Contents

A.1: TanDEM-X Mission Status and Science Activities (invited)

Chair: Alberto Moreira (German Aerospace Center (DLR), Germany)

TanDEM-X: Mission Status and Science Activities 1

Irena Hajnsek (ETH Zurich, DLR Oberpfaffenhofen, Germany); Alberto Moreira, Manfred Zink, Stefan Buckreuss, Markus Bachmann, Thomas Kraus and Thomas Busche (German Aerospace Center (DLR) e. V., Germany)

Improving TanDEM-X / GEDI Tropical Forest Height Mapping with Structure Information 5

Changhyun Choi, Matteo Pardini and Roman Guliaev and Konstantinos P. Papathanassiou (German Aerospace Center (DLR), Germany)

Global LoD-1 Building Model from TanDEM-X Data 9

Xiao Xiang Zhu (German Aerospace Center (DLR), Remote Sensing Technology & Technical University of Munich (TUM), Signal Processing in Earth Observation, Germany); Yuanyuan Wang (Technical University of Munich & DLR, Germany); Yilei Shi (Technical University of Munich, Germany); Marie Lachaise (DLR Germany); Sina Montazeri, Vytautas Jancauskas and Ridvan Salih Kuzu (DLR, Germany)

Scaling Relation of Retrogressive Thaw Slumps on the Taymyr Peninsula..... 13

Philipp Bernhard (ETH Zürich, Switzerland); Simon Zwieback (University of Alaska Fairbanks, USA); Irena Hajnsek (ETH Zurich; DLR, Germany)

A Comparison between the Pol-InSAR and PolSAR models for Sea Ice Topographic Retrieval 19

Lanqing Huang (ETH Zürich, Switzerland); Georg Fischer (German Aerospace Center (DLR), Germany); Irena Hajnsek (ETH Zurich, DLR, Germany)

The new TanDEM-X DEM 2020: Generation and Specifications 25

Birgit Wessel (German Aerospace Center (DLR) & DFD-LAX, Germany); Marie Lachaise, Markus Bachmann, Barbara Schweißhelm, Martin Huber and Thomas Fritz (DLR, Germany); Raphael Tubbesing (Company for Remote Sensing and Environmental Research (SLU), Germany); Stefan Buckreuss (DLR, Germany)

B.1: Advances in Inverse Synthetic Aperture Radar (invited)

Chairs: Elisa Giusti (CNIT & RaSS, Italy), Amir Hossein Oveis (Radar and Surveillance Systems (RaSS · Lab – CNIT) & University of Pisa, Italy)

Open Set Recognition in SAR Images Using the Openmax Approach: Challenges and Extension to Boost the Accuracy and Robustness..... 30

Amir Hossein Oveis (RaSS – CNIT & University of Pisa, Italy); Elisa Giusti, Selenia Ghio (RaSS – CNIT, Italy); Marco Martorella (University of Pisa, Italy)

High resolution DVB-S based passive radar for ISAR imaging and drone detection 34

Viktor Seidel, Jörg Heckenbach and Martin Ummenhofer, Iole Pisciottano (Fraunhofer FHR, Germany); Felix Kriehmigen (EPAK GmbH, Germany); Diego Cristallini (Fraunhofer FHR, Germany)

Impact of trajectory mismatch on 3D ISAR imaging of aerial targets 38

Rafal Rytel, Jedrzej Drozdowicz, Łukasz Maślikowski, Piotr Samczynski and Marcin Kamil Baczyk (Warsaw University of Technology, Poland)

Combining Genetic Algorithm Based Joint Time-Frequency Analysis and Keystone Transform for ISAR Image Enhancement 44
Ahmet Oguz Sakin, Ahmet Canberk Songur and Emrah Onat (TOBB University of Economics and Technology, Turkey)

3D Inverse Synthetic Aperture Radar Imaging via MIMO Compressive Sensing 50
Neda Rojhani (University of Pisa, Italy); Marco Passafiume (University of Florence, Italy); Edoardo Ciervo (Università degli Studi di Firenze, Italy); Monica Righini (University of Florence, Italy); Giovanni Collodi (Università degli Studi di Firenze, Italy); Alessandro Cidronali (University of Florence, Italy)

An Improved ISAR Imaging Method under low SNR 54
Yongpeng Gao, Zegang Ding, Tianyi Zhang and Shujiang Liu (Beijing Institute of Technology, China); Xin Guo (DFH Satellite Co. Ltd, China); Pucheng Li (Beijjing Institute of Technology & School of Informatino and Electronics, China)

C.1: Bi- and Multistatic SAR

Chairs: Krzysztof (Chris) Kulpa (Warsaw University of Technology, Poland), Hubert M.J. Cantalloube (ONERA Université Paris-Saclay, France)

ROSE-L Tandem – Bistatic Extension for Single-Pass Interferometry 60
Markus Bachmann, Manfred Zink (German Aerospace Center (DLR), Germany); Dirk Geudtner (European Space Agency, The Netherlands); Allan Bojarski, Michele Martone, Ralph Kahle, Gerhard Krieger, Matteo Pardini and Jens Reimann (German Aerospace Center (DLR), Germany); Maximilian Schandri (DLR – HR, Germany); Berthyl Duesmann (European Space Agency, The Netherlands); Ian Shurmer (ESA ESOC, Germany); Dirk Kuijper (CS Group Germany GmbH, Germany)

Autofocus for SAR images in strongly asymmetrical bistatic configurations 64
Hubert M.J. Cantalloube (ONERA Université Paris-Saclay, France); Jean-François Nouvel and Olivier Boisot (ONERA École de l'Air, France)

Through-wall monostatic and bistatic polarimetric 3D SAR 70
Daniel Andre, Richard T. Sabiers and Mark Finnis (Cranfield University, United Kingdom)

Estimation of Volume Decorrelation from TanDEM-X Bistatic Coherence 74
Paola Rizzoli, Luca Dell'Amore and Jose-Luis Bueso-Bello, Nicola Gollin and Michele Martone (German Aerospace Center (DLR), Germany)

Polarimetric bistatic SAR image coherence 80
Alexander E. Hagelberg, Daniel Andre and Mark Finnis (Cranfield University, United Kingdom)

D.1: Calibration

Chairs: Grzegorz Adamiuk (Airbus Defence and Space GmbH, Germany), Patrick Berens (Fraunhofer FHR, Germany)

RCS Determination of Reference Targets down to 0.1 dB Uncertainty 86
Jens Reimann, Anna Maria Büchner and Sebastian Raab, Matthias Jirousek, Klaus Weidenhaupt and Marco Schwerdt (German Aerospace Center (DLR), Germany)

DLR's next generation of multi-band transponders for the calibration of fully polarimetric SAR missions 90
Klaus Weidenhaupt, Anna Maria Büchner, Jens Reimann and Marco Schwerdt, Matthias Jirousek and Sebastian Raab (German Aerospace Center (DLR), Germany)

Motion Compensation for Accurate Position Estimation of Ground Moving Targets using the Multi-Channel Airborne System DBFSAR ***95***
Andre Barros Cardoso da Silva, Sushil Kumar Joshi and Stefan V. Baumgartner (German Aerospace Center (DLR), Germany)

Coregistration of Airborne Synthetic Aperture Radar Data using Optical Flow ***101***
Prithvi Laguduvan Thyagarajan (University of Siegen, Germany); Patrick Berens (Fraunhofer FHR, Germany); Holger Nies, Ivo Ihrke (University of Siegen, Germany)

TerraSAR-X / TanDEM-X Mission and Calibration Status ***107***
Patrick T.P. Klenk, Kersten Schmidt, Thomas Kraus, Markus Bachmann and Marco Schwerdt (German Aerospace Center (DLR), Germany)

E.1: Biomass and Forest Application

Chair: Konstantinos P. Papathanassiou (German Aerospace Center, Germany)

BIOMASS Level-2 Processor Implementation in BioPAL ***112***
Francesco Banda (Aresys, Italy); Maciej Soja (MJ Soja Consulting, Australia); Mauro Mariotti d'Alessandro (Politecnico di Milano, Italy); Alberto Alonso-González (German Aerospace Center (DLR), Germany); Emanuele Giorgi and Paolo Mazzucchelli (Aresys, Italy); Stefanie Lumnitz and Clément Albinet (ESA, Italy); Klaus Scipal (ESA/ESTEC, The Netherlands)

ALOS-2/PALSAR-2 Long-term Pantropical Observation – A Paradigm Shift in Global Forest Monitoring ***116***
Christian N. Koyama (Japan Aerospace Exploration Agency, Japan); Masanobu Shimada (Tokyo Denki University & Japan Aerospace Exploration Agency, Japan); Manabu Watanabe (Tokyo Denki University, Japan); Takeo Tadono (Japan Aerospace Exploration Agency, Japan)

TomoSAR derived features for estimation of Forest Structure and Fuel load ***121***
Bhuwan Ranjit (University of Twente & Faculty ITC, The Netherlands); Hossein Aghababaei, Wietske Bijker and Alfred Stein (University of Twente, The Netherlands)

Estimation of Forest Parameters from polarimetric L-band Images ***126***
Martin Kufer (Hochschule München University of Applied Sciences, Germany); Andreas Schmitt (Hochschule München University of Applied Sciences, Germany & Institute for Applications of Machine Learning and Intelligent Systems (IAMLIS), Germany); Anna Wendleder (German Aerospace Center (DLR) & German Remote Sensing Data Center, Germany); Peter Krzystek (Institute for Applications of Machine Learning and Intelligent Systems (IAMLIS), Germany); Marco Heurich (Bavarian Forest National Park, Germany & Chair of Wildlife Ecology and Wildlife Management, University of Freiburg, Germany)

Towards a Symbiosis of Model-Based and Machine Learning Forest Height Estimation based on TanDEM-X InSAR ***132***
Islam Mansour (German Aerospace Center (DLR) Germany & ETH Zürich, Switzerland); Konstantinos P. Papathanassiou, Ronny Haensch (German Aerospace Center, Germany); Irena Hajnsek (ETH Zurich, Switzerland & DLR, Germany)

A.2: TanDEM-X Mission Status and Science Activities II. & ESA Multifrequency SAR Mission (invited)

Chairs: Lorenzo Iannini (European Space Agency, The Netherlands), Ernesto Imbembo (European Space Agency, The Netherlands)

Contribution of PolInSAR Parameters of the Coherence Region to Crop Classification with Bistatic TanDEM-X Data 136

Noelia Romero-Puig (German Aerospace Center (DLR), Germany); Juan Manuel Lopez-Sanchez and Mario Busquier (University of Alicante, Spain)

Sentinel-1A/-1B Mission and Performance Status, Sentinel-1C/-1D Improvements..... 141

Pierre Potin (European Space Agency & ESRIN, Italy); Muriel Pinheiro (European Space Agency, Italy); Ramon Torres (European Space Agency & ESTEC, The Netherlands); Dirk Geudtner, David J. Bibby, Ignacio Navas-Traver and Mario Cossu, Stefan Graham (European Space Agency, The Netherlands)

Sentinel-1 Next Generation: Enhanced C-band Data Continuity 147

Ramon Torres (European Space Agency & ESTEC, The Netherlands); Dirk Geudtner (European Space Agency, The Netherlands); Malcolm Davidson (ESA/ESTEC, The Netherlands); David J. Bibby, Ignacio Navas-Traver, Ana Garcia Hernandez, Gregory Laduree, Jelle Poupaert, Mario Cossu, Marie Touveneau and Stefan Graham (European Space Agency, The Netherlands)

Earth Explorer 10 Candidate Mission Harmony..... 150

Martin Suess, Bjorn Rommen, Erik De Witte (ESTEC & European Space Agency, The Netherlands)

Copernicus ROSE-L SAR Mission 154

Dirk Geudtner (European Space Agency, The Netherlands); Nico Gebert and Malcolm Davidson, Daniele Petrolati (ESA/ESTEC, The Netherlands); Lorenzo Iannini, Steve Osborne, Robert Furnell (European Space Agency, The Netherlands)

Earth Explorer Biomass P-band SAR Mission: Status and Calibration Concept 158

Philip Willemsen, Adriano Carbone (European Space Agency / ESTEC, The Netherlands); Ernesto Imbembo, Bjorn Rommen and Michael Fehringer (European Space Agency, The Netherlands); Tristan Simon (European Space Agency / ESTEC, The Netherlands); Klaus Scipal (ESA/ESRIN, The Netherlands); Maktar Malik (ESA, The Netherlands); Antonio Leanza (SERCO B.V. & European Space Agency, The Netherlands)

B.2: Space Missions

Chairs: Maria Jose Gonzalez Bonilla (INTA, Spain), Josef Hermann Martin Mittermayer (German Aerospace Center (DLR), Germany)

Lunar Microwave Imaging Radar (LMIR) 162

Yingjie Wang (Aerospace Information Research Institute, Chinese Academy of Science, China); Robert Yu Wang (Institute of Electronics, Chinese Academy of Sciences, China); Kaiyu Liu and Yuanbo Jiao (Aerospace Information Research Institute, Chinese Academy of Science, China); Qingchao Zhao (University of Chinese Academy of Science, China); Naiming Ou (Institute of Electronics, Chinese Academy of Sciences, China); Xiuqing Liu and Dacheng Liu (Aerospace Information Research Institute, Chinese Academy of Sciences, China); Wei Yu and Yi Wang (The 14th Research Institute of China Electronics Technology Group Corporation, China)

StriX-alpha SAR satellite: demonstration of observations modes and initial calibration results..... 165

Krzysztof Orzel, Shuji Fujimaru, Toshihiro Obata, Tomoyuki Imaizumi and Motoyuki Arai (Synspective, Japan)

Space Variance Analysis of ROSE-L SAR Images with Efficient Kernel Evaluation Technique ***169***
Valeria Gracheva (ESTEC-ESA, The Netherlands); Pau Prats, Marc Rodriguez-Cassola (German Aerospace Center (DLR), Germany)

Development of SAR Payload for 80 kg Class Micro-Satellite Based on Active Phased Array Antenna ***175***
Seok Kim, Seung-Hun Lee and Sung-Chan Song (Hanwha Systems, Inc., South Korea); Hyun-Ung Oh (Chosun University, South Korea); Eunji Lee (Hanwha Systems, South Korea)

La Palma Special PAZ-Ciencia Call: a case of study of management of the scientific use of PAZ SAR products for volcanic-related studies ***180***
Maria Jose Gonzalez Bonilla, Juan Manuel Cuerda Muñoz, Nuria Casal and Nuria Gimeno Martínez (INTA, Spain)

C.2: Sparse, MIMO, Distributed, and Circular SAR

In memoriam of Prof. Otmar Loffeld

Chairs: Hubert M.J. Cantalloube (ONERA Université Paris-Saclay, France), Joachim H. G. Ender (Fraunhofer FHR & Universität Siegen, Germany)

Cross-platform Range Ambiguity Rejection Algorithm for Multi-static SAR Constellations in Elevation ***185***
Nguyen Phuong Mai, Marc Rodriguez-Cassola and Gerhard Krieger (German Aerospace Center (DLR), Germany)

Multi-Channel SAR Image Reconstruction using Data of DLR's New DBFSAR Airborne System ***190***
Juan Pablo Navarro Castillo, Rolf Scheiber, Marc Jäger and Alberto Moreira (German Aerospace Center (DLR), Germany)

DOA Angle Estimation Methods for Ship Geolocation using DLR's Multichannel DBFSAR System ***196***
Sushil Kumar Joshi, Stefan V. Baumgartner and Andre Barros Cardoso da Silva, Gerhard Krieger (German Aerospace Center (DLR), Germany)

Statistical Analysis of Typical Target Regions of Multi-aspect SAR Based on Parametric Model ***202***
Xiaoyang Yue, Fei Teng and Zhiguo Zhang (Aerospace Information Research Institute, Chinese Academy of Sciences, China); Yun Lin (North China University of Technology, China); Wen Hong (National Key Laboratory of Microwave imaging Technology & Institute of Electronics, Chinese Academy of Scienecs, China)

Multistatic 3D SAR Imaging with Coarse Elevation and Azimuth Sampling ***207***
Richard Welsh, Daniel Andre and Mark Finnis (Cranfield University, United Kingdom)

D.2: Polarimetry I (invited)

Chairs: Laurent Ferro-Famil (ISAE-SUPAERO, University of Toulouse & CESBIO, University of Toulouse, France), Andreas Reigber (German Aerospace Center (DLR), Germany)

Polarimetric scattering signatures based on local-plane surface representation in multi-baseline Pol-TomoSAR for urban areas ***213***
Alessandra Budillon, Gilda Schirinzi (University of Naples Parthenope, Italy)

Multi-frequency Polarimetric Change Analysis for Agricultural Monitoring..... 218
Alberto Alonso-González, Konstantinos P. Papathanassiou (German Aerospace Center (DLR), Germany)

A PolSAR Clustering Scheme Using the Model-free Scattering Power Components..... 224
Subhadip Dey (Microwave Remote Sensing Lab, Indian Institute of Technology Bombay, India); Carlos López-Martínez (Universitat Politècnica de Catalunya (UPC), Spain); Avik Bhattacharya (Indian Institute of Technology Bombay, India); Alejandro C Frery (Victoria University of Wellington, New Zealand)

Earthquake damage assessment using dual-polarimetric Sentinel-1 ascending-descending orbits..... 230
Emanuele Ferrentino (Istituto Nazionale di Geofisica e Vulcanologia, Italy); Ferdinando Nunziata (Università di Napoli Parthenope, Italy); Christian Bignami (Istituto Nazionale di Geofisica e Vulcanologia & Researcher, Italy); Laura Graziani and Alessandra Maramai (Istituto Nazionale Geofisica e Vulcanologia, Italy); Maurizio Migliaccio (Universita' Napoli Parthenope, Italy)

A new entropy method for multi-acquisitions SAR data..... 235
Nathan Paillou (CentraleSupelec ONERA NUS DSO Research Alliance, France); Laetitia Thirion-Lefevre (SONDRA, Centrale-Supelec, France); Regis Guinvarc'h (CentraleSupelec, France)

E.2: SAR Applications for Land, Vegetation, and Surveillance

Chair: Michael Schmitt (University of the Bundeswehr Munich, Germany)

Estimation of Road Surface Roughness Using Airborne Synthetic Aperture Radar..... 239
Arun Babu, Stefan V. Baumgartner, Gerhard Krieger and Lucas Germano Rischioni (German Aerospace Center (DLR), Germany)

Towards a Global Model for NDVI Estimation from Sentinel-1 SAR Backscatter..... 245
Thomas Roßberg and Michael Schmitt (University of the Bundeswehr Munich, Germany)

Assessing Sentinel-1 InSAR Short-Time-Series for Systematic Rainforest Mapping with Deep Learning..... 249
Ricardo Simão Diniz Dal Molin, Jr. and Paola Rizzoli (German Aerospace Center (DLR), Germany)

Modelling of agricultural SAR Time Series using Convolutional Autoencoder for the extraction of harvesting practices of rice fields..... 254
Thomas Di Martino (CentraleSupelec ONERA NUS DSO Research Alliance, ONERA & ONERA, DTIS, France); Regis Guinvarc'h (CentraleSupelec, France); Laetitia Thirion-Lefevre (SONDRA, Centrale-Supelec, France); Elise Colin Koeniguer (ONERA, France)

Intermediate Project Deliverable of Integrated Mining Impact Monitoring (i2Mon)..... 260
Chia-Hsiang Yang (EFTAS Fernerkundung Technologietransfer, Germany); Karsten Zimmermann (DMT Group, Germany); Kian Pakzad and Andreas Müterthies (EFTAS Remote Sensing Transfer of Technology, Germany)

A.3: RADARSAT-2 / RADARSAT Constellation Mission (RCM) & Comparison between SAR, SAS (invited)

Chairs: Ron Caves (MDA, Canada), Roy E Hansen (Norwegian Defence Research Establishment (FFI) & Department of Informatics, University of Oslo, Norway)

RADARSAT-2 Mission Status..... 264
Ron Caves and Gordon Rigby (MDA, Canada)

Status of the RADARSAT Constellation Mission in the Third Year of Operation 267
Stephane Cote, Mélanie Lapointe, Pierre-Philippe Vezina, Eric Arsenault, Stephane Cote, Andre Boyer and Catherine Casgrain (Canadian Space Agency, Canada)

SARNext – Changing How and When We Observe Our Planet..... 273
Ron Caves and Jayanti J. Sharma (MDA, Canada)

Synthetic Aperture Sonar Multi-aspect differential interferometry for Detection of Internal Waves 277
Torstein Olsmo Sæbø (Norwegian Defence Research Establishment (FFI), Norway); Roy E. Hansen (Norwegian Defence Research Establishment (FFI) & Department of Informatics, University of Oslo, Norway); Anthony Lyons (University of New Hampshire, USA)

Detection of Coherent Scatterers in Synthetic Aperture Sonar Using Multilook Coherence 283
Roy E Hansen (Norwegian Defence Research Establishment (FFI) & Department of Informatics, University of Oslo, Norway); Marc Geilhufe (Norwegian Defence Research Establishment (FFI), Norway); Stig A V Synnes (Norwegian Defence Research Establishment (FFI) & University of Oslo, Norway); Torstein Olsmo Sæbø (Norwegian Defence Research Establishment (FFI), Norway); Stine Thon (University of Oslo, Norway)

B.3: Digital Beamforming, SAR Technology

Chairs: Ernst Krogager (Danish Defence Acquisition and Logistics Organization (DALO) & LU-VV06, Denmark), Marwan Younis (German Aerospace Center (DLR), Germany)

On-board Processing Architecture of DLR's DBFSAR / V-SAR System 289
Maron Schlemon, Rolf Scheiber, Stefan V. Baumgartner, Sushil Kumar Joshi, Marc Jäger and Sebastian Pasch (German Aerospace Center (DLR), Germany)

Adaptive Digital Beamforming for SAR Imaging in Elevation..... 294
Yashi Zhou (China Academy of Space Technology, China); Wei Wang (Chinese Academy of Science, China); Zhen Chen (University of Chinese Academy of Science, China); Zheng Lu, Xiaolei Han, Jie Liu and Qingjun Zhang (China Academy of Space Technology, China)

On-Board RFI Detection in Digital Beamforming SAR Systems using a Series of Digital Square-Law Detectors 298
Tobias Bollian (Microwaves and Radar Institute & German Aerospace Center (DLR), Germany); Marwan Younis (German Aerospace Center (DLR), Germany)

Mitigation of the SAR Image Radiometric Loss Associated with the SCORE DBF in Presence of Terrain Height Variations 302
Federica Bordoni, Gerhard Krieger (German Aerospace Center (DLR), Germany)

Microwave Photonics Beamformer for Spaceborne SAR 307
Tobias Otto and Simone Gabrielli (OHB System AG, Germany); Paolo Ghelfi (CNIT, Italy); Giovanni Serafino (Scuola Superiore Sant'Anna, Italy); Manuel Reza (Sant'Anna School of Advanced Studies, Italy); Ahmad Mohammad (LioniX International, The Netherlands); Chris Roeloffzen (LioniX International BV, The Netherlands); Paul Van Dijk (Hengelosestraat 500 & LioniX International BV, The Netherlands); Hakimeh Mohammadhosseini (Antwerp Space, Belgium); Dzianis Saladukha (Tyndall National Institute, Germany); Francesco Floris (Tyndall National Institute, Ireland); Ricardo Roggan (Astro- und Feinwerktechnik Adlershof GmbH, Germany)

Copernicus HPCM: ROSE-L SAR Instrument and Performance Overview 310
Marc Zimmermanns and Christian Roemer (Airbus Defence and Space, Germany)

C.3: Along Track Interferometry & InSAR

Chairs: Simona Verde (CNR-IREA, Italy), Richard Bamler (German Aerospace Center (DLR), Germany)

Along Track Interferometry (ATI) versus Doppler Centroid Anomaly (DCA) Estimation of Ocean Surface Radial Velocity using RADARSAT-2 Modex-1 ScanSAR Data..... 316

Usman Iqbal Ahmed and Bernhard Rabus (Simon Fraser University, Canada); Dirk Geudtner (European Space Agency, The Netherlands); Mamoon Rashid (Carleton University, Canada); Christoph H. Gierull (DRDC Ottawa, Canada)

Coherent Azimuth Ambiguity Suppression Based on Linear Optimum Filtering of Short Along-Track Baseline SAR Interferograms..... 321

Dominik Richter, Marc Rodriguez-Cassola, Mariantonietta Zonno and Pau Prats (German Aerospace Center (DLR), Germany)

Advances in automatic InSAR-derived TanDEM-X DEM editing..... 326

Carolina González, Jose-Luis Bueso-Bello, Nicola Gollin, Daniel Carcereri, Paola Rizzoli, Manfred Zink (German Aerospace Center (DLR), Germany)

On the Benefit of a Slight PRI Variation for SAR Interferometry..... 332

Michelangelo Villano, Nertjana Ustalli, Maxwell Nogueira Peixoto, Josef Hermann Martin Mittermayer, Gerhard Krieger and Alberto Moreira (German Aerospace Center (DLR), Germany)

Impact of coherent ambiguities on InSAR performance for bistatic SAR missions. The Harmony mission case..... 338

Mariantonietta Zonno, Dominik Richter, Aathira Thaniyil Prabhakaran and Marc Rodriguez-Cassola (German Aerospace Center (DLR), Germany); Alberto M Zurita, Javier del Castillo Mena and Ana Olea Garcia (Airbus Defence and Space, Spain); Tobias Bollian (Microwaves and Radar Institute & German Aerospace Center (DLR), Germany)

D.3: Polarimetry II (invited)

Chairs: Laurent Ferro-Famil (ISAE-SUPAERO, University of Toulouse & CESBIO, University of Toulouse, France), Andreas Reigber (German Aerospace Center (DLR), Germany)

A multi-polarization analysis of Terra Nova Bay polynya..... 344

Giovanna Inserra, Maurizio Migliaccio, Ferdinando Nunziata, Andrea Buono (Università di Napoli Parthenope, Italy)

Performance Analysis of Roll-Invariant PolSAR Parameters from C-band images with Regard to Sea Ice Type Separation..... 348

Debanshu Ratha, Malin Johansson, Andrea Marinoni, Torbjorn Eltoft (UiT The Arctic University of Norway, Norway)

Deep learning based Filtering of Polarimetric SAR Images..... 352

Roghayeh Zamani (Università degli Studi di Napoli Parthenope, Italy); Hossein Aghababaei (University of Twente, The Netherlands); Sergio Vitale and Giampaolo Ferraioli (Università degli Studi di Napoli Parthenope, Italy)

Forest Height Inversion from Multi-Baseline Polarimetric Interferometric SAR Acquisitions..... 356

Jun Su Kim and Konstantinos P. Papathanassiou (German Aerospace Center, Germany)

Impact of Highly Varying Incidence Angle on the Feature Space of PolSAR Images..... 360

Sylvia Schmitz (Karlsruhe Institute of Technology (KIT) & Fraunhofer IOSB, Germany); Horst Hammer (Fraunhofer IOSB, Germany); Antje Thiele (Fraunhofer IOSB & Karlsruhe Institute of Technology (KIT), Germany); Stefan Hinz (Karlsruhe Institute of Technology (KIT), Germany)

E.3: Snow, Ice, and Maritime Applications

Chairs: Scott Hensley (Jet Propulsion Laboratory & Radar Science and Engineering Section, USA), Andreas Danklmayer (Fraunhofer FHR, Germany)

Differential SAR Interferometry and Co-polar Phase Differences for Snow Water Equivalent Estimation ***366***

Kristina Belinska, Georg Fischer (German Aerospace Center (DLR), Germany); Irena Hajnsek (ETH Zurich, Switzerland & DLR, Germany)

The Glacier Zone Index applied on the Manson Icefield ***370***

Anna Wendleder (German Aerospace Center (DLR) & German Remote Sensing Data Center, Germany); Vanessa Mix (Munich University of Applied Sciences, Germany); Andreas Schmitt (Munich University of Applied Sciences, Germany & Institute for Applications of Machine Learning and Intelligent Systems (IAMLIS), Germany)

A temporal assessment of fully polarimetric multifrequency SAR observations over the Canadian permafrost ***375***

Paloma Saporta and Alberto Alonso-González (German Aerospace Center (DLR), Germany); Irena Hajnsek (ETH Zurich, Switzerland & DLR, Germany)

Multiparametric Sea State Fields from Synthetic Aperture Radar ***381***

Andrey Pleskachevsky, Björn Tings and Sven Jacobsen, Egbert Schwarz, Detmar Krause and Sergey Voinov (German Aerospace Center (DLR), Germany)

A High-Resolution Wide-Swath "Ambiguous" SAR Mode for Ship Monitoring ***386***

Nertjana Ustalli and Michelangelo Villano (German Aerospace Center (DLR), Germany)

A.4: Innovation and next SAR mission & Challenges for next generation SAR: The micro-SAR trend I (invited)

Chairs: Ernesto Imbembo (European Space Agency, The Netherlands), Michael Völker (Airbus DS GmbH, Germany)

Design and Technology Aspects of Array-fed Large Reflector Based Multi-channel SAR Concept ***391***

Javier del Castillo Mena, Tamara Coello and Quiterio García (Airbus Defence and Space, Spain); Ernesto Imbembo (European Space Agency, The Netherlands); Giovanni Toso (European Space Agency, ESA ESTEC, The Netherlands)

Ka-Band SCORE Radar Front End ***397***

Simone Gabrielli and Uwe Rosenberg (OHB System AG, Germany); Sampo Salo (Harp Technology Ltd, Finland)

Airbus future SAR missions, techniques and technologies

Grzegorz Adamiuk (Airbus Defence and Space GmbH, Germany); Junghyo Kim (Airbus DS GmbH & Space System, Germany)

Selective Doppler Frequency Suppression Algorithm for Azimuth Ambiguity Suppression in SAR Images ***402***

Andrea Radius, Pierre Leprovost, Vladimir Ignatenko, Darren Muff, Matthew Nottingham, Ozan Dogan, Tino Seilonen and Leszek Lamentowski (ICEYE, Finland)

Double Dual Focusing for Range Ambiguity Suppression – Experimental Results ***407***

Ozan Dogan (ICEYE OY, The Netherlands); Vladimir Ignatenko, Darren Muff, Pierre Leprovost, Matthew Nottingham, Andrea Radius and Tino Seilonen (ICEYE, Finland); Leszek Lamentowski (ICEYE Oy, Poland); Ozan Dogan (ICEYE, Finland)

B.4: Space SAR Missions and Systems

Chair: Rolf Scheiber (German Aerospace Center (DLR), Germany)

Sentinel-1 instruments status and product performance update for 2022 413
Muriel Pinheiro (European Space Agency, Italy); Nuno Miranda (European Space Agency & ESRIN, Italy); Andrea Recchia, Niccolo' Franceschi, Alessandro Cotrufo and Riccardo Piantanida (Aresys, Italy); Kersten Schmidt and Christoph Gisinger (German Aerospace Center (DLR), Germany); Guillaume Hajduch (CLS Group, Brest, France); Pauline Vincent (Collecte Localisation Satellites CLS, France)

Stuck Bit Error Identification for the TerraSAR-X and TanDEM-X Onboard Memory..... 418
Allan Bojarski, Markus Bachmann and Thomas Kraus and Ulrich Steinbrecher (German Aerospace Center (DLR), Germany)

Ambiguity Assessment and Mitigation Approaches for the TerraSAR-X Concurrent Imaging Technique 423
Thomas Kraus (German Aerospace Center (DLR), Germany); João Pedro Turchetti Ribeiro (Aeronautics Institute of Technology (ITA), Brazil); Markus Bachmann (German Aerospace Center (DLR), Germany); Renato Machado (Aeronautics Institute of Technology (ITA), Brazil)

System Design of High Resolution, Wide Swath, L-band SAR onboard ALOS-4..... 429
Masanobu Shibata, Shohei Nakamura, Tasuku Kuriyama and Takehiro Hoshino (Mitsubishi Electric Corporation, Japan); Yukihiro Kankaku, Takeshi Motohka and Shinichi Suzuki (Japan Aerospace Exploration Agency, Japan)

Verification of X-band SAR system using inverse SAR imaging of ISS..... 433
Oleksandr Sushko, Dmytro Vasylenko, Oleksandr Shpylka, Serhii Martyniuk and Volodymyr Vasyliev (EOS Ukraine, Ukraine)

C.4: Tomographic SAR (invited)

Chairs: Simona Verde (CNR-IREA, Italy), Tim Peikert (HENSOLDT Sensors GmbH, Germany)

Multi-temporal DInSAR data processing for landslide risk monitoring: First results from the ASI-MEFISTO project..... 436
Simona Verde and Diego Reale, Eugenio Sansosti, Antonio Pauciullo; Virginia Zamparelli, Gianfranco Fornaro (CNR-IREA, Italy)

Potential of Deep Learning in SAR Tomographic Inversion of Very Small Interferometric Stacks 442
Kun Qian, Yuanyuan Wang (Technical University of Munich & German Aerospace Center, Germany); Xiao Xiang Zhu (German Aerospace Center (DLR), Remote Sensing Technology & Technical University of Munich (TUM), Signal Processing in Earth Observation, Germany)

TomoSAR Imaging Using Statistical Regularization on Polarimetric SAR Observations.... 448
Eduardo Torres-García (Cinvestav-IPN, Mexico); Gustavo Daniel Martín-del-Campo-Becerra (German Aerospace Center (DLR), Germany); Deni Torres-Román (Cinvestav-IPN, Mexico); Andreas Reigber (German Aerospace Center (German Aerospace Center (DLR), German)

The Efficiency of Polarization Information in Detection of Permanent Scatterers..... 452
Hossein Aghababaei (University of Twente, The Netherlands); Giampaolo Ferraioli (Università di Napoli Parthenope, Italy)

SAR Interferometric and Tomographic Imaging of Saturn's Moon Enceladus Using Strongly Perturbed Orbits ***457***
Andreas Benedikter (German Aerospace Center (DLR) & University of Erlangen-Nuremberg, Germany); Gerhard Krieger, Marc Rodriguez-Cassola, Hauke Hussmann, Kai Wickhusen and Alexander Stark (German Aerospace Center (DLR) Germany); Michael Stelzig and Martin Vossiek (LHFT, Friedrich-Alexander-Universität Erlangen Nürnberg, Germany)

D.4: Vegetation Structure Measurement by means of multi-baseline SAR (invited)

Chairs: Francesco Banda (Aresys, Italy), Konstantinos P. Papathanassiou (German Aerospace Center, Germany)

Separation and Characterization of 3D Reflectivity Changes in Forest Scenarios using SAR Tomography ***462***
Matteo Pardin, Konstantinos P. Papathanassiou (German Aerospace Center, Germany)

On the Use of Tomographic derived Reflectivity Profiles for Pol-InSAR Forest Height Inversion ***468***
Roman Guliaev, Matteo Pardini and Konstantinos P. Papathanassiou (German Aerospace Center (DLR), Germany)

Forest structure characterization using SAR tomography and an adaptive estimation technique ***472***
Laurent Ferro-Famil (ISAE-SUPAERO, University of Toulouse & CESBIO, University of Toulouse, France); Yue Huang (University of Rennes 1, France); Nan Ge (Technical University of Munich, Germany)

Weather and Seasonal Effects on Vertical Reflectivity Profiles: Tower-based Coherent and Correlation Tomographic Observations ***476***
Albert R. Monteith and Lars Ulander (Chalmers University of Technology, Sweden)

Vegetation Analysis through L-band Monostatic and Bistatic Measurements from ESA TomoSense Data ***481***
Mauro Mariotti d'Alessandro and Stefano Tebaldini (Politecnico di Milano, Italy)

E.4: Airborne & Ground Based SAR Systems

Chairs: Othmar Frey (ETH Zurich & Gamma Remote Sensing, Switzerland), Michael Schmitt (University of the Bundeswehr Munich, Germany)

SAR-Light: the new ONERA SAR sensor onboard UAV ***485***
Sebastien Angelliaume, Nicolas Castet, Xavier Dupuis and Helene Oriot (ONERA, France)

Dual-frequency carborne DInSAR at L-band and Ku-band for mobile mapping of surface displacements ***489***
Othmar Frey (ETH Zurich & Gamma Remote Sensing, Switzerland); Charles Werner, Rafael Caduff (Gamma Remote Sensing AG, Switzerland)

Synthetic Aperture Radar Design for a High-Altitude Platform ***493***
Matthias Jirousek, Markus Peichl (German Aerospace Center (DLR), Germany); Simon Anger (German Aerospace Center (DLR) & Microwaves and Radar Institute, Germany); Marius Engel, Stephan Dill, Rolf Scheiber and Stefan V. Baumgartner (German Aerospace Center (DLR), Germany)

A.5: Challenges for next generation SAR: The micro-SAR trend II (Invited)

Chair: Guy Seguin (INSARSAT Inc., Canada)

Challenges for next generation SAR: The Micro-SAR Trend 497
Guy Seguin (INSARSAT Inc., Canada); Dirk Geudtner (European Space Agency, The Netherlands)

Design Approaches for Micro-SARs 501
Joerg Friedrich Herrmann (HUTAB Consulting)

ICEYE Radar Constellation Development and Evolution 509
Mikko Laaninen, Martin Neerot (Iceye Oy, Finland); Jakub Niemczyk (Iceye Polska Poland); Alan Thompson (ICEYE, Canada)

Role of micro-SAR trend within EOSC 512
Patrick Plourde, Mélanie Lapointe, Chloé Mireault-Lecourt and Lydia Philpott (Canadian Space Agency, Canada); Simon Larose (Calian Ltd, for the Canadian Space Agency, Canada); Etienne Boulais and Eric Dubuc (Canadian Space Agency, Canada)

Challenges for next generation micro-SAR: lessons learned from China's first light and small commercial SAR satellite – Hisea-1 515
James Zheng and Qiang Chen (Spacety Luxembourg, Luxembourg); Xiaoyu Yan and Weiija Ren (Spacety China, China)

B.5: Fading Signals in Multi-Temporal InSAR Data Stacks: Problem or Opportunity (invited)

Chairs: Francesco De Zan (German Aerospace Center (DLR), Germany), Alessandro Ferretti (TRE ALTAMIRA Srl, Italy)

Surface soil moisture retrieval from C-band SAR data combining coherent and incoherent change detection 519
Davide Palmisano, Giuseppe Satalino (Consiglio Nazionale delle Ricerche (CNR), Italy); Anna Balenzano (CONSIGLIO NAZIONALE DELLE RICERCHE (CNR), Italy); Francesco Mattia (Consiglio Nazionale delle Ricerche (CNR), Italy)

On the analysis of the DInSAR time series retrieved through the P-SBAS approach: a focus on possible bias 523
Claudio De Luca, Francesco Casu, Michele Manunta and Giovanni Onorato (CNR-IREA, Italy); Riccardo Lanari (IREA, Italy)

Spatiotemporal Analysis of C-band interferometric Phase Anomalies over Sicily 527
Francesco De Zan, Paloma Saporta and Giorgio Gomba (German Aerospace Center (DLR), Germany)

On the Reality of the Coherence Matrix in SAR Interferometry 531
Alessandro Ferretti (TRE ALTAMIRA Srl, Italy)

C.5: Interferometric SAR for Infrastructure Monitoring

Chairs: Filippo Biondi (University of L'Aquila & Italian Ministry of Defence, Italy), Gianfranco Fornaro (CNR-IREA, Italy)

Update on Mosul dam destabilization. Displacement, velocity and acceleration estimation and infra-image vibrations versus multi-temporal phenomena
Filippo Biondi (University of L'Aquila & Italian Ministry of Defence, Italy)

High-Voltage Electric Power Transmission Monitoring by Micro- Motion Estimation using Synthetic Aperture Radar Data ***535***
Nicomino Fiscante (Roma Tre, Italy); Filippo Biondi (University of L'Aquila, Italy); Pia Addabbo (University of Sannio, Italy); Carmine Clemente (University of Strathclyde, United Kingdom (Great Britain)); Gaetano Giunta (University of Roma Tre, Italy); Danilo Orlando (Universita' degli Studi Niccolo' Cusano, Italy)

On the Relevance of Temporary Persistent Scatterers for Long-Term PS-InSAR Monitoring ***541***
Nils Dörr, Andreas Schenk and Stefan Hinz (Karlsruhe Institute of Technology, Germany)

A Novel Method for High Resolution RADAR Imaging by Orbital Angular Momentum Interferometry ***547***
Nicomino Fiscante (Roma Tre, Italy); Filippo Biondi (University of L'Aquila, Italy); Pia Addabbo (University of Sannio, Italy); Carmine Clemente (University of Strathclyde, United Kingdom); Danilo Orlando (Università degli Studi Niccolò Cusano, Italy)

GIS study on the urban evolution of the city of Braşov, Romania ***553***
Teodora Balint (Technical University of Civil Engineering, Romania)

D.5: Classification and Feature Extraction

Chairs: Martin Stangl (Airbus Defence and Space, Germany), Karsten Schulz (Fraunhofer IOSB, Germany)

RSO feature extraction using Super resolution wavelets and Inverse Radon transform ***559***
Manjunath Thindlu Rudrappa (Fraunhofer FHR, Germany)

Impact of Spatial Resolution and Zoom on Interpreter-Based Evaluation of Compressed SAR Images ***565***
Ulrike Pestel-Schiller and Jörn Ostermann (Leibniz Universität Hannover, Germany)

Complex-Valued Autoencoders with Coherence Preservation for SAR ***570***
Reza Mohammadi Asiyabi (University Politehnica of Bucharest & Research Center for Spatial Information (CEOSpaceTech), Romania); Mihai Datcu (German Aerospace Center, Germany); Andrei Anghel (University Politehnica of Bucharest (UPB), Romania); Holger Nies (University of Siegen, Germany)

An Accurate Sparse SAR Imaging Method for Joint Feature Enhancement Based on Nonconvex-Nonlocal Total Variation Regularization ***576***
Zhongqiu Xu and Guoru Zhou (University of Chinese Academy of Sciences, China); Bingchen Zhang (Institute of Electronics, Chinese Academy of Scinece, China); Zhe Zhang (Aerospace Information Research Institute, Chinese Academy of Sciences & Geroge Mason University, China); YiRong Wu (National Key Laboratory of Microwave Imaging Technology, China)

Superpixel Segmentation for PolSAR Images Based on Hotelling-Lawley Trace Distance ... ***582***
Meilin Li and Huanxin Zou, Zhen Dong (National University of Defence Technology, China)

E.5: Advanced Processing Techniques

Chairs: Helene Oriot (ONERA, France), Marwan Younis (German Aerospace Center (DLR), Germany)

Operational RFI Mitigation Approach in Sentinel-1 IPF ***586***
Niccolo' Franceschi, Andrea Recchia and Riccardo Piantanida (Aresys, Italy); Guillaume Hajduch, Pauline Vincent (Collecte Localisation Satellites CLS, France); Muriel Pinheiro (European Space Agency, Italy); Nuno Miranda (European Space Agency & ESRIN, Italy); Clément Albinet (ESA, Italy)

On a Dual-Sequence Stripmap Imaging Mode as Alternative for High-Resolution Wide-Swath SAR ***591***
Felipe Queiroz de Almeida (German Aerospace Center (DLR) & Microwaves and Radar Institute, Germany); Marwan Younis, Gerhard Krieger and Alberto Moreira (German Aerospace Center (DLR), Germany)

SAR image post-processing for acquisition trajectory change ***597***
Hubert M.J. Cantalloube (ONERA Université Paris-Saclay, France)

A Joint SAR-Communication System using Continuous Phase Frequency Shift Keying Codes and Mismatched Filtering Compression ***603***
Maria-Elisavet Chatzitheodoridi, Abigael Taylor, Helene Orio, Olivier Rabaste (ONERA, France)

Imaging of objects in space using arbitrary transmit signals ***609***
Simon Anger (German Aerospace Center (DLR) & Microwaves and Radar Institute, Germany); Matthias Jirousek, Stephan Dill and Markus Peichl (German Aerospace Center (DLR), Germany)

A.6: China L-band Full-polarimetric and InSAR satellite SAR (invited)

Chairs: Da Liang (Aerospace Information Research Institute, Chinese Academy of Sciences & Ocean University of Chin a, China), Robert Yu Wang (Institute of Electronics, Chinese Academy of Sciences, China)

LuTan-1: An Innovative L-band Spaceborne SAR Mission ***614***
Heng Zhang (Institute of Electronics, Chinese Academy of Sciences, China); Kaiyu Liu, Dacheng Liu, Jili Wang and Yafeng Chen (Aerospace Information Research Institute, Chinese Academy of Sciences, China); Yunkai Deng (Institute of Electronics, Chinese Academy of Sciences, China); Da Liang (Aerospace Information Research Institute, Chinese Academy of Sciences & Ocean University of China, China); Robert Yu Wang (Institute of Electronics, Chinese Academy of Sciences, China)

Dual-Channel Working Mode of LuTan-1 SAR System ***619***
Haoyu Lin (Aerospace Information Research Institute, Chinese Academy of Science & University of Chinese Academy of Sciences, China); Heng Zhang (Institute of Electronics, Chinese Academy of Sciences, China); Dacheng Liu and Yafeng Chen, Kaiyu Liu (Aerospace Information Research Institute, Chinese Academy of Science, China)

Non-interrupted Phase Synchronization Scheme for LuTan-1 Mission ***625***
Heng Zhang and Robert Yu Wang (Institute of Electronics, Chinese Academy of Sciences, China); Da Liang, Dacheng Liu (Aerospace Information Research Institute, Chinese Academy of Sciences, China)

The LuTan-1 SAR Antenna System ***629***
Wei Yu (The 14th Research Institute of China Electronics Technology Group Corporation, China); Kan Wang (Nanjing Research Institute of Electronic Technology, China); Jianjun Wu (Xidian University, China); Naiming Ou (Institute of Electronics, Chinese Academy of Sciences, China)

B.6: Ionosphere, Wave Propagation, Refection Effects

Chair: Valeria Gracheva (ESTEC-ESA, The Netherlands)

Study on Ionospheric Effects on SAR and their Statistics ***633***
Giorgio Gomba and Francesco De Zan (German Aerospace Center (DLR), Germany); Bjorn Rommen and Raul Orus Perez (ESA / ESTEC, The Netherlands)

An Autofocus Algorithm for the Recovery of Ionospheric Phase Signatures in the Biomass Mission ***638***
Andres Felipe Betancourt Payan (DLR & FAU Erlangen, Germany); Marc Rodriguez-Cassola (German Aerospace Center (DLR), Germany); Andreas Benedikter (German Aerospace Center (DLR) & University of Erlangen-Nuremberg, Germany); Pau Prats, Gerhard Krieger (German Aerospace Center (DLR), Germany)

Investigation of the influence of the equatorial anomaly of the Earth's ionosphere on the propagation of radio waves in the P-band ***643***
Andrew S. Kryukovsky (Russian New University, Russia); Boris Kutuza (Institute of Radio Engineering and Electronics of RAS, Russia); Vladimir Stasevich (NPP ROBIS, Russia); Dmitry Rastyagaev (Russian New University, Russia);

A Method of Building Parameter Extraction Based on CSAR Imaging ***649***
Yishi Li (National University of Defense Technology & College of Electronic Science and Technology, China); Leping Chen, Daoxiang An, Xiaotao Huang and Beibei Ge (National University of Defense Technology, China); Mingze Wang and Wei Xu (Shaanxi Neifu Zhongfei Airport Management Co., Ltd, China)

C.6: Interferometry

Chairs: Bernhard Rabus (Simon Fraser University, Canada), Francesco De Zan (German Aerospace Center (DLR), Germany)

Recursive and robust InSAR Phase Estimation ***654***
Francesco De Zan (German Aerospace Center (DLR), Germany)

On a Possible SAR Interferometric Phase Error Associated with the Scan-On-Receive Digital Beamforming ***659***
Federica Bordoni and Gerhard Krieger (German Aerospace Center (DLR), Germany)

A CubeSat Add-On for Resolving Phase Unwrapping Errors in Single-Pass SAR Interferometry ***664***
Maxwell Nogueira Peixoto and Michelangelo Villano (German Aerospace Center (DLR), Germany)

En Route to Operational Repeat-Pass InSAR with SFU's SAR-Optical Airborne System ***670***
Jeff Stacey, Wyatt Gronnemose, Jayson Eppler and Bernhard Rabus (Simon Fraser University, Canada)

Interferometric Phase Generation of In-CSAR Based on Improved BPA ***675***
Jianpeng Li, Daoxiang An, Beibei Ge, Dong Feng and Zhimin Zhou (National University of Defense Technology, China); Mingze Wang and Wei Xu (Shaanxi Neifu Zhongfei Airport Management Co., Ltd, China)

D.6: Classification and Feature Extraction via ML/DL I

Chairs: Horst Hammer (Fraunhofer Institute of Optronics, System Technologies and Image Exploitation IOSB, Germany), Ronny Haensch (DLR, Germany)

Deep Neural Network (DNN) Based Synthetic Aperture Radar (SAR) Processor ***679***
Usman Iqbal Ahmed, Bernhard Rabus and Jarrod Haas (Simon Fraser University, Canada)

Training a CNN with Simulated Data for ATR – Lessons Learned ***684***
Horst Hammer, Silvia Kuny (Fraunhofer IOSB, Germany); Sylvia Schmitz, Antje Thiele (Fraunhofer IOSB & Karlsruhe Institute of Technology (KIT), Germany)

Self-supervised training strategies for SAR image despeckling with deep neural networks ***690***
Emanuele Dalsasso (Télécom Paris, France); Loic Denis (Université Jean Monnet, France); Max Muzeau and Florence Tupin (Télécom ParisTech, France)

Height Reconstruction in Urban Areas from Single SAR Imagery using Deep Learning ***696***
Michael Recla and Michael Schmitt (University of the Bundeswehr Munich, Germany)

Automatic ML-based water body detection as part of the hydrological conditioning of the TanDEM-X DEM ***700***
Raphael Tubbesing (Company for Remote Sensing and Environmental Research (SLU), Germany); Leena Warmedinger and Martin Huber, Achim Roth (German Aerospace Center (DLR), Germany); Birgit Wessel (German Aerospace Center (DLR) & DFD-LAX, Germany)

E.6: Advanced SAR Concepts & Technology

Chair: Jens Fischer (German Aerospace Center (DLR), Germany)

Quantum Annealing for SAR System Design and Processing ***705***
Sigurd Huber, Kay Glatting, Gerhard Krieger and Alberto Moreira (German Aerospace Center (DLR), Germany)

Block-Frequency Quantization for Data Volume Reduction in FScan Systems ***711***
Nicola Gollin and Michele Martone (German Aerospace Center, Germany)

Dynamic Predictive Quantization for Staggered SAR: Experiments with Real SAR Data ... ***717***
Nicola Gollin, Jakob Giez, Michele Martone, Paola Rizzoli and Gerhard Krieger (German Aerospace Center, DLR, Germany)

A Kind of Novel Quasi-passive boardband 'Gap Generator' of Synthetic Aperture Radar .. ***723***
Hua Li (University of Chinese Academy of Sciences & Aerospace Information Research Institute, Chinese Academy of Sciences, China)

A.7: LuTan-1 SAR mission data processing and land remote sensing application (invited)

Chairs: Tao Li, Xinming Tang (Land Satelite Remote Sensing Application Center, China)

Analysis of forestry application potential of LuTan-1 mission: Preliminary assessment based on airborne experiment ***728***
Kunpeng Xu, Lei Zhao, Erxue Chen and Zhengyuan Li (IFRIT, Chinese Academy of Forestry, China)

LuTan-1 SAR Main Applications and Products ***732***
Tao Li, Xinming Tang, Xiaoqing Zhou and Xiang Zhang (Land Satelite Remote Sensing Application Center, China)

A Two-Stage Parameter Estimation Method via Airborne CSAR ***736***
Beibei Ge, Daoxiang An, Jianpeng Li, Leping Chen and Zhimin Zhou (National University of Defense Technology, China); Mingze Wang and Wei Xu (Shaanxi Neifu Zhongfei Airport Management Co., Ltd, China)

K Band Radar Drone Signatures Measurement and Simulation ***740***
Nickolai Zhelev Kolev (Naval Academy, Bulgaria); Jordan Sivkov (Nikola Vaptsarov Naval Academy, Bulgaria); Miroslav Y. Tsvetkov (Nikola Vaptsarov Naval Academy & NVNA, Bulgaria); Chavdar Alexandrov (Nikola Vaptsarov Naval Academy, Bulgaria)

B.7: Advanced SAR Modes and Processing

Chair: Gerhard Krieger (DLR, Germany)

Geometric Programming for Optimizing SAR Waveform Parameters: Precursor for Cognitive SAR ***746***
John Wen Hao Lee and Jeremy Kwang Siong Leow (DSO National Laboratories, Singapore)

Towards an improved Radiometric Accuracy for Sentinel-1 with optimized Elevation Antenna Patterns ***752***
Kersten Schmidt and Marco Schwerdt (German Aerospace Center (DLR), Germany); Guillaume Hajduch (CLS Group, Brest, France); Pauline Vincent (Collecte Localisation Satellites CLS, France); Andrea Recchia (Aresys, Italy); Nuno Miranda (European Space Agency & ESRIN, Italy)

Frequency Scanning Transmit/Receive Antenna Beam Imaging Mode ***757***
Marwan Younis (German Aerospace Center (DLR), Germany); Felipe Queiroz de Almeida (German Aerospace Center (DLR) & Microwaves and Radar Institute, Germany); Michelangelo Villano (German Aerospace Center (DLR), Germany); Tobias Bollian (Microwaves and Radar Institute & German Aerospace Center (DLR), Germany); Gerhard Krieger, Alberto Moreira (German Aerospace Center (DLR), Germany)

C.7: Tomography, Topography

Chairs: Gianfranco Fornaro (CNR-IREA, Italy), Jens Fischer (German Aerospace Center (DLR), Germany)

Automatic Editing of the Global TanDEM-X DEM ***762***
Markus Bachmann, Carolina González, Jose-Luis Bueso-Bello, Paola Rizzoli and Manfred Zink (German Aerospace Center (DLR), Germany)

Topographic Mapping with Back-Projection Tomography and Geocoded Polarimetric SAR Images ***766***
Elias Mendez Dominguez (University of Zurich & Remote Sensing Laboratories, Switzerland); David Small and Daniel Henke (University of Zurich, Switzerland)

A Framework of DTM, DSM, and CHM Generation using Low-frequency InSAR Data over Forest Areas ***772***
Yanzhou Xie and Haiqiang Fu, Jianjun Zhu and Changcheng Wang (Central South Unviersity, China); Qinghua Xie (China University of Geosciences (Wuhan), China & Institute for Computing Research (IUII), University of Alicante, Spain)

Coherent change detection robust to layover regions using SAR tomography ***778***
Yuki Yamaguchi, Taichi Tanaka, Masato Toda and Tsenjung Tai (NEC Corporation, Japan)

The Reconstruction Performance Analysis for Distributed SAR Systems Based on Weighted Backprojection Algorithm ***784***
Da Liang (Aerospace Information Research Institute, Chinese Academy of Sciences & Ocean University of Chin a, China); Heng Zhang (Institute of Electronics, Chinese Academy of Sciences, China)

D.7: Classification and Feature Extraction via ML/DL II

Chair: Ronny Haensch (DLR, Germany)

An Improved 3-D Reconstruction Method based on Deep Neural Network ***789***
Tianyi Zhang, Zegang Ding, Siyuan Liu, Yangkai Wei and Guanxing Wang (Beijing Institute of Technology, China); Zhi Yang and Xin Guo (DFH Satellite Co. Ltd, China); Yongpeng Gao (Beijing Institute of Technology, China)

Transcoding-based pre-training of semantic segmentation networks for PolSAR images ... 794
Ronny Haensch (German Aerospace Center (DLR), Germany); Lorenzo Bruzzone and Alessandro Cattoi (University of Trento, Italy)

Exploiting different training approaches for CNN based solutions in SAR image despeckling ... 799
Sergio Vitale, Giampaolo Ferraioli and Vito Pascazio (Università Parthenope di Napoli, Italy)

Deep Learning for Mapping Forests with TanDEM-X ... 803
Jose-Luis Bueso-Bello, Daniel Carcereri, Carolina González, Michele Martone and Paola Rizzoli (German Aerospace Center (DLR), Germany)

SAR image synthesis with GAN and continuous aspect angle and class constraints ... 809
Yann Giry-Fouquet (Université de Technologie de Troyes & Thales DMS, France); Alexandre Baussard (Université de Technologie de Troyes, France); Cyrille Enderli and Tristan Porges (Thales DMS, France)

E.7: SAR Concepts & Simulators

Chair: Rudolf Zahn (Consultant, Germany)

Co-Production Active Learning for Operational Sea Ice Mapping ... 815
Macarena D. Ortiz (National Geospatial Intelligence Agency, USA); Eric Wendoloski and Philip Slingerland (Aerospace Corporation, USA); Triet Le, Rachel Bernstein, Jacob McCord, Philip Sage, Wade Schwartzkopf and Bethany McDonald (National Geospatial Intelligence Agency, USA); Alexandra Darden (NOAA, USA)

Simulation of Distributed SAR images by multi-platform image synthesis: application to a CubeSats formation ... 821
Antonio Gigantino, Alfredo Renga, Maria Daniela Graziano and Antonio Moccia (University of Naples Federico II, Italy)

KAISAR: Physics-based GPU-accelerated Realistic SAR Simulator ... 827
Simone Placidi (MetaSensing, Singapore); Alessandro Vetere, Eugenio Pino and Adriano Meta (MetaSensing, Italy)

Generation of Global Backscatter Maps for Future SAR Missions Design ... 833
Luca Dell'Amore, Jose-Luis Bueso-Bello, Michele Martone and Paola Rizzoli (German Aerospace Center (DLR), Germany)