

International Radar Symposium IRS 2021	
Time CEST	21 – 22 June 2021 Virtual Programme
Monday, 21 June 2021	
10:00 - 10:30	Conference Opening Speakers: <i>Peter Knott, Carlos Jahn, Thomas Dallmann</i>
10:30 - 10:40	Break
Focus Session 1	
Session 11 / Automotive Radar for Automated Driving Chairs: <i>Marc-Michael Meinecke, Andreas Danklmayer</i>	
10:40 - 11:00	11.1 Moving Target Classification with a Dual Automotive FMCW Radar System using Convolutional Neural Networks <i>Steven Duong, Daniel Kahrizi, Sven Mettler and Clemens Klöck</i>
11:00 - 11:20	11.2 IMIKO-Radar: Interference Measurements of Today's Automotive Radar Sensors <i>Alicja Ossowska, Leen Sit, Sarath Manchala, Thomas Vagler, Jana Vanova, Jan Hejtmanek, Kevin Krupinski and Urs Lübbert</i>
11:20 - 11:40	11.3 Making Vulnerable Road Users More Visible to Radar : A Communications Inspired Approach <i>Saeid K.Dehkordi and Giuseppe Caire</i>
11:40 - 12:00	11.4 A Novel Ghost Target Cancellation Scheme using Periodical Interference Sensing for Automotive Chirp Sequence Radar <i>Masahiro Umehira, Daiki Ammen, Yuu Watanabe, Xiaoyan Wang and Shigeki Takeda</i>
12:00 - 12:20	11.5 Landmark-based RADAR SLAM for Autonomous Driving <i>Avinash Nittur Ramesh, Carlos Moreno Leon, Jorge Centenera Zafra, Stefan Brüggewirth and Maria Antonia Gonzalez Huici</i>
12:20 - 12:30	Break
Keynote	
12:30 - 13:00	<i>Robert D. Palmer</i>, University of Oklahoma Phased Array Weather Radar R&D at the Advanced Radar Research Center at the University of Oklahoma
13:00 - 14:00	Break

Parallel Sessions 1	
Session 12 / Automotive Radar Chairs: <i>Stephane Kemkemian, Urs Luebbert</i>	
	12.1
14:00 - 14:20	The Technique of Measurement of the Pattern of Receive Phased Antenna Array for Automotive Radar <i>Aleksandr Myakinkov, Semen Shabalin, Stanislav Kuznetsov, Andrey Kuzin, Roman Fadeev and <u>Ksenia Fomina</u></i>
	12.2
14:20 - 14:40	Determine Radar Backscattering of Vegetation for the Automotive 77 GHz Band <i>Vera Kurz, Florian Pfeiffer, Carlo van Driesten and Erwin Biebl</i>
	12.3
14:40 - 15:00	FMCW-FMCW Interference Analysis in mm-Wave Radars; An indoor case study and validation by measurements <i>Robin Amar, Mohammad Alae-Kerahroodi and Bhavani Shankar M. R.</i>
	12.4
15:00 - 15:20	Analysis of Automotive Radar Interference in Spatial Domain <i>Anum Ahmed Pirkani, Fatemeh Norouzian, Edward Hoare, Mike Cherniakov and Marina Gashinova</i>
	12.5
15:20 - 15:40	Characterization of the Effect of Low Pass Filter Response on the Interference in FMCW Automotive Radar <i>Fatemeh Norouzian, Anum Pirkani, Edward Hoare, Mikhail Cherniakov and Marina Gashinova</i>

Parallel Sessions 1	
Session 13 / Radar Remote Sensing and SSA Chairs: <i>Alexander Charlish, Hermann Rohling</i>	
	13.1
14:00 - 14:20	Automatic Target Recognition on High Resolution SAR Images with Deep Learning Domain Adaptation <i>Tobias Brosch and Christoph Neumann</i>
	13.2
14:20 - 14:40	ISAR imaging of space objects using large observation angles <i>Simon Anger, Matthias Jirousek, Stephan Dill and Markus Peichl</i>
	13.3
14:40 - 15:00	Translational motion estimation with multistatic ISAR systems <i>Alejandro Testa, Fabrizio Santi and Debora Pastina</i>
	13.4
15:00 - 15:20	Oil slick monitoring using Sentinel-I SAR images <i>Tomás Rodrigues and Paulo Marques</i>
	13.5
15:20 - 15:40	Adaptive Calibration Of The Tandem-L Ground Demonstrator <i>Jan Paul Kroll, Marwan Younis, Gerhard Krieger and Tobias Rommel</i>

Parallel Sessions 1	
Session 14 / Weather Radar Chairs: <i>Andreas Danklmayer, Alexander Manz</i>	
	14.1
14:00 - 14:20	A new airborne network concept to improve air navigation safety <i>Ferran Valdes Crespi, Stephan Sandenbergh, Jochen Schell, Daniel O'Hagan and Peter Knott</i>
	14.2
14:20 - 14:40	Validation of Wind Fields Retrieved by Dual-Doppler Techniques Using a Vertically Pointing Radar <i>Raquel Evaristo, Ricardo Reinoso-Rondinel, Silke Trömel and Clemens Simmer</i>
	14.3
14:40 - 15:00	Polarimetric radar-based methods for evaluation of hydrometeor mixtures in numerical weather prediction models <i>Velibor Pejčic, Clemens Simmer and Silke Trömel</i>
	14.4
15:00 - 15:20	Storm Cell Observation And Prediction Using Polarimetric Weather Radars <i>Ricardo Reinoso-Rondinel, Raquel Evaristo, Mari Schmidt, Felix Crijnen, Silke Trömel and Clemens Simmer</i>
15:20 - 15:40	./.

	Keynote
16:30 - 17:00	<i>Matt Markel</i> , Waymo Radar Team Radar Challenges and Opportunities for Fully Autonomous Vehicles
	Panel Discussion
17:00 - 18:00	AI and Radar <i>Dominik Luber</i> , IABG mbH (Discussion leader) <i>Tobias Brosch</i> , Hensoldt Sensors GmbH <i>Stefan Brüggewirth</i> , Fraunhofer FHR <i>Souvik Hazra</i> , Infineon Technologies <i>Jürgen Ziegler</i> , IABG mbH
	Virtual Get Together
18:00 - 19:00	<ul style="list-style-type: none"> • DGON Christian Hülsmeier Award • Networking on the virtual platform "wonder.me"

Tuesday, 22 June 2021	
Focus Session 2	
Session 21 / Counter-drone surveillance Chairs: Mohammed Jahangir, Michail Antoniou	
09:00 - 09:20	21.1 Drone detection with a multistatic C-band radar <i>Marc Schneebeli, Andreas Leuenberger, Peter Wellig, Urs Siegenthaler, Leon Wabeke, Celma Kitching and Kevin Kloke</i>
09:20 - 09:40	21.2 High-detail X-band RCS simulations of a DJI S900 hexacopter, and comparisons against measurements <i>Peter J. Speirs, Matthias Renker, Uwe Aulenbacher, Peter Wellig and Axel Murk</i>
09:40 - 10:00	21.3 The Need for Simultaneous Tracking and Recognition in Drone Surveillance Radar <i>Stephen Harman and Bashar Ahmad</i>
10:00 - 10:20	21.4 Prototyping a Dual-Channel Receiver for use in a Staring Cooperative Radar Network for the Detection of Drones <i>Benjamin Griffin, Alessio Balleri, Chris Baker and Mohammed Jahangir</i>
10:20 - 10:40	21.5 Tracking Analysis of Drone Detection System at Airports: Methodology and results <i>Ralf Heidger, Vincent Lambercy and Douwe Thieo Lambers</i>

Parallel Sessions 2	
Session 22 / UAV Detection and Counter-Drone Chairs: <i>Michail Antoniou, Vojtěch Stejskal</i>	
10:40 - 11:00	22.1 FAROS-E: a compact and low-cost millimeter wave surveillance radar for real time drone detection and classification <i>Samiur Rahman and Duncan A. Robertson</i>
11:00 - 11:20	22.2 Developing Drone Experimentation Facility: Progress, Challenges and cUAS Consideration <i>Dimitrios Panagiotakopoulos, Ivan Petrunin, Alex Williamson, Antonios Tsourdos, Stephen Harman, Tim Quilter, Ian Williams-Wynn, Gavin Goudie, Philip Vernall, Neil Watson, Eimantas Puscius and Jonathan Reid</i>
11:20 - 11:40	22.3 Chebyshev moments based Drone Classification, Recognition and Fingerprinting <i>Carmine Clemente, Luca Pallotta, Christos Ilioudis, Francesco Fioranelli, Gaetano Giunta and Alfonso Farina</i>
11:40 - 12:00	22.4 Simultaneous Signal Processing with Multiple Coherent Processing Intervals in FMCW Radar for Drone Detection <i>Marek Ciesielski, Krzysztof Stasiak, Mariia Khyzhniak, Konrad Jędrzejewski, Marcin Żywek and Sebastian Brawata</i>
12:00 - 12:20	22.5 Measurements of Birds and Drones with L-Band Staring Radar <i>Mohammed Jahangir, George Atkinson, Michail Antoniou, Chris Baker, Jonathon Sadler and Jim Reynolds</i>

Parallel Sessions 2	
Session 23 / SAR and ISAR Imaging Chairs: Yasuo Watanabe, Jacek Misiurewicz	
10:40 - 11:00	23.1
	Bistatic SAR Imaging with Satellite Phase Code Modulated Waveforms <i>Andon Lazarov, Christo Kabakchiev and Todor Kostadinov</i>
11:00 - 11:20	23.2
	A Waveform-Encoded SAR Concept Based on a Limited Number of Cyclically-Shifted Chirps <i>Se-Yeon Jeon and Michelangelo Villano</i>
11:20 - 11:40	23.3
	XY-DemoRad – a low-cost K-band SAR system for UAV application <i>Maciej Wielgo, Krzysztof Stasiak, Damian Gromek, Krzysztof Radecki and Piotr Samczyński</i>
11:40 - 12:00	23.4
	Radar Imaging Based on Frequency Filtering <i>Florian Fembacher</i>
12:00 - 12:20	./.

Parallel Sessions 2	
Session 24 / Localisation and Tracking Chairs: <i>Chris Baker, Roland Mallwitz</i>	
	24.1
10:40 - 11:00	Multi-Radar Tracking Optimization for Collaborative Combat <i>Nouredine Nour, Reda Belhaj-Soullami, Cédric L R Buron, Alain Peres and Frederic Barbaresco</i>
	24.2
11:00 - 11:20	Novel Composite Motion Extraction from Velocity Signature of FMCW Radar for Activity Recognition <i>Anwasha Khasnobish, Arindam Ray, Arijit Chowdhury, <u>Smriti Rani</u>, Tapas Chakravarty and Arpan Pal</i>
	24.3
11:20 - 11:40	Ground Target Motion Estimation based on visual measurements <i>Luis Miguel del Pozo López, Miguel Sabarís Boullosa and <u>Juan José Navarro Corcuera</u></i>
	24.4
11:40 - 12:00	Multi-hypothesis Track Initialization With The Use Of Multiple Trajectory Models <i>Marek Konopko, Mateusz Malanowski and Jan Hardejewicz</i>
	24.5
12:00 - 12:20	Extended Object Tracking assisted Adaptive Multi-Hypothesis Clustering for Radar in Autonomous Driving Domain <i>Stefan Haag, Bharanidhar Duraisamy, Felix Govaers, Martin Fritzsche, Jürgen Dickmann and Wolfgang Koch</i>

Parallel Sessions 2	
Session 25 / Recent Advances in Radar Technology Chairs: <i>Piotr Samczynski, Boris Levitas</i>	
	25.1
10:40 - 11:00	Transmitter for UWB Stepped-Frequency Noise Radar <i>Kostyantyn Lukin, Volodymyr Palamarchuk, Oleg Zemlyaniy, Dmytro Tatyanko and Sergiy Lukin</i>
	25.2
11:00 - 11:20	Integrated Up-Down Converter for Multi-Band UWB M-Sequence Based Radar <i>Miroslav Sokol and Pavol Galajda</i>
	25.3
11:20 - 11:40	Transmit Beampattern Synthesis for Planar Array with One-bit DACs <i>Tong Wei, Linlong Wu, Mohammad Alae-Kerahroodi and Bhavani Shankar M. R.</i>
	25.4
11:40 - 12:00	Enhanced Cross-correlation Based Translational Motion Compensation in a Passive Radar with Data Gaps Filling <i>Roman Mularzuk, Adrian Krysiński and Maciej Soszka</i>
	25.5
12:00 - 12:20	Application of polynomial trend removal for suppression of Doppler clutter in drone surveillance radars <i>Konrad Jedrzejewski, Krzysztof Kulpa, Marek Ciesielski, Krzysztof Stasiak and Sebastian Brawata</i>

12:20 - 12:30	Break
	Keynote
12:30 - 13:00	<i>Vincent Socci</i> , National Instruments Integrating of UAS Operations into the National Airspace System
13:00 - 14:00	Break
	Focus Session 3
	Session 31 / Forward Scatter Radar (FSR) <i>Chairs: Pierfrancesco Lombardo, Mike Cherniakov</i>
14:00 - 14:20	31.1 Railway safety radar system with use of FSR <i>Daria Balashova, Alexander Myakinkov, Vladimir Burov, <u>Semen Shabalin</u>, Alexey Mikhaylov and Alexander Ryndyk</i>
14:20 - 14:40	31.2 Reverse Forward Scatter Radar Power Budget Analysis <i>Jared Taylor, Liam Daniel, Edward Hoare, Marina Gashinova and Mikhail Cherniakov</i>
14:40 - 15:00	31.3 Iterative Doppler-Only Track initialization enhanced with Direction of Arrival information <i>Miika Tolonen, Tuomo Kauranne, Juha Hartikka, Mauno Ritola and Matti Korhonen</i>
15:00 - 15:20	31.4 Multiple Integration Method for SISAR Imaging Radar Systems <i>Sebastian Diaz Riofrio, Christos Ilioudis, Carmine Clemente and Massimiliano Vasile</i>
15:20 - 15:40	31.5 Experimental results for a Passive Forward Scatter Radar based on OFDM waveforms of opportunity <i>Fabiola Colone, Carlo Bongioanni and Pierfrancesco Lombardo</i>

Parallel Sessions 3	
Session 32 / Passive, Bistatic and Multi-Static Radar Chairs: Dirk Heberling, Guy Kouemou	
15:40 - 16:00	32.1 Ship target velocity estimation with multi-transmitter GNSS-based passive radar exploiting long integration times <i>Ilaria Nasso, Fabrizio Santi and Debora Pastina</i>
16:00 - 16:20	32.2 Passive Forward Scattering Signal Extraction Using Second-Order Vertical Synchrosqueezing <i>Marek Płotka, Karol Abratkiewicz, Mateusz Malanowski, Krzysztof Kulpa and Piotr Samczyński</i>
16:20 - 16:40	32.3 Real-Time Selection of FM Transmitter in Passive Bistatic Radar Based on Short-Term Bandwidth Prediction <i>Marcin Żywek and Mateusz Malanowski</i>
16:40 - 17:00	32.4 DVB-T Passive Radar experimental comparisons of a custom made Passive Radar receiver, RFSoc and a Software Defined Radio <i>Idar Norheim-Næss and Erlend Finden</i>
17:00 - 17:20	32.5 Expert Systems for Passive Radar Configuration <i>Volker Winkler, Steffen Lutz and Michael Brandfass</i>

Parallel Sessions 3	
Session 33 / Cognitive Radar Chairs: <i>Stefan Brüggewirth, Michael Brandfass</i>	
15:40 - 16:00	33.1
	Domain Adaptation Across Configurations of FMCW Radar for Deep Learning Based Human Activity Classification <i>Hamid Khodabakhshandeh, Tristan Visentin, Rodrigo Hernangomez, and Miro Pütz</i>
16:00 - 16:20	33.2
	An Equivariant Neural Network with Hyperbolic Embedding for Robust Doppler Signal Classification <i>Pierre-Yves Lagrave, Frédéric Barbaresco and Yann Cabanes</i>
16:20 - 16:40	33.3
	Target Recognition with Missing Stepped Frequency Backscatter <i>Ismail Jouny</i>
16:40 - 17:00	33.4
	Identification of Parameters of High Order Polynomial Phase Signals <i>Ewa Swiercz, Dariusz Janczak and Krzysztof Konopko</i>
17:00 - 17:20	33.5
	Detection And Parameters Estimation Of Binary Phase Shift Keying Signals In Low Signal To Noise Ratio <i>Van Minh Duong, Vesely Jiri, Hubacek Petr, Janu Premysl and Nhat Giang Phan</i>

Parallel Sessions 3	
Session 34 / Radar and Clutter Modelling Chairs: <i>Anna Dzvonkovskaya, Rainer Kronberger</i>	
15:40 - 16:00	34.1 Mathematical morphology for clutter removal in airborne radars <i>Seshagiri Duvvuri, Dyana Arumuganainar, Kamla Prasan Ray and Surendra Pal</i>
16:00 - 16:20	34.2 Generation of VHF ground clutter map employing partially cooperative transmitter <i>Karsten Schubert, Jochen Bredemeyer and Jens Werner</i>
16:20 - 16:40	34.3 Hypersonic and Space Target Echo Modeling for Multistatic Passive Radar <i>Krzysztof Kulpa, Mateusz Malanowski, Marcin Bączyk and Konrad Jędrzejewski</i>
16:40 - 17:00	34.4 Improved Sea-Clutter Modelling for Multichannel (STAP) Processing <i>Sabrina Machhour and <u>Stephane Kemkemian</u></i>
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Parallel Sessions 3	
Session 35 / New Challenges for Radar Technology Chairs: Dieter Nagel, Christina Knill	
15:40 - 16:00	35.1
	IT Security In Radar Sensor Systems – A Methodological Approach <i>Christophe Schoenenberger</i>
16:00 - 16:20	35.2
	Best Practices IT security - What the customer wanted and what the market offers <i>Chris-Julien Becker</i>
16:20 - 16:40	35.3
	4D Passive Radar for Drone Detection and Tracking <i>David Mata-Moya, Nerea Del Rey Maestre, Pedro Jose Gomez del Hoyo, Javier Rosado Sanz, and Maria-Pilar Jarabo-Amores</i>
16:40 - 17:00	35.4
	Waveform Design for Beampattern Shaping in 4D-imaging MIMO Radar Systems <i>Ehsan Raei, Mohammad Alae-Kerahroodi and Bhavani Shankar Mysore</i>
17:00 - 17:20	35.5
	Target RCS Modeling and CFAR Detection Performance with Photonics-based Distributed Multi-Band MIMO Radars <i>Malik Muhammad Haris Amir, Salvatore Maresca, Giovanni Serafino, Paolo Ghelfi and Antonella Bogoni</i>

17:20 - 17:30	Break
	Closing Session
17:30 - 18:30	<i>Peter Knott, Krzysztof Kulpa</i>