methods in Microwave Technology	EuMC20 Modelling of Field Radiation and Scattering	
Beam	Student School Build Your Own Radar: Instruction		W-25 Advanced mmWave Radar System Solutions for Industrial and Consumer Sensing Applications		
Media arena	EuMC05 1-Minute Poster Pitch (09:40 - 10:10)	Women in Microwaves Lunch Lecture	Career Platform How to Stand Out in a Job Application	Women in Microwaves Panel Discussion	
Fluor				Teaching Microwaves Increase Your Microwave Lecturing Skills	
Round control		Career Platform Career Lounge: Meet Jobs, Build Careers			
Transitzone B		Automotive Forum Lunch			
Transitzone C		Student School Build Your Own Radar: Hands-On Experience			
loopbrug	Career Platform Company Wall and Job Wall				
Beatrix		Opening of the European Microwave Week EuMC/EuMW Opening			
Juliana 2	W-05 Digital Predistortion for 5G MIMO Wireless Transmitters				
Hall 1		EuMC06 Interactive Poster Session	EuMIC15 Interactive Poster Session		
Hall 1	Student Design Competition Detect a Drone / Build (a part of) an Amplifier				
Off-site	EuMW Welcome Reception 18.30 - 22.00				

■ EuMW ■ EuMC ■ EuRAD ■ EuMIC ■ Student Activity ■ EuMIC/EuMC ■ EuMC/EuRAD

WEDNESDAY







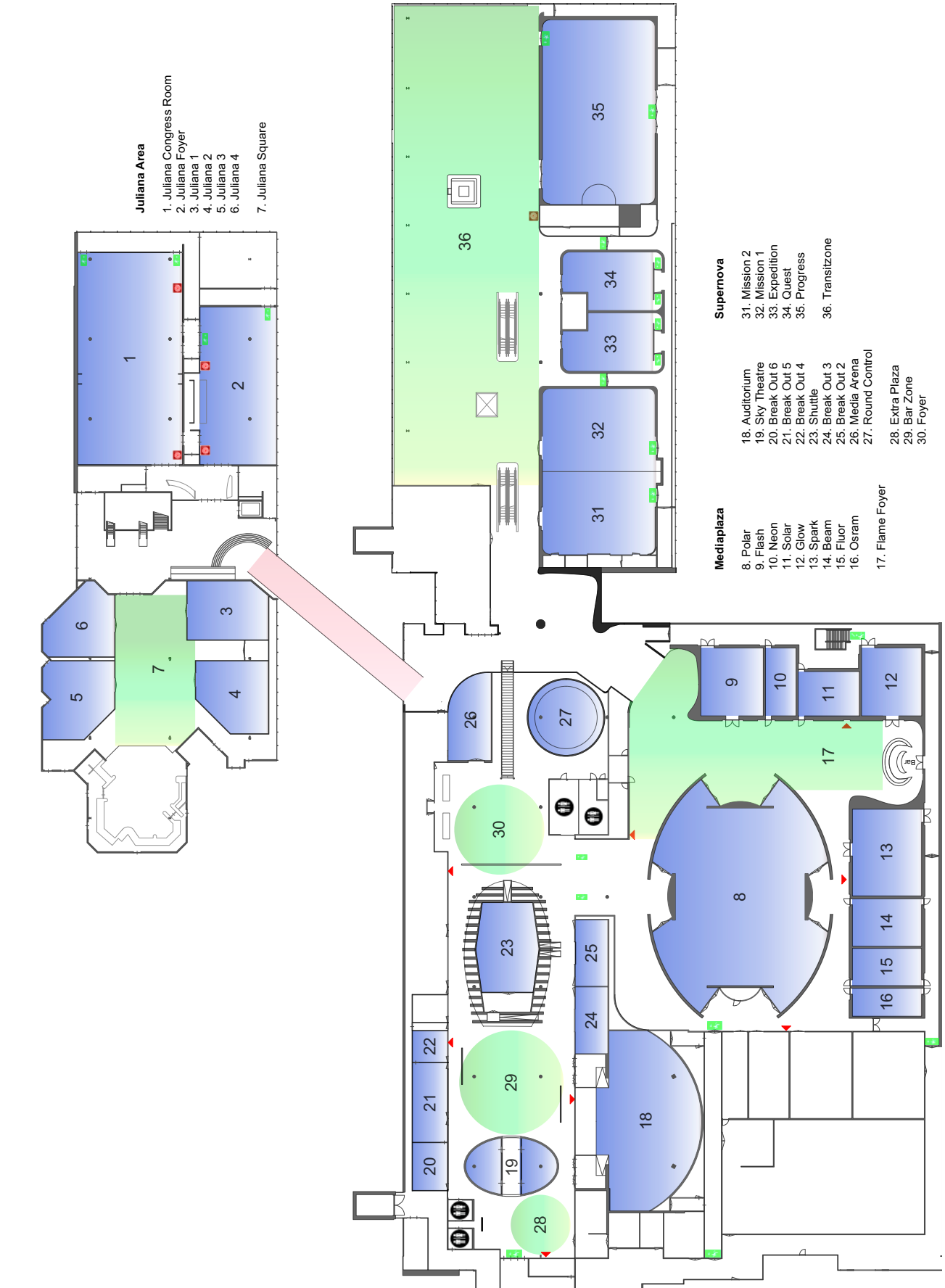
Room	08:30 – 10:10	10:50 – 12:30		13:50 – 15:30	16:10 – 17:50	EVENING PROGRAMME
Progress				W-14 Automotive Radar Networks and Sensor Fusion		
Mission 1		EuRAD02 Dual Use & Waveform Design		EuRAD04 Doppler Processing Techniques for Low Reflectivity Targets	EuRAD06 Emerging & Industrial Applications	
Mission 2	EuMC21 Special Antenna Systems	EuMC27 [Focussed Session] Emerging Microwave Technology: Asia-Pacific		EuMC33 Advances on RF Power Amplifier Behavioural Modelling	EuMC39 Solid State High Power Amplifiers for Satellite and Radar Applications	
Quest		EuRAD03 Design and Calibration Concepts for Advanced Radar Systems		EuRAD05 Radar Circuits and Systems	EuRAD07 Radar Scenario Simulations	
Expedition	EuMC22 Novel Circuits Solutions for Energy Transfer in the Near-Field and Far-Field	EuMC28 Novel Wireless Power Transfer and Energy Harvesting Systems		EuMC34 Recent Advances in RFID and IoT Sensors	EuMC40 [Focussed Session] Emerging Antenna Technologies for RFID	
Polar	EuRAD01 EuRAD Opening Session					
Auditorium	EuMC23 [Focussed Session] Innovative Antennas for Cubesat Platforms	DSS Forum Space Situational Awareness	DSS Forum Strategy Analytics Lunch	DSS Forum Space Situational Awareness		DSS Forum Cocktail Reception
Spark	S-08 High Power Amplification for Space Applications			EuMC35 Integrated Antennas	EuMC41 SATCOM and mmWave Antennas	
Flash	EuMC24 Additive Manufacturing and Emerging Materials for mmWave Applications	EuMC29 Reconfigurable Planar Passive Components		EuMC36 Transmission Lines and Passive Components	EuMC42 Planar Power Dividers/ Combiners	
Glow		EuMC30 Non-Planar Filters		EuMC37 Non-Planar Filters and Devices	EuMC43 Non-Planar Devices and Systems	
Beam	EuMC25 Metamaterials for Circuits and Sensors	EuMC31 Frequency Selective Surfaces, Reflectors and Metamaterial Antennas		EuMC38 Metasurfaces and FSSs Applications	EuMC44 [Special Session] Silicon-Based Ka-Band Massive MIMO Systems	
Media arena	EuMC26 1-Minute Poster Pitch (09:40 - 10:10)	Career Platform [Special Session] Industry Market and Professional Opportunities	IEEE Young Professionals	Career Platform Startup Panel		
Fluor	S-04 Quantum Computing for Electrical Engineers					
Shuttle		IEEE Young Professionals				
Round control		Career Platform Career Lounge: Meet Jobs, Build Careers				
loopbrug	Career Platform Company Wall and Job Wall					
Juliana 2	W-12 High-Efficiency Linear Power Amplifiers for High Bandwidth, High PAR Signals					
Hall 1	Student Design Competition Detect a Drone / Build (a part of) an Amplifier		EuMC32 Interactive Poster Session	Student Design Competition Detect a Drone / Build (a part of) an Amplifier		
Off-site						Microwave Nightfever 20.00 - 24.00

THURSDAY

☕		🍴		☕		🍸
Room	08:30 – 10:10	10:50 – 12:30		13:50 – 15:30	16:10 – 17:50	EVENING PROGRAMME
Progress	W-23 High Resolution Radar for Automotive					
Mission 1	EuRAD08 Object Classification in Automotive Radars	EuRAD12 [Focussed Session] Radar Interference Cancellation		EuRAD16 Automotive		
Mission 2	EuRAD09 Defence Applications	EuRAD13 [Special Session] Radar and Electronic Warfare		EuRAD17 Advanced Techniques and Innovative Array Configurations for DoA		
Quest	EuRAD10 SAR Processing	EuRAD14 Surveillance and SAR		EuRAD18 SAR Applications		
Expedition	EuMC/EuRAD01 Radar Receivers and Front-Ends	EuMC49 Front-End and Active Module		EuMC54 Low Noise Amplifier and Phased Array Module		
Polar					Closing of the European Microwave Week EuMC/EuMW Closing and Awards Ceremony	
Auditorium	EuMC45 [Special Session] Focus Day: Array Antennas for Radio Astronomy	EuMC/EuRAD02 [Special Session] Focus Day: Active Array Antennas for Space	Technology in Context The Law of Space	EuMC/EuRAD03 [Special Session] Focus Day: Active Array Antennas for Defence		HAM Radio Social 18.00 - 21.00
Spark	EuMC46 Advanced Planar Filter Principles and Technologies	EuMC50 Compact Planar Filtering Devices		W-15 Recent Advances in Micro-Doppler Radar and its Applications		
Flash	EuMC47 Dielectric Measurements	EuMC51 Calibration and Characterisation Techniques		EuMC55 Antenna Characterisation Techniques		
Glow	EuMC48 Microwave Monitoring and Sensing of Biomedical Parameters	EuMC52 Biological Microwave Effects and Imaging Techniques		EuMC56 [Focussed Session] Electromagnetics in Biomedical Applications		
Beam	Tom Brazil Doctoral School of Microwaves The Route to 5G: Design of mmWave Active Array Systems, from RFIC to Signal Processing					
Media arena	EuRAD11 1-Minute Poster Pitch (09:40 - 10:10)		EuMC53 1-Minute Poster Pitch (12:00 - 12:30)		EuMC57 In Recognition: Prof.Dr. A.T. de Hoop	
Round control	Career Platform Career Lounge: Meet Jobs, Build Careers					
BOR 6	Career Platform Job Dating					
loopbrug	Career Platform Company Wall and Job Wall					
Juliana Congress Room 1	W-31 5G and Beyond: Enabling RF Architectures and Technologies for Emerging Wireless Systems					
Hall 1			EuRAD15 Interactive Poster session	EuMC58 Interactive Poster Session		

FRIDAY

						
Room	08:30 – 10:10	10:50 – 12:30		13:50 – 15:30	16:10 – 17:50	EVENING PROGRAMME
Progress				EuRAD25 Closing Session		
Mission 1	EuRAD19 MIMO Radar	EuRAD22 Automotive Radar MIMO Processing				
Mission 2	EuRAD20 Passive Radars	EuRAD23 Target Characterisation with Radar				
Quest	EuRAD21 New Radar Concepts	EuRAD24 [Special Session] Civilian Radar Research and Development in China				
Expedition	S-02 Cognitive Radar Signal Processing			S-01 Introduction to MIMO Radar		
Auditorium	5G Forum 5G: From Technology to Business		Technology in Context 5G, But Why?	5G Forum 5G: From Technology to Business		
Flash	W-21 Recent Advances in Topologies, Technologies and Practical Realizations of Microwave Sensors					
Glow	W-30 Recent Advances on Microwave Filters					
BOR 2	W-32 Practical Aspects of Running a Microwave Laboratory and How to Make Good Measurements Every Time					
Transitzone A			EuRAD Seated Lunch			
Transitzone B			5G Forum and WS/SC Seated Lunch			



Route to the Jaarbeurs by car or from Utrecht Central station

	Taxi		Informatie	Event & Exhibition Centre	Beatrixgebouw	Jaarbeurs
	Bus		Fietsenstalling	Hal 1 t/m 4 en 7 t/m 12	Beatrix Theater	Jaarbeursplein 3521 AL Utrecht
	Sneltram		Oplaadpunt	Speys	Expozaal	jaarbeurs.nl
	EHBO		Parkeren mindervaliden	Eerste verdieping:	Jaarbeurs MeetUp	Parkeren en navigeren
	Geldautomaat		Looproute	Croesezaal	Kantoren Jaarbeurs	Bekijk de plattegrond om te beoordelen op
	Pers		Restaurant	Julianazalen (Hal 5)	Trade Mart	welk parkeerterrein je het beste kunt
				Supernova	Zeyn	parkeren.

JAARBEURS
attract - engage - accelerate

Exhibitor List 2020

A: ACST GmbH · AdTech Ceramics · AFT Microwave GmbH · AGC · AGC-NELCO Europe SA · AINFO Inc. · AIRMEMS · Alfred Tronser GmbH · ALPHA-RLH · Altair Engineering GmbH · AMCAD Engineering · American Standard Circuits, Inc. · American Technical Ceramics Corp. (ATC) · Ampleon · Analog Devices GmbH · Anyarc (Kunshan) Technology Co., Ltd · API Tech · AR Europe Ltd · Arralis · Artech House Books · ASB Inc. · ATEM · Atlantic Microwave Ltd · Auriga PIV-Tech · AVX Corp.

B: BAE Systems Surface Ships Ltd · Bits&Chips · Bruco IC · BSC Filters Ltd · bsw TestSystems & Consulting BV

C: Cadence · China Electronics Technology Instruments Co., Ltd (CETC) · Cicor Group · CISTEME · Cobham Electrical and Electronic Equipment · Coilcraft · COMSOL BV · Copper Mountain Technologies · CPE Italia SpA

D: DICONEX · DELTA OHM · Ditom Microwave Inc. · Dow-Key Microwave · dSPACE GmbH · DYCONEX AG

E: ECA Group · EDI CON China · Electronic Specifier Ltd · Elektor · Elite RF · ERZIA Technologies S.L. · ETL Systems · European Microwave Week 2021 · Everything RF

F: Farran Technology Ltd · Filtronic Broadband Limited · Focus Microwaves Inc. · Focusimple Electronics Co., Ltd · FormFactor Inc. · Fraunhofer FHR · Fraunhofer IAF · Fuzhou Micable Electronic Technology Co., Ltd

G: Gapwaves · Greenray Industries

H: Hangzhou Freqcontrol Electronic Technology Ltd · hf-Praxis · High Frequency Electronics · Holzworth Instrumentation · Huber + Suhner AG · Hytem

I: IHP GmbH · IMST GmbH · iNOVEOS · Institut d'Electronique, de Microelectronique et de Nanotechnologies (IEMN) · Intech Microwaves S.R.L. · Isola GmbH

J: JQL Technologies Corporation

K: K&L Microwave, Inc · Keysight Technologies · Knowles Precision Devices · KOA Europe GmbH · KOSTECSYS Co., Ltd · Kuhne Electronic GmbH

L: LPKF Laser & Electronics AG · Lancaster University Engineering Department

M: Mathworks B.V. · Maury Microwave Corp. · Mesuro Limited · METDA Corp · Mician GmbH · Micro Harmonics Corporation · Micro Systems Engineering GmbH · Micro Systems Technologies Management AG (MST) · Microsanj LLC · Microwave Engineering Europe · Microwave Journal · Microwave Products Group · Microwave Systems JSC · Microwaves and RF · Millwave Silicon Solutions Inc. · Milliway Microelectronics · MISOTECH · Mitron Inc · Mouser Electronics · MPI Corporation · MRC Gigacomp GmbH & Co. KG · MTR S.R.L. · MUEGGE GmbH · Murata Software Co., Ltd

N: NI · NSI-MI Technologies · NXP Semiconductors

O: OMMIC

P: Pasquali Microwave Systems SRL · Pickering Interfaces Ltd · Pico Technology Ltd · Planar Monolithics Industries Inc · Plexsa Manufacturing · Pole Zero · Prana R&D · Pure Pro Technology Co., Ltd

Q: Quartzcom AG

R: Remcom Inc. · Research Fab Microelectronics Germany (FMD) · RF MORECOM · RF-Lambda Europe GmbH · Rflight Communication Electronic Co., Ltd · RFMW Europe Ltd · Rogers Corporation · Rohde

& Schwarz GmbH & Co. KG · Rosenberger Hochfrequenztechnik GmbH & Co. KG

S: SARAS Technology Ltd · Schmid & Partner Engineering AG · Schott AG · Shenzhen Superlink Technology Co., Ltd · Siglent Technologies Germany GmbH · Signal Integrity Journal · Smiths Interconnect · Hypertac SA · Southwest Microwave · SpaceForest · SPINNER GmbH · STACEM · Stratedge Corporation · Sumitomo Electric Europe Ltd · Sumitomo Electric Industries · Sungsan Electronics & Communications Co., Ltd · Suzhou Astroniks Electronic Technology Co., Ltd

T: Tech-X Corporation · Teledyne Technologies · Telemeter Electronic GmbH · TEMSTRON Co., Ltd · TEMWELL Corp · TICRA · Times Microwave Systems · TMD Technologies Ltd · TNO Defence, Safety and Security · Trilight Microwave AB + Microwave Systems · Tronser, Inc. · Tusk IC nv

U: UIY Inc. · United Monolithic Semiconductors SAS

V: Varioprint AG · Vectawave · Ventec International Group · VIA Electronic GmbH · Virginia Diodes Inc. · Vishay Electronic GmbH · VTT

W: W.L. Gore & Associates GmbH · WAVEPIA Co., Ltd · Wavice Inc. · Wevercomm Co., Ltd · WIN Semiconductors Corp · WIPL-D d.o.o. · Withwave Co., Ltd · Wolf-speed, A Cree Company · Wuerth Elektronik eiSos GmbH & Co. KG

X: XLIM - UMR CNRS 7252 - Université de Limoges

Y: Yole Développement

Z: Zhejiang Wazam New Materials Co., Ltd · Zhongshan Fragrant Mountain Microwave Co., Ltd



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