

Contents

A.1: ALOS-2 (invited)

Chairs: Masato Ohki (Japan Aerospace Exploration Agency, Japan), Yoshio Yamaguchi (Niigata University, Japan)

<i>Nine Component Scattering Power Decomposition of POLSAR data</i>	1
Rashmi Malik (Indian Institute of Technology Kanpur, India); Gulab Singh and Shradha Mohanty (Indian Institute of Technology Bombay, India); Onkar Dikshit (Indian Institute of Technology Kanpur, India); Yoshio Yamaguchi (Niigata University, Japan)	
<i>Interferometric Analysis of Raw Data for Radio Frequency Interference Detection in ALOS-2</i>	4
Ryo Natsuaki (The University of Tokyo, Japan); Pau Prats (German Aerospace Center (DLR), Germany)	
<i>Detecting Landslides in Forested Areas Using Polarimetric and Interferometric SAR Data by PALSAR-2</i>	8
Masato Ohki, Takahiro Abe and Takeo Tadono (Japan Aerospace Exploration Agency, Japan); Masanobu Shimada (Tokyo Denki University & Japan Aerospace Exploration Agency, Japan)	
<i>Assessing the Impact of Precipitation on L-band SAR Forest Observation: An ALOS-2 Big Data Case Study in the Tropics</i>	10
Christian N. Koyama and Manabu Watanabe (Tokyo Denki University, Japan); Takeo Tadono (Japan Aerospace Exploration Agency, Japan); Masanobu Shimada (Tokyo Denki University & Japan Aerospace Exploration Agency, Japan)	
<i>All Quad Pol. Scattering Power Decomposition Images Acquired by ALOS for General Purpose of Utilization</i>	16
Yoshio Yamaguchi (Niigata University, Japan); Ryousuke Nakamura (National Institute of Advanced Industrial Science and Technology (AIST), Japan); Ryu Sugimoto (National Institute of Advanced Industrial Science and Technology, Japan); Chiaki Tsutsumi (AIST, Japan)	

B.1: Space Missions: Products, Experiments, Verifications, ... I

Chair: Josef Hermann Martin Mittermayer (German Aerospace Center (DLR), Germany)

<i>Development Status of the Biomass SAR Instrument</i>	20
Thomas Fügen and Eckhardt Sperlich (Airbus Defence and Space GmbH, Germany); Christoph Heer (Airbus Defence and Space, Germany); Carl Warren (Airbus Defense and Space Ltd., United Kingdom (Great Britain)); Adriano Carbone (Rhea System B. V. & ESA/ESTEC, The Netherlands); Florence Hélière (European Space Agency ESTEC, The Netherlands)	
<i>Switchover to the Redundant SAR Instrument Chain on the TanDEM-X Satellite</i>	26
Ulrich Steinbrecher (DLR, Germany); Thomas Kraus and Patrick T.P. Klenk (German Aerospace Center (DLR), Germany); Christo Grigorov (Microwaves and Radar Institute & German Aerospace Center, Germany); Johannes Böer	
<i>Observation Strategies for TanDEM-X and Tandem-L</i>	30
Markus Bachmann (German Aerospace Center (DLR), Germany); Maximilian Schandri (DLR – HR, Germany); Allan Bojarski (German Aerospace Center, Germany); Stefan Buckreuss and Manfred Zink (DLR, Germany)	
<i>The TanDEM-X Global Water Body Layer</i>	36
Jose-Luis Bueso-Bello, Francescopaolo Sica and Paolo Valdo (German Aerospace Center (DLR), Germany); Andrea Pulella (German Aerospace Center (DLR), Germany); Philipp Posovszky (Germany Aerospace Center (DLR), Germany); Carolina González (German Aerospace Center (DLR), Germany); Michele Martone (German Aerospace Center, Germany); Paola Rizzoli (German Aerospace Center (DLR), Germany)	

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

Chairs: Elisa Giusti (CNIT & RaSS, Italy), Marco Martorella (University of Pisa, Italy)

<u>Preliminary investigations toward multi-frame DVB-S based passive ISAR</u>	42
Fabrizio Santi (Sapienza University of Rome, Italy); Iole Pisciotano (Fraunhofer Institute for High Frequency Physics and Radar Techniques (FHR), Germany); Diego Cristallini (Fraunhofer FHR, Germany); Debora Pastina (Uniroma, Italy)	
<u>The alignment problem for 3D ISAR imaging with real data</u>	46
Jinjian Cai (Beijing Institute of Technology, China); Marco Martorella (University of Pisa, Italy); Quanhua Liu (Beijing Institute of Technology, China); Elisa Giusti (CNIT & RaSS, Italy); Zegang Ding (Beijing Institute of Technology, China)	
<u>Comparison of simulated and measured ISAR images flow of a ship at sea</u>	52
Luc Vignaud (Onera Demr/Tsi, France); Nina Ødegaard (Norwegian Defence Research Establishment (FFI), Norway); Henri Ruggiero (DGA, France); Christian Cochin and Jean-Christophe Louvigné (DGA MI – French MoD, France); Atle Onar Knapskog (Norwegian Defence Research Establishment (FFI), Norway)	
<u>ISAR imaging with FMCW multichannel airborne SAR</u>	56
Niels J de Jong (TU Delft, The Netherlands); Jacco de Wit and Matern Otten (TNO, The Netherlands); Faruk Uysal (Delft University of Technology, The Netherlands); Miguel Caro Cuenca (TNO, The Netherlands)	
<u>ISAR imaging with a multi-channel multi-static passive radar</u>	62
Marcin Kamil Baczyk (Warsaw University of Technology, Poland); Krzysztof (Chris) Kulpa (Warsaw University of Technology, Spain)	

D.1: Tomography & Topography

Chairs: Gianfranco Fornaro (CNR-IREA, Italy), Othmar Frey (ETH Zurich & Gamma Remote Sensing, Switzerland)

<u>Enhanced-resolution SAR tomography using the weighted covariance fitting criterion</u>	66
Gustavo Daniel Martín-del-Campo-Becerra, Andreas Reigber and Matteo Nannini (German Aerospace Center (DLR), Germany)	
<u>A Model-Free Ratio based Nonlocal Framework for Denoising of SAR and TomoSAR data</u>	71
Hossein Aghababaei (University of Twente, The Netherlands); Roghayeh Zamani (K. N. Toosi University of Technology, Iran); Giampaolo Ferraioli, Vito Pascazio and Gilda Schirrinzi (Università di Napoli Parthenope, Italy)	
<u>Vertical Analysis of Windblown Forest Short-term Decorrelation for SAR Tomography: New Results of the Pisascat Experiment</u>	76
Fabrizio Lombardini and Reza Bordbari (University of Pisa, Italy)	
<u>Multi-resolution SAR Tomography</u>	80
Simona Verde and Gianfranco Fornaro (CNR-IREA, Italy); Antonio Pauciullo (IREA, CNR, Italy); Diego Reale (CNR-IREA, Italy)	
<u>Estimation of Sub-Canopy Ground Height from Capon TomoSAR profiles: A Performance Analysis</u>	86
Matteo Pardini (German Aerospace Center (DLR), Germany); Konstantinos P. Papathanassiou (German Aerospace Center, Germany)	

E.1: Maritime/Ocean Applications (Invited)

Chairs: Andrey Pleskachevsky (German Aerospace Center, Germany), Roland Romeiser (University of Miami, USA)

<u>Sea State from Sentinel-1 SAR Wave Mode Imagery for Maritime Situation Awareness</u>	91
Andrey Pleskachevsky (German Aerospace Center, Germany); Björn Tings and Sven Jacobsen (German Aerospace Center (DLR), Germany)	

<u>Observations of Sea Surface Winds and Sea Surface Deformation with the Harmony mission</u>	94
Paco Lopez Dekker (Delft University of Technology, The Netherlands); Bertrand Chapron (IFREMER, France); Harald Johnsen (Norce, France)	
<u>Comparison of Ocean Currents Derived from UHF ATI-SAR to Dispersive Shifts Observed in Sub-Aperture Image Sequences</u>	98
Mark A Sletten (Naval Research Lab, USA); Steven Menk (Naval Research Laboratory, USA); Jakov V. Toporkov (Naval Research Lab, USA); Robert Liang and Andrei Abelev (US Naval Research Laboratory, USA)	
<u>A Study of the Capabilities and Limitations of L-band SAR for Oil Thickness Measurement</u>	103
Cathleen Jones, Sernsak Jaruwatanadilok, Xueyang Duan and Benjamin Holt (Jet Propulsion Laboratory, California Institute of Technology, USA); Frank Monaldo (University of Maryland, USA)	
<u>DNA analysis of surfactant and oil associated bacteria in the near-surface layer of the ocean in relation to natural and oil slicks observed with SAR</u>	107
Alexander V. Soloviev, Kathryn Howe, Cayla Dean, Aurelien Tartar and Mahmood Shivji (Nova Southeastern University, USA); Susanne Lehner (German Aerospace Center (DLR), Germany); Egbert Schwarz (German Aerospace Center, Germany); Hui Shen and William Perrie (Bedford Institute of Oceanography, Canada)	
A.2: Status Report PAZ	
Chairs: Maria Jose Gonzalez Bonilla (INTA, Spain), Christoph Heer (Airbus Defence and Space, Germany)	
<u>PAZ Mission. Science Activities</u>	110
Maria Jose Gonzalez Bonilla and Juan Manuel Cuerda Muñoz (INTA, Spain); Eva Vega (Spanish National Aerospace Institute, Spain); Marcos García Rodriguez and Nuria Casal (INTA, Spain)	
<u>PAZ Calibration Status After First Year Of Operation</u>	114
Juan Manuel Cuerda Muñoz, Marcos García Rodriguez and Nuria Casal (INTA, Spain); Patricia Cifuentes Revenga (INTA & ISDEFE, Spain); Nuria Gimeno Martínez and Maria Jose Gonzalez Bonilla (INTA, Spain); Kersten Schmidt (German Aerospace Center (DLR), Germany)	
<u>Advances in PAZ products geometric analysis</u>	120
Patricia Cifuentes Revenga (National Institute for Aerospace Technology, Spain); Nuria Casal, Juan Manuel Cuerda Muñoz, Nuria Gimeno Martínez, Marcos García Rodriguez and Maria Jose Gonzalez Bonilla (INTA, Spain)	
B.2: Space Missions: Products, Experiments, Verifications, ... II	
Chairs: Alessandro Ferretti (TRE ALTAMIRA Srl, Italy), Michelangelo Villano (German Aerospace Center (DLR), Germany)	
<u>Comparison of Sentinel-1 and RADARSAT-2 Data for Monitoring of Tailings Storage Facilities</u>	125
Rebecca M. Hudson, Shinya Sato, Roger Morin and Mary Anne McParland (MDA, Canada)	
<u>NovaSAR-1 – Early Mission Achievements</u>	131
Philip Whittaker (SSTL, United Kingdom (Great Britain)); Samuel Doody (Airbus DS Ltd, United Kingdom (Great Britain)); Martin Cohen (Airbus Defence & Space Ltd, United Kingdom (Great Britain)); Ben Schwarz (SSTL, United Kingdom (Great Britain)); Geoff Burbidge (Airbus DS Ltd, United Kingdom (Great Britain)); Rachel Bird (SSTL, United Kingdom (Great Britain))	
<u>Design of SmallSat SAR for Dedicated New Zealand Applications</u>	135
Jan Krecke (The University of Auckland, New Zealand); Michelangelo Villano and Nertjana Ustalli (German Aerospace Center (DLR), Germany); Andrew C M Austin and John Cater (The University of Auckland, New Zealand); Gerhard Krieger (DLR, Germany)	
<u>Generalized Likelihood Ratio Tests for Linear Structure Detection in SAR Images</u>	140
Nicolas Gasnier (Télécom Paris & CS Group, France); Loic Denis (Université Jean Monnet, France); Florence Tupin (Télécom ParisTech, France)	

C.2: ISAR

Chairs: Stefan V. Baumgartner (German Aerospace Center (DLR), Germany), Jens Rosebrock (Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR, Germany)

[Complete simulation chain for maritime patrol surveillance using SAR/ISAR modes..... 146](#)
Christian Cochin (DGA MI - French MoD, France); Etienne Everaere (ONERA, France); Corentin Le Barbu (Scalian DS, France); Nicolas Trouvé (Onera, France); Erwan Ceotto (DGA (MOD), France); Antoine Jouade (DGA, France)

[Along-track Orbit Prediction Error Correction of Space Targets Based on Translational Motion Phase ... 152](#)
ZhengKun Yuan (China); Junling Wang (Beijing Institute of Technology, China); Lizhi Zhao (Minzu University of China, China); Meiguo Gao (Beijing Institute of Technology, China)

[ISAR imaging by integrated Compressed Sensing, range alignment and autofocus..... 156](#)
Felix Rosebrock (Fraunhofer FHR, Germany); Jens Rosebrock (Fraunhofer Institute for High Frequency Physics and Radar Techniques FHR, Germany); Delphine Cerutti-Maori (Fraunhofer FHR, Germany); Joachim H. G. Ender (Fraunhofer FHR & Universität Siegen, Germany)

[Research on advanced space surveillance using the IoSiS radar system..... 161](#)
Simon Anger, Matthias Jirousek, Stephan Dill and Markus Peichl (German Aerospace Center (DLR), Germany)

D.2: Tomographic SAR (invited)

Chairs: Giampaolo Ferraioli (Università di Napoli Parthenope, Italy), Diego Reale (CNR-IREA, Italy)

[3D Buildings Reconstruction with SAR Tomography Guided by Partial Footprints Information..... 165](#)
Clément Rambour (CNAM / ONERA, France); Loic Denis (Université Jean Monnet, France); Florence Tupin (Télécom ParisTech, France)

[An improved SAR tomographic technique using contextual information..... 169](#)
Alessandra Budillon (University of Naples Parthenope, Italy); Angel Caroline Johnsy (University of Naples Parthenope, Italy); Gilda Schirinzi (Università di Napoli Parthenope, Italy)

[High Quality Large-Scale 3-D Urban Mapping with Multi-Master TomoSAR..... 173](#)
Yilei Shi (Technical University of Munich, Germany); Richard Bamler (German Aerospace Center (DLR), Germany); 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)

[Semantic Segmentation of High-Resolution Airborne SAR Images using Tomographic Information..... 177](#)
Olivier D'Hondt (TU-Berlin, Germany); Ronny Haensch (DLR, Germany); Victor Cazcarra-Bes (German Aerospace Center (DLR), Germany); Olaf Hellwich (Berlin University of Technology, Germany)

[UAV-borne repeat-pass SAR interferometry and tomography with a compact L-band SAR system..... 181](#)
Othmar Frey (ETH Zurich & Gamma Remote Sensing, Switzerland); Charles Werner (GAMMA Remote Sensing Research and Consulting AG, Switzerland)

E.2: Maritime Applications

Chair: Andreas Danklmayer (Fraunhofer FHR, Germany)

[Advanced Coastal Bathymetry Retrieval from Moving Wave Patterns in Reprocessed Spotlight SAR Data..... 185](#)
Roland Romeiser (University of Miami, USA); Hans Graber (Center for Southeastern Tropical Advanced Remote Sensing, University of Miami, USA)

[1Range-Doppler Tracking of Ships using Single-Channel Airborne Radar Data 188](#)
Sushil Kumar Joshi (German Aerospace Center (DLR), Germany); Stefan V. Baumgartner (German Aerospace Center (DLR), Germany)

<u><i>Analysis of Ship Deformation using the Backprojection Autofocus of Large Ships with Arbitrary Motion for Synthetic Aperture Radar</i></u>	194
Aron Sommer (Leibniz Universität Hannover, Germany); Joern Ostermann (Leibniz Universitaet Hannover, Germany)	
<u><i>Status for Sentinel-1 Level-2 Ocean Products</i></u>	198
Guillaume Hajduch (CLS, France); Romain Husson (CLS, Canada); Harald Johnsen (Norce, France); Nicolas Longepe (CLS, France); Alexis Mouche (Ifremer, France); Nuno Miranda (European Space Agency & ESRIN, Italy); Pauline Vincent (Collecte Localisation Satellites CLS, France)	
<u><i>Perspectives for Sentinel-1 Level-2 Ocean Products</i></u>	202
Guillaume Hajduch (CLS, France); Romain Husson (CLS, Canada); Harald Johnsen (Norce, France); Nicolas Longepe (CLS, France); Alexis Mouche (Ifremer, France); Nuno Miranda (European Space Agency & ESRIN, Italy); Pauline Vincent (Collecte Localisation Satellites CLS, France); Yuan Zhao (Ifremer, France)	
A.3: RADARSAT-2 / RADARSAT Constellation Mission (RCM) (invited)	
Chairs: Ron Caves (MDA, Canada), Guennadi Kroupnik (Canadian Space Agency, Canada)	
<u><i>RADARSAT-2 Update on Operations and Image Quality</i></u>	206
Ron Caves (MDA, Canada); Dan Williams, Yiman Wang, Gordon Fitzgerald, Neil Gibb and Yan Wu (MDA Corporation, Canada)	
<u><i>The RADARSAT Constellation: Mission Overview and Status</i></u>	210
Stephane Cote, Mélanie Lapointe, Eric Arsenault, Magdalena Wierus and Daniel De Lisle (Canadian Space Agency, Canada)	
<u><i>RADARSAT Constellation Mission: Image Quality and Calibration Status</i></u>	*
Mélanie Lapointe and Stephane Cote (Canadian Space Agency, Canada)	
<u><i>RCM Data Access & Applications</i></u>	215
Daniel De Lisle, Steve Iris and Guennadi Kroupnik (Canadian Space Agency, Canada)	
<u><i>New Capabilities for Maritime Surveillance with RADARSAT-2</i></u>	218
Ron Caves, Colin McRae, Evgeniy Lebed and Khalid El-Darymli (MDA, Canada)	
B.3: European Space Agency's Multi-frequency SAR Missions (invited)	
Chairs: Malcolm Davidson (ESA/ESTEC, The Netherlands), Ramon Torres (European Space Agency & ESTEC, The Netherlands)	
<u><i>Sentinel-1A/-1B Mission Status</i></u>	222
Pierre Potin (European Space Agency & ESRIN, Italy)	
<u><i>The Sentinel-1C/-1D Development and Deployment Plan</i></u>	228
Ramon Torres (European Space Agency & ESTEC, The Netherlands); David J Bibby, Dirk Geudtner, Ignacio Navas-Traver, Francisco Ceba Vega, Jelle Poupaert, Mario Cossu, Marie Touveneau, Ana Garcia Hernandez and Gregory Laduree (European Space Agency, The Netherlands)	
<u><i>Sentinel-1 Next Generation: C-band Data Continuity and Novel Capabilities</i></u>	232
Dirk Geudtner and Michel Tossaint (European Space Agency, The Netherlands)	
<u><i>ROSE-L – The L-band SAR Mission for Copernicus</i></u>	236
Malcolm Davidson (ESA/ESTEC, The Netherlands); Nicolas Gebert (European Space Agency & ESTEC, The Netherlands); Luisella Giulicchi (ESA, The Netherlands)	

<u><i>Biomass – A fully polarimetric P-band SAR ESA mission</i></u>	238
Matteo Sedehi (Aurora Technology B. V. for ESA – European Space Agency, The Netherlands); Adriano Carbone (Rhea System B. V. & ESA/ESTEC, The Netherlands); Florence Hélière (European Space Agency ESTEC, The Netherlands); Bjorn Rommen (Estec & European Space Agency, The Netherlands); Michael Fehringer and Klaus Scipal (ESA/ESTEC, The Netherlands); Philip Willemsen (European Space Agency ESTEC, The Netherlands); Antonio Leanza (ESTEC & SERCO, The Netherlands); Ernesto Imbembo (Aurora Technology B. V. for ESA-ESTEC, Noordwijk, The Netherlands); Tristan Simon (European Space Agency (ESTEC), The Netherlands)	

C.3: Feature Extraction + Comparison between SAR, SAS and Sonography (invited)

Chairs: Timothy Marston (University of Washington & The Applied Physics Laboratory, USA), Matthias Weiß (Fraunhofer FHR, Germany)

<u><i>Ground Targets Positioning in SAR Images Based on Multi-modality Image Matching</i></u>	243
Zhaoyou Huang and Kuiying Yin (Nanjing Research Institute of Electronic Technology, China)	

<u><i>Multi-mission remote sensing of low concentration produced water slicks</i></u>	249
Malin Johansson (UiT The Arctic University of Norway, Norway); Stine Skrunes and Camilla Brekke (University of Tromsø, Norway); Hugo Isaksen (Kongsberg Satellite Services, Norway)	

<u><i>Synthetic Aperture Sonar Motion Compensation using Deep Learning</i></u>	255
Matthew Emigh (Naval Surface Warfare Center Panama City Division, USA); James Prater (Naval Surface Warfare Center Panama City Division, USA)	

<u><i>Motion Estimation for Synthetic Aperture Sonar using Redundant Phase Center Interferograms</i></u>	259
James Prater (Naval Surface Warfare Center Panama City Division, USA); Matthew Emigh (Naval Surface Warfare Center Panama City Division, USA); Darshan Bryner (Naval Surface Warfare Center Panama City Division, USA)	

<u><i>Sub-aperture recombination for sliding window SAS processing in 3D down-looking synthetic aperture sonar</i></u>	263
Timothy Marston (University of Washington & The Applied Physics Laboratory, USA); Kevin Williams (APL-UW, USA); Daniel Plotnick (ARL-PSU, USA)	

D.3: MTI, GMT, and Moving Targets

Chairs: Florent Christophe (ONERA, France), Ludger Prünte (Fraunhofer-Institut für Hochfrequenzphysik und Radartechnik FHR, Germany)

<u><i>Quality Losses of STAP in Case of Missing Pulses</i></u>	269
Ludger Prünte (Fraunhofer-Institut für Hochfrequenzphysik und Radartechnik FHR, Germany)	

<u><i>A Shadow-based Method for Moving Target Detection in Video SAR</i></u>	274
Chao Zhong (Xidian University, China); Yuhong Zhang (Xidian University, USA); Jinshan Ding (Xidian University, China)	

<u><i>First Result of Spaceborne Dual-Channel Spotlight SAR GMTI Experiment Using Chinese Gaofen-3 Satellite</i></u>	280
Wenjie Shen (North China University of Technology, China); Wen Hong (National Key Laboratory of Microwave imaging Technology & Institute of Electronics, Chinese Academy of Sciences, China); Yanping Wang (North China University of Technology, China); Weidong Yu (Institute of Electronics, Chinese Academy of Sciences, China); Qingjun Zhang (Institute of Spacecraft System Engineering, China Academy of Space Technology, China); Liangbo Zhao (Chinese Academy of Space Technology, China); Bing Han (Institute of Electronics, Chinese Academy of Sciences, China); Yun Lin (North China University of Technology, China); Hui Bi (Nanjing University of Aeronautics and Astronautics, China)	

<u><i>Moving Target Detection in VideoSAR Based on Improved Faster R-CNN</i></u>	285
Xuejun Huang, Dongxing Liang and Jinshan Ding (Xidian University, China)	

E.3: SAR Applications for Land, Vegetation, and Surveillance

Chair: Martin Kirscht (Airbus Defence and Space, Germany)

<u><i>Biomass SAR Instrument: architectural overview and hardware development status</i></u>	290
Adriano Carbone (Rhea System B. V. & ESA/ESTEC, The Netherlands); Natanael Ayllon (ESA/ESTEC, The Netherlands); Elisa Cipriani (ESA-ESTEC, The Netherlands); Leo Farhat (HE space for ESA/ESTEC, The Netherlands); Nelson Fonseca, Sophie-Abigael Gomanne, Petar Jankovic and Petronilo Martin-Iglesias (European Space Agency, The Netherlands); Matteo Sedehi (Aurora Technology B. V. for ESA – European Space Agency, The Netherlands); Florence Hélière (European Space Agency ESTEC, The Netherlands); Michael Fehringer (ESA/ESTEC, The Netherlands)	
<u><i>Amazon Rainforest Mapping using Sentinel-1 Short Time Series</i></u>	296
Andrea Pulella (German Aerospace Center (DLR), Germany); Francescopaolo Sica and Paola Rizzoli (German Aerospace Center (DLR), Germany)	
<u><i>Potential for phase-based surface moisture estimation with C-band SAR data</i></u>	300
Giorgio Gomba and Francesco De Zan (German Aerospace Center (DLR), Germany); Davide Palmisano, Francesco Mattia and Giuseppe Satalino (Consiglio Nazionale delle Ricerche (CNR), Italy)	
<u><i>Road Surface Condition Monitoring Using Fully Polarimetric Airborne SAR Data</i></u>	303
Arun Babu and Stefan V. Baumgartner (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany)	
<u><i>The BIOMASS DEM Product Prototype Processor: An overview</i></u>	309
Muriel Pinheiro (German Aerospace Center (DLR), Germany); Simone Mancon (Aresys srl & Aresys, Italy); Stefano Tebaldini (Politecnico di Milano, Italy); Davide Giudici (Aresys srl, Italy); Mauro Mariotti d'Alessandro (Politecnico di Milano, Italy); Matteo Nannini, Rolf Scheiber and Pau Prats (German Aerospace Center (DLR), Germany); Riccardo Piantanida (Aresys, Italy); Francesco Banda (Aresys srl & Aresys, Italy); Nestor Yague-Martinez (German Aerospace Center (DLR), Germany); Konstantinos P. Papathanassiou (German Aerospace Center, Germany); Klaus Scipal (ESA/ESTEC, The Netherlands)	

P.A: Poster (Space-based SAR Systems)

Chairs: Stefan V. Baumgartner (German Aerospace Center (DLR), Germany), Jens Fischer (German Aerospace Center (DLR), Germany)

<u><i>Variation in coherence for fixed ground objects derived from bi-static TerraSAR-X/TanDEM-X data</i></u>	315
Takashi Nonaka, Tomohito Asaka and Keishi Iwashita (Nihon University, Japan)	
<u><i>A novel MIMO-SAR imaging scheme</i></u>	319
Guodong Jin (Nanjing University of Aeronautics and Astronautics, China); Wei Wang (Institute of Electronics, Chinese Academy of Sciences, China); Yongwei Zhang (Institute of Electronics, Chinese Academy of Sciences & University of the Chinese Academy of Sciences, China); Yajun Long (Institute of Electronics, Chinese Academy of Sciences, China)	
<u><i>Performances Analysis of PRF Sampling Strategies for SAR Satellite Swarms</i></u>	323
Alessandro Mancinelli (Delft University of Technology, The Netherlands); Lorenzo Iannini (Delft University of Technology, Italy); Faruk Uysal and Paco Lopez Dekker (Delft University of Technology, The Netherlands)	
<u><i>AIS P/L on SAR satellite: the Copernicus Sentinel-1 solution</i></u>	329
Rita Roscigno (Thales Alenia Space Italy, Italy); Francesca Spataro (Thales Alenia Space-Italia, Italy); Patrizio Pavia (Thales Alenia Space Italia, Italy); Ramon Torres (European Space Agency & ESTEC, The Netherlands); David J Bibby and Mario Cossu (European Space Agency, The Netherlands)	
<u><i>AIS Assisted Sentinel-1 SLC Image Ship Detection, Motion and Displacement Estimation</i></u>	335
Miroslav Y. Tsvetkov (Nikola Vaptsarov Naval Academy & NVNA, Bulgaria); Nickolai Zhelev Kolev (Naval Academy, Bulgaria); Chavdar Alexandrov (Nikola Vaptsarov Naval Academy, Bulgaria); Avgustin Hristov (Naval Academy, Bulgaria)	

<u>Inter-Comparability of Radiometric Performance between Sentinel-1A and Sentinel-1B</u>	340
Kersten Schmidt and Marco Schwerdt (German Aerospace Center (DLR), Germany); Nuno Miranda (European Space Agency & ESRI, Italy)	
<u>CROME Radar Instrument aboard the COMPASS Mission</u>	344
Aurélien Fourmault (MDA Corporation, Canada); Isaac B Smith (York University, Canada)	
<u>A Satellite On-Board SAR Processing Chain for Generation of Rapid Civil Alerts</u>	350
Stefan Wiehle, Dominik Günzel, Björn Tings, Helko Breit, Ulrich Balss and Srikanth Mandapati (German Aerospace Center (DLR), Germany)	
<u>Atmospheric Artifacts Compensation for InSAR by Using Global and Local Numerical Weather Prediction Models</u>	355
Zhongbo Hu and Jordi J. Mallorqui (Universitat Politècnica de Catalunya (UPC), Spain)	
P.B: Poster (SAR Concepts & Simulators & Processing)	
Chair: Rudolf Zahn (Consultant, Germany)	
<u>A Compensation Method Based on Electromagnetic Vortex Synthetic Aperture Radar Imaging</u>	361
Gaofeng Shu, Wentao Wang and Heng Zhang (Institute of Electronics, Chinese Academy of Sciences, China)	
<u>A Subaperture SAR-Decomposition Algorithm to Delineate Urban Targets of Large Azimuth Angles and Vegetation</u>	366
Yun Ling (University of Electronic Science and Technology of China, China); Yong Wang (East Carolina University, USA); Yin Zhang (University of Electronic Science and Technology of China, China)	
<u>Multi-chromatic phase analysis of SAR images for man-made structures detection</u>	370
Béatrice Pinel-Puysségur (CEA, France); Guillaume Gaillard (CEA-DAM, France)	
<u>Range Model for High Resolution Large Squint Spaceborne SAR</u>	374
Hui Kuang (Beijing Institute of Space Craft System Engineering, China); Jie Liu (Beijing Institute of Spacecraft System Engineering, China); Haifeng Yu (Beijing Institute of Space Craft System Engineering, China); Lei Liu and Shuhao Liu (Institute of Spacecraft System Engineering, China Academy of Space Technology, China); Zhibin Wang (Beijing Institute of Space Craft System Engineering, China)	
<u>Semi-Supervised SAR Target Recognition with Graph Attention Network</u>	378
Liwu Wen, Xuejun Huang, Siqi Qin and Jinshan Ding (Xidian University, China)	
<u>Systematic Comparison of Backgeocoding Algorithms for SAR Processing and Simulation Environments</u>	383
Alejandro Linde-Cerezo (German Aerospace Center (DLR), Germany); Marc Rodriguez-Cassola (DLR, Germany); Pau Prats and Muriel Pinheiro (German Aerospace Center (DLR), Germany)	
<u>Recovering unambiguous differential ionospheric phase screens</u>	387
Francesco De Zan and Giorgio Gomba (German Aerospace Center (DLR), Germany); Paloma Saporta (Technical University of Munich (TUM), Germany); Victor D Navarro Sanchez (German Aerospace Center (DLR), Germany)	
<u>Focusing of new generation SAR Spotlight data through the Efficient Time-Domain Back-Projection</u>	390
Francesco Tataranni (INNOVA Consorzio per l'Informatica e la Telematica SrL, Italy); Antonella Gallipoli (Z. I. La Martella, III Traversa G. B. Pirelli & INNOVA Consorzio per l'Informatica e la Telematica, Italy); Paolo Inversi (Telespazio S. p. A, Italy)	
<u>Characterization of impurities in building materials with SAR</u>	396
Alexander Haas, Markus Peichl and Stephan Dill (German Aerospace Center (DLR), Germany)	
<u>Development of SAR system installable on a drone</u>	400
Tomonori Deguchi (Nittetsu Mining Consultants Co., Ltd., Japan)	

P.C: Poster (Calibration & Hardware-Aspects)

Chair: Grzegorz Adamiuk (Airbus Defence and Space GmbH, Germany)

- [TanDEM-X Calibration Assessment after Redundancy Switch](#)..... 403
Patrick T.P. Klenk, Kersten Schmidt and Thomas Kraus (German Aerospace Center (DLR), Germany);
Ulrich Steinbrecher (DLR, Germany); Marco Schwerdt (German Aerospace Center (DLR), Germany)
- [A Research of Amplitude and Phase Weighting Methods for Low Side-lobe Based on Arc Antenna Array](#).. 407
Bin Liu (Inner Mongolia University of Technology, China); Pingping Huang, WeiXian Tan and Wei Xu
(Inner Mongolia University of Technology, China)
- [Investigation of Mutual Coupling Effects between L-Band Antennas for the Use in Accurate Transponder Devices](#) 412
Anna Maria Büchner, Klaus Weidenhaupt, Markus Limbach, Sebastian Raab and Marco Schwerdt (German Aerospace Center (DLR), Germany)
- [Effect of Antenna Cross-Pol Pattern on Ambiguity Performance of Quad-Pol SAR Systems](#)..... 416
Jung-Hwan Lim, Jae Wook Lee and Taek kyung Lee (Korea Aerospace University, Korea (South))
- [Design and Analysis of Light-Weight Deployable Mesh Reflector Antenna for Small Multibeam SAR Satellite](#)..... 421
Oleksandr Sushko (EOS Ukraine, Ukraine); Elguja Medzmariashvili and Shota Tserodze (Georgian Technical University, Georgia); Dmytro Vasylenko, Serhii Khoroshylov, Oleksandr Shpylka, Serhii Martyniuk and Volodymyr Vasyliiev (EOS Ukraine, Ukraine)
- [Advanced Active Antenna Calibration Schemes for future space born SAR Missions](#)..... *
- Alexander Moessinger and Grzegorz Adamiuk (Airbus Defence and Space GmbH, Germany)
- [Poisson's Summation Formula in Radar Imaging](#)..... 424
Jens Fischer (German Aerospace Center (DLR), Germany); Tobias Rommel (German Aerospace Centre (DLR), Germany); Rudolf Stens (RWTH Aachen, Germany)
- [Quantum annealer for network flow minimization in InSAR images](#) 430
Soronzonbold Otgonbaatar (DLR, Germany); Mihai Datcu (German Aerospace Center, Germany)
- [Compressed Sensing Imaging for Staggered SAR with Low Oversampling Ratio](#)..... 434
Xingxing Liao (University of Electronic Science and Technology of China, China); Changlin Jin (Southwest China Research Institute of Electronic Equipment, China); Zhe Liu (University of Electronic Science and Technology of China, P.R. China)
- [IQ Bias Channel Deviation on TerraSAR-X and TanDEM-X](#)..... 438
Allan Bojarski (German Aerospace Center, Germany); Markus Bachmann, Thomas Kraus, Jens Reimann, Helko Breit and Ulrich Balss (German Aerospace Center (DLR), Germany)
- [An Echo Intensity Calculation Method based on DNN for SAR Ray-tracing Simulation](#) 443
Shengren Niu (AIRCAS&School of Electronic, Electrical and Communication Engineering, UCAS&GIPAS, Beijing, China); Xiaolan Qiu (AIRCAS&GIPAS, Beijing, China); Chibiao Ding (AIRCAS&School of Electronic, Electrical and Communication Engineering, UCAS&GIPAS, Beijing, China); Xiangyang Lin (Beijing Institute of Remote Sensing Information, Beijing, China); Bin Lei (AIRCAS&School of Electronic, Electrical and Communication Engineering, UCAS&GIPAS, Beijing, China)

P.D: Poster (Interferometric, Polarmetrie, Multi-Channel)

Chair: Fabrizio Lombardini (University of Pisa, Italy)

- [Airborne SAR interferometry for large scale mapping of tidal flats: the GeoWAM project](#)..... 447
Muriel Pinheiro, Rolf Scheiber, Joel Amao-Oliva, Marc Jäger, Ralf Horn and Jens Fischer (German Aerospace Center (DLR), Germany); Martin Keller (DLR, Germany); Andreas Reigber (German Aerospace Center (DLR), Germany)

<u>Permafrost Thawing and Freezing Process Observed by TerraSAR-X Interferometry in the Northern Qinghai-Tibet Plateau</u>	453
Chao Wang and Hong Zhang (Institute of Remote Sensing and Digital Earth, CAS, China); Yixian Tang (Institute of Remote Sensing and Digital Earth, China); Jing Wang (Institute of Remote Sensing and Digital Earth, CAS, China); Zhengjia Zhang (School of Geography and Information Engineering, China University of Geosciences, China)	
<u>DiapOTB: a new open source tool for Differential SAR interferometry</u>	457
Philippe Durand and Nadine Pourthie (CNES, France); Gaelle Usseglio (THALES SERVICE, France); Céline Tison (CNES, France)	
<u>BelSAR: the first Belgian airborne campaign for L-band, full-polarimetric bistatic and interferometric SAR acquisitions over an agricultural site in Belgium</u>	461
Anne Orban (Centre Spatial de Liège, Belgium); Denis Defrère (University of Liège, Belgium); Christian Barbier (Centre Spatial de Liège, Belgium)	
<u>Wheat Planting Area Extraction and Yield Evaluation Based on Polarization Scattering Characteristics</u> ..	465
Aimin Cai (38th Research Institute, China Electronic Technology Group Corporation, China)	
<u>Urban Area Analysis in Single-polarized SAR Images Based On Unsupervised Deep Learning</u>	469
Zhongling Huang (Northwestern Polytechnical University); Mihai Datcu (German Aerospace Center, Germany)	
<u>Phase Mismatch Calibration for Multi-Channel TOPS SAR with Different Azimuth Steering Laws</u>	474
Jialuo Hu, Wei Xu, Pingping Huang, WeiXian Tan and Yifan Dong (Inner Mongolia University of Technology, China)	
<u>A Robust Time-domain Algorithm for Multichannel HRWS SAR Imaging</u>	478
Yuekun Wang and Zhonghao Wei (Nanjing Research Institute of Electronics Technology, China); Long Zhuang (Nanjing Research Institute of Electronics, China); Chuanzhao Han (Nanjing Research Institute of Electronics Technology, China)	
<u>Signal Reconstruction Algorithm for Azimuth Multichannel SAR System Based on a quadratically constrained Optimization Model</u>	482
Yongwei Zhang (Institute of Electronics, Chinese Academy of Sciences & University of the Chinese Academy of Sciences, China); Wei Wang (Institute of Electronics, Chinese Academy of Sciences, China)	
<u>A parallel multi-temporal InSAR method for Sentinel-1 large scale deformation monitoring</u>	488
Wei Duan, Hong Zhang and Chao Wang (Institute of Remote Sensing and Digital Earth, CAS, China); Yixian Tang (Institute of Remote Sensing and Digital Earth, China)	
P.E: Poster (Snow, Sea, Atmosphere)	
Chair: Georg Fischer (German Aerospace Center (DLR), Germany)	
<u>The detection of snow avalanches using TerraSAR-X data</u>	492
Anna Wendleder (German Aerospace Center (DLR) & German Remote Sensing Data Center, Germany); Toni Lanzenberger and Andreas Schmitt (Munich University of Applied Sciences, Germany)	
<u>Onboard Processing Concept for Maritime Surveillance Demonstrated with DLR's Airborne Radar Sensors F-SAR and DBFSAR</u>	496
Stefan V. Baumgartner (German Aerospace Center (DLR), Germany); Sushil Kumar Joshi (German Aerospace Center (DLR), Germany)	
<u>Ship Detection Using Sentinel-1 Amplitude SAR Data</u>	502
Jhordeym Santos (ISEL, Portugal); Paulo Marques (ISEL-IT Lisboa, Portugal)	
<u>Subsurface TomoSAR imaging of the Mittelbergferner glacier in the Austrian Alps</u>	507
Gustavo Daniel Martín-del-Campo-Becerra (German Aerospace Center (DLR), Germany); Andreas Benedikter (German Aerospace Center (DLR) & University of Erlangen-Nuremberg, Germany); Joel Amao-Oliva and Rolf Scheiber (German Aerospace Center (DLR), Germany)	

<u><i>Newly-formed sea ice distinction near the oil platform Prirazlomnaya in the Pechora Sea using polarimetric Radarsat-2 SAR observations</i></u>	513
Dmitry V. Ivonin (Russian Academy of Sciences, Russia); Andrei Yu. Ivanov (P.P.Shirshov Institute of Oceanology, Russian Academy of Sciences, Russia); Malin Johansson (UiT The Arctic University of Norway, Norway); Camilla Brekke (University of Tromsø, Norway)	
<u><i>Agricultural Land Cover Mapping based on Sentinel-1 Coherence Time-Series</i></u>	517
Tina Nikaein (Delft University of Technology (TU Delft), The Netherlands); Lorenzo Iannini (Delft University of Technology, Italy); Paco Lopez Dekker (Delft University of Technology, The Netherlands)	
<u><i>Ship Detection using Linear and Circular Range-Compressed Airborne Radar Data</i></u>	521
Sushil Kumar Joshi (German Aerospace Center (DLR), Germany); Stefan V. Baumgartner (German Aerospace Center (DLR), Germany)	
<u><i>Evolution of supraglacial lakes on the Greenland Ice sheet during Summer Season</i></u>	527
Anna Wendleder (German Aerospace Center (DLR) & German Remote Sensing Data Center, Germany); Grzegorz Gnatzy (University of Applied Sciences, Germany); Andreas Schmitt (Munich University of Applied Sciences, Germany); Sahra Abdullahi (German Aerospace Center (DLR), Germany)	
<u><i>Selecting principal attributes in multimodal remote sensing for sea ice characterization</i></u>	531
Eduard Khachatryan (UiT The Arctic University of Norway, Norway); Saloua Chlaily (UiT the Arctic University of Norway, Norway); Torbjørn Eltoft (University of Tromsø, Norway); Andrea Marinoni (UiT the Arctic University of Norway, Norway)	
<u><i>Lac Bam imaged by TerraSAR-X - Classification and Visualisation of Seasonal and Annual Changes</i></u>	537
Christoph Klingebiel and Andreas Schmitt (Munich University of Applied Sciences, Germany); Anna Wendleder (German Aerospace Center (DLR) & German Remote Sensing Data Center, Germany); Linda Moser (GAF, Germany)	
<u><i>Spectrum properties of near-surface wind field derived from SAR in the offshore windfarm areas in the German Bight</i></u>	543
Bughsin Djath (Helmholtz-Zentrum Geesthacht & HZG, Germany); Johannes Schulz-Stellenfleth (Helmholtz-Zentrum Geesthacht, Germany)	
A.4: TanDEM-X: The DEM Mission with Innovative Applications I (Invited)	
Chairs: Irena Hajnsek (ETH Zurich, DLR Oberpfaffenhofen, Germany), Manfred Zink (DLR, Germany)	
<u><i>TanDEM-X 10 Years of Operation: Mission Status and Science Activities</i></u>	547
Irena Hajnsek (ETH Zurich, DLR Oberpfaffenhofen, Germany)	
<u><i>The TanDEM-X Change DEM: the new temporal DEM of the TanDEM-X Mission</i></u>	550
Marie Lachaise, Markus Bachmann, Thomas Fritz, Martin Huber, Barbara Schweißhelm and Birgit Wessel (German Aerospace Center (DLR), Germany)	
<u><i>Automatic Editing of the TanDEM-X Global DEM</i></u>	556
Carolina González, Markus Bachmann, Jose-Luis Bueso-Bello and Paola Rizzoli (German Aerospace Center (DLR), Germany); Manfred Zink (DLR, Germany)	
<u><i>InSAR phase estimation advances for high-resolution TanDEM-X DEM generation</i></u>	560
Francescopaolo Sica (German Aerospace Center (DLR), Germany); Nicola Gollin (German Aerospace Center, Germany); Giorgia Gobbi and Paola Rizzoli (German Aerospace Center (DLR), Germany)	
<u><i>TanDEM-X Surface Elevation Changes and Synergies with COSMO-SkyMed for Cryosphere Monitoring</i></u>	564
Pietro Milillo (University of California Irvine, USA); Eric Rignot (Jet Propulsion Laboratory, USA); Paola Rizzoli (German Aerospace Center (DLR), Germany); Bernd Scheuchl and Jeremie Mougnot (University of California, Irvine, USA); Jose-Luis Bueso-Bello and Pau Prats (German Aerospace Center (DLR), Germany); Manfred Zink (DLR, Germany); Luigi Dini (Agenzia Spaziale Italiana, Italy)	

B.4: SAR Concepts & Simulators

Chairs: Thomas Fügen (Airbus Defence and Space GmbH, Germany), Valeria Gracheva (German Aerospace Center (DLR), Germany)

<i>Predictive Quantization for Onboard Data Reduction in Future SAR Systems</i>	570
Nicola Gollin and Michele Martone (German Aerospace Center, Germany); Michelangelo Villano and Paola Rizzoli (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany)	
<i>10:15 Orbit error impacts and autofocus applied to Geosynchronous SAR (GEOSAR)</i>	576
Xavier Carreño-Megias (Carrer de Jordi Girona, 1, 3 & Universidad Politecnica de Catalunya, Spain); Jorge Nicolás-Álvarez, Oriol Fusté and Antoni Broquetas (Universitat Politècnica de Catalunya, Spain); Albert Aguasca (Universitat Politecnica de Catalunya (UPC), Spain)	
<i>Simulation of Geosynchronous Hydroterra Image Products with Airborne SAR Data</i>	581
Valeria Gracheva, Pau Prats, Rolf Scheiber and Ralf Horn (German Aerospace Center (DLR), Germany); Martin Keller (DLR, Germany); Jens Fischer, Andreas Reigber and Alberto Moreira (German Aerospace Center (DLR), Germany)	
<i>A Modification of Rician Distribution for SAR Image Modelling</i>	587
Oktay Karakus (Visual Information Lab, University of Bristol, Bristol, U.K.); Ercan Engin Kuruoglu (Data Science and Information Technology Center, Tsinghua-Berkeley Shenzhen Institute, China); Alin M Achim (Visual Information Lab, University of Bristol, Bristol, U.K.)	
<i>Dynamic 3D Model of a Tree for High-Resolution SAR Imaging</i>	593
Xavier Husson (ONERA & Université Paris Saclay, France); Thomas Lepetit and Fabrice Boust (ONERA, France); Nicolas Trouvé (Onera, France)	

C.4: Polarimetry I (invited)

Chairs: Laurent Ferro-Famil (University of Rennes 1, France), Armando Marino (The University of Stirling, United Kingdom (Great Britain))

<i>Modeling of the impact of the soil roughness on PolSAR images</i>	599
Flora Weissgerber and Elise Colin Koenuiger (ONERA, France); Nicolas Trouvé (Onera, France)	
<i>Multi-aspect Polarimetric SAR Image Scattering Feature Information Coding and Classification with Machine Learning Approach</i>	605
Yang Li (School of Information Science and Technology, North China University of Technology, China)	
<i>Polarimetric Change Analysis in Forest using PolInSAR Ground and Volume separation techniques</i>	609
Alberto Alonso-González (German Aerospace Center (DLR), Germany); Konstantinos P. Papathanassiou (German Aerospace Center, Germany)	
<i>Inferring the Dielectric Properties of Oil Slick from Multifrequency SAR imagery via a Polarimetric Two-Scale Model</i>	615
Cornelius P Quigley (UiT, The Arctic University of Norway, Norway); Camilla Brekke and Torbjørn Eltoft (University of Tromsø, Norway)	
<i>Effect of polarimetric information on time-frequency analysis using spaceborne SAR image</i>	619
Lu Zhang (Aerospace Information Research Institute, CAS, China); Yue Huang and Laurent Ferro-Famil (University of Rennes 1, France); Wenjin Wu (Aerospace Information Research Institute, CAS, China)	

D.4: Multidimensional Imagery from Multichannel SAR Data (invited)

Chairs: Fabrizio Lombardini (University of Pisa, Italy), Andreas Reigber (German Aerospace Center (DLR), Germany)

<i>GPU accelerated processor for continuous L- and C- band SAR tomography</i>	625
Andrey Giardino and Paolo Pasquali (SARMAP, Switzerland); Marco Defilippi (Sarmap, Switzerland); Achille Peternier (SUPSI, Switzerland); Christopher Hereward Buck (European Space Agency, The Netherlands)	

<u>Adaptive processing for spaceborne monitoring of forests using SAR tomography</u>	629
Laurent Ferro-Famil and Yue Huang (University of Rennes 1, France); Stefano Tebaldini (Politecnico di Milano, Italy)	
<u>A New Paradigm to Observe Early Warning Faults of Critical Infrastructures by Micro-Motion Estimation from Satellite SAR Observations. Application to Pre-Collapse Damage Assessment of the Morandi Bridge in Genoa (Italy)</u>	634
Filippo Biondi (University of L'Aquila, Italy); Pia Addabbo (University G. Fortunato, Italy); Carmine Clemente (University of Strathclyde, United Kingdom (Great Britain)); Danilo Orlando (Universita' degli Studi Niccolo' Cusano, Italy)	
A.5: TanDEM-X: The DEM Mission with Innovative Applications II (Invited)	
Chairs: Irena Hajsek (ETH Zurich, DLR Oberpfaffenhofen, Germany), Manfred Zink (DLR, Germany)	
<u>An Investigation of Forest Height Estimation by using TanDEM-X Local InSAR Phase Center Variations</u>	639
Changhyun Choi (German Aerospace Center (DLR), Germany); Konstantinos P. Papathanassiou (German Aerospace Center, Germany); Matteo Pardini and Roman Guliaev (German Aerospace Center (DLR), Germany)	
<u>Extraction of Absolute Water Level in the Florida Everglades Using TanDEM-X Bistatic Science Phase Observations with a Large Perpendicular Baseline</u>	643
Sang-Hoon Hong (Pusan National University, Korea (South)); Shimon Wdowinski (Florida International University, USA); Sang-Wan Kim (Sejong University, Korea (South))	
<u>Detection of retrogressive thaw slumps using TanDEM-X observations: Possibilities and Limitations</u>	646
Philipp Bernhard (ETH Zürich, Switzerland); Simon Zwieback (University of Alaska Fairbanks, USA); Silvan Leinss (ETH Zürich, Switzerland); Irena Hajsek (ETH Zurich, DLR Oberpfaffenhofen, Germany)	
<u>Global Glacier Surface Elevation Change and Geodetic Mass Balance Estimations</u>	652
Philipp Malz, Christian Sommer, David Farías and Thorsten Seehaus (Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Germany); Matthias Braun (Friedrich-Alexander-Universität Erlangen Nürnberg (FAU), Germany)	
<u>PolSAR based Scattering Characterization for Sea-Ice Topographic Retrieval using TanDEM-X Data</u>	655
Lanqing Huang (ETH Zürich, Switzerland); Irena Hajsek (ETH Zurich, DLR Oberpfaffenhofen, Germany)	

B.5: Space SAR Missions and Systems

Chairs: Joachim H. G. Ender (Fraunhofer FHR & Universität Siegen, Germany), Rolf Scheiber (German Aerospace Center (DLR), Germany)

<u>The SCOUT Product Line for AIRBUS Space-Borne X-Band SAR Instruments</u>	660
Alexander Werner Hees (Airbus Defence and Space GmbH, Germany); Martin Stangl (Airbus Defence and Space, Germany); Michael Frerich, Rainer Wilhelm, Thomas Schwämmlein and Andreas Rathke (Airbus Defence and Space GmbH, Germany)	
<u>Sentinel-1 Next Generation: main mission and instrument performance of the Phase 0</u>	666
Mariantonietta Zonno and Jalal Matar (German Aerospace Center (DLR), Germany); Felipe Queiroz de Almeida (German Aerospace Center (DLR) & Microwaves and Radar Institute, Germany); Marwan Younis and Jens Reimann (German Aerospace Center (DLR), Germany); Marc Rodriguez-Cassola and Gerhard Krieger (DLR, Germany); Andrea Perrera (Thales Alenia Space Italia, Italy); Michel Tossaint (European Space Agency, The Netherlands)	
<u>An Update on the Capella Space Radar Constellation</u>	671
Gordon Farquharson and Davide Castelletti (Capella Space, USA); Craig Stringham (Capella Space Corporation, USA); Duncan Eddy (Capella Space, USA)	
<u>Formation Considerations for Distributed Satellite SAR Systems</u>	675
Thomas Kraus (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany); Markus Bachmann and Alberto Moreira (German Aerospace Center (DLR), Germany)	

C.5: Polarimetry II (invited)

Chairs: Laurent Ferro-Famil (University of Rennes 1, France), Armando Marino (The University of Stirling, United Kingdom (Great Britain))

- [*Double bounce mechanism and deterministic targets in SAR remote sensing*](#) 681
Laetitia Thirion-Lefevre and Regis Guinvarc'h (CentraleSupélec, France); Elise Colin Koeniguer (ONERA, France)
- [*A new decomposition of compound polarimetric targets*](#) 684
Armando Marino (The University of Stirling, United Kingdom (Great Britain))
- [*Polarimetric Scattering based Support GLRT for Detection of Permanent Scatterers*](#) 690
Hossein Aghababaei (University of Twente, The Netherlands); Giampaolo Ferraioli (Università di Napoli Parthenope, Italy); Alessandra Budillon (University of Naples Parthenope, Italy); Vito Pascazio and Gilda Schirinzi (Università di Napoli Parthenope, Italy)

D.5: Remote Sensing and Application

Chairs: Filippo Biondi (University of L'Aquila & Italian Ministry of Defence, Italy), Rudolf Zahn (Consultant, Germany)

- [*Campotosto Dam Destabilization Under Earthquake Series Ongoing in Central Italy*](#) 695
Filippo Biondi (University of L'Aquila, Italy); Pia Addabbo (University G. Fortunato, Italy); Carmine Clemente (University of Strathclyde, United Kingdom (Great Britain)); Danilo Orlando (Università degli Studi Niccolò Cusano, Italy)
- [*X-Band/C-Band-Comparison of Ship Wake Detectability*](#) 700
Björn Tings, Sven Jacobsen and Stefan Wiehle (German Aerospace Center (DLR), Germany); Egbert Schwarz (German Aerospace Center, Germany); Holger Daelow (German Aerospace Center (DLR), Germany)
- [*Influence on Radar Back-scatter of Oil Spreading and Evaporation in Marine Oil Spills*](#) 705
Isa Yunusa Chedi (Surrey Space Center & University of Surrey, United Kingdom (Great Britain)); Donato Amitrano (Surrey Space Centre, United Kingdom (Great Britain)); Raffaella Guida (University of Surrey, United Kingdom (Great Britain))
- [*Spaceborne SAR wave mode as big data for global ocean wave measurements*](#) 711
Bingqing Huang (Aerospace Information Research Institute, Chinese Academy of Sciences, China); XiaoMing Li (Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences, China)
- [*Ocean wave measurement by the along-track and cross-track interferometric SAR*](#) 717
Shoichiro Kojima (National Institute of Information and Communications Technology & Applied Electromagnetic Research Institute, Japan)

E.5: Snow, Ice, and Glacier I

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

- [*Ice-sheet sounding at X, L and UHF bands from high altitude by vertical SAR imaging*](#) 723
Hubert M.J. Cantalloube (ONERA Université Paris-Saclay, France)
- [*A wavelet-based thermal noise removal approach for Sentinel-1 records on polar areas*](#) 727
Saloua Chlailly and Thomas Kræmer (UiT the Arctic University of Norway, Norway); Torbjørn Eltoft (University of Tromsø, Norway); Andrea Marinoni (UiT the Arctic University of Norway, Norway)
- [*The Added-Value of TOPSAR Coherence Tracking for Sentinel-1 Interferometry Over Ice Shelves*](#) 732
Quentin Glaude (Université de Liège & Université Libre de Bruxelles, Belgium); Dominique Derauw (Centre Spatial de Liège, Belgium & Instituto de Investigación en Paleobiología y Geología - Universidad Nacional de Río Negro-CONICET, Argentina); Christian Barbier (Centre Spatial de Liège, Belgium); Frank Pattyn (Université libre de Bruxelles, Belgium)

<u><i>SAR Image Texture Entropy Analysis for Applicability Assessment of Area-Based and Feature-Based Aea Ice Tracking Approaches</i></u>	737
Denis Demchev (Nansen Environmental and Remote Sensing Center, Norway & Arctic and Antarctic Research Institute, Russia); Leif E.B. Eriksson (Chalmers University of Technology, Sweden); Vasily Smolanitsky (Arctic and Antarctic Research Institute, Russia)	
<u><i>Synthetic aperture radar data analysis by deep learning for automatic sea ice classification</i></u>	740
Salman Khaleghian and Thomas Kræmer (UiT the Arctic University of Norway, Norway); Alistair Everett, Åshild Kiærbech and Nick Hughes (Norwegian Meteorological Institute, Norway); Torbjorn Eltoft (Norway & UiT The Arctic University of Norway, Norway); Andrea Marinoni (UiT the Arctic University of Norway, Norway)	
A.6: Calibration	
Chair: Guillaume Hajduch (CLS, France)	
<u><i>Exploiting Sentinel-1 data to assess Radio Frequency Interference impact on geosynchronous SAR</i></u>	746
Andrea Recchia, Niccolo' Franceschi, Alessandro Cotrufo, Riccardo Piantanida and Davide Giudici (Aresys, Italy); Andrea Monti-Guarnieri (Politecnico di Milano, Italy)	
<u><i>Estimation of Multi-Channel SAR Instrument Errors using a Hybrid Calibration System Model</i></u>	750
Jan Paul Kroll (German Aerospace Center, Germany); Marwan Younis (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany)	
<u><i>In-Flight Multi-Channel Calibration for Airborne Post-Doppler STAP</i></u>	756
Andre Barros Cardoso da Silva (German Aerospace Center (DLR), Germany); Stefan V. Baumgartner (German Aerospace Center (DLR), Germany)	
<u><i>Concurrent Internal Calibration of Spaceborne SAR Systems</i></u>	762
Jens Reimann and Marco Schwerdt (German Aerospace Center (DLR), Germany)	
<u><i>Sentinel-1A/B SAR Calibration and Performance Status</i></u>	766
Nuno Miranda (European Space Agency & ESRIN, Italy); Peter Meadows (BAE Systems Applied Intelligence, United Kingdom (Great Britain)); Riccardo Piantanida, Andrea Recchia and Niccolo' Franceschi (Aresys, Italy); Guillaume Hajduch (CLS, France); Pauline Vincent (Collecte Localisation Satellites CLS, France); Alexis Mouche (Ifremer, France); David Small (University of Zurich, Switzerland); Adrian Schubert (Remote Sensing Laboratories, University of Zurich, Switzerland)	
B.6: Image Filtering, Enhancement, and Correction	
Chairs: Michael Eineder (German Aerospace Center (DLR) & Technische Universität München, Germany), Helene Oriot (ONERA, France)	
<u><i>Interpreter-Based Evaluation of Compressed SAR Images Using JPEG and HEVC Intra Coding: Compression Can Improve Usability</i></u>	770
Ulrike Pestel-Schiller and Jörn Ostermann (Leibniz Universität Hannover, Germany)	
<u><i>The Joint Filtering Method Of Multibaseline InSAR In NSST Domain Based On Kurtosis</i></u>	776
Yanfang Liu (The School of Electronic and Information Engineering, Beihang University, China); Shiqiang Li (Aerospace Information Research Institute, Chinese Academy of Sciences, China); Heng Zhang (Chinese of Academy of Science, China)	
<u><i>A scheme for stabilizing the image generation for VideoSAR</i></u>	781
Fabian Hartmann, Aron Sommer, Ulrike Pestel-Schiller and Jörn Ostermann (Leibniz Universität Hannover, Germany)	
<u><i>An Integrated Approach for SAR Image Speckle Reduction and Target Detection</i></u>	786
Si-Wei Chen, Xing-Chao Cui and Xuesong Wang (National University of Defense Technology, China); Shunping Xiao (National University of Defence Technology, China)	

<i>Absolute Radiometric Calibration of Broadband X-Band Transponders</i>	790
Sebastian Raab, Kersten Schmidt, Klaus Weidenhaupt, Jens Reimann, Anna Maria Büchner and Marco Schwerdt (German Aerospace Center (DLR), Germany)	

C.6: Polarimetry

Chairs: Andreas Danklmayer (Fraunhofer FHR, Germany), Marco Lavelle (Jet Propulsion Laboratory, California Institute of Technology, USA)

<i>Multistatic dual-polarimetric through-wall 3D-SAR</i>	795
Daniel Andre (Cranfield University, United Kingdom (Great Britain)); Francis M Watson (Dstl, United Kingdom (Great Britain)); Mark Finnis (Cranfield University, United Kingdom (Great Britain))	

<i>Azimuth Ambiguity in Quad-Pol SAR from the Perspective of Target Decomposition</i>	799
Peng Li (University of Chinese Academy of Sciences, China); Xiuqing Liu and Dacheng Liu (Aerospace Information Research Institute, Chinese Academy of Sciences, China); Pengfei Zhao (University of Chinese Academy of Sciences, China)	

<i>Urban Area Extraction Using Optimal Roll-invariant Features and Multi-Aperture Polarimetric Entropy</i>	804
Yu Wang (Institute of Electronics, Chinese Academic of Sciences, China); Weidong Yu and Chunle Wang (Institute of Electronics, Chinese Academy of Sciences, China)	

<i>Estimation of Tree Height Using the ESPRIT Algorithm with ALOS/PALSAR Dual-pol InSAR Datasets</i>	810
Dongyang Liu (University of Electronic Science and Technology of China, China); Yong Wang (East Carolina University, USA)	

D.6: Interferometry I

Chairs: Horst Hammer (Fraunhofer Institute of Optics, System Technologies and Image Exploitation IOSB, Germany), Gilda Schirinzi (Università di Napoli Parthenope, Italy)

<i>Super Resolution Persistent Scatterer Interferometry (SR-PSI)--PS densification through Capon based SAR reprocessing</i>	814
Hao Zhang (Nanjing University of Posts and Telecommunications, China); Paco Lopez Dekker (Delft University of Technology, The Netherlands)	

<i>Interferometric phase uncertainty estimation for decorrelating heterogeneous targets</i>	819
Simon Zwieback and Franz J Meyer (University of Alaska Fairbanks, USA)	

<i>Nonlinear displacement analysis using cluster based PS extraction and Gaussian process regression</i>	824
Taichi Tanaka (NEC Corporation, Japan); Osamu Hoshuyama (NEC, Japan)	

<i>An Effective Approach to Select Valid and Accurate Ground Control Points in SBAS-InSAR Technique</i>	829
Yan Yan (University of Electronic Science and Technology of China, China); Yong Wang (East Carolina University, USA)	

<i>Validation of the Tropospheric Corrected Interferograms and Analysis of the expected Performance in Deformation Rate Estimation</i>	833
Alessandro Parizzi (German Aerospace Center (DLR), Germany); Ramon Brcic (German Aerospace Center, Germany); Francesco De Zan (German Aerospace Center (DLR), Germany)	

E.6: Snow, Ice, and Glacier II

Chair: Marc Jäger (German Aerospace Center (DLR), Germany)

<i>ICESAR 2019 - A Study on Sea Ice based on F-SAR XCL-Band Data</i>	838
Ralf Horn, Rolf Scheiber and Joel Amao-Oliva (German Aerospace Center (DLR), Germany); Ronny Haensch (DLR, Germany); Felix Weinmann and Marc Jäger (German Aerospace Center (DLR), Germany)	

<i>A Volumetric P-band Imaging Concept for the SAR Exploration of Saturn's Moon Enceladus</i>	842
Andreas Benedikter (German Aerospace Center (DLR) & University of Erlangen-Nuremberg, Germany); Marc Rodriguez-Cassola (DLR, Germany)	
<i>Towards Pan-Arctic Sea Ice Type Retrieval using Sentinel-1 TOPSAR modes</i>	848
Suman Singha (German Aerospace Center (DLR), Germany)	
<i>Fast Azimuthal Displacement Retrieval from TOPSAR Burst Overlapping Interferometry: Application in Dronning Maud Land (Antarctica)</i>	851
Quentin Glaude (Université de Liège & Université Libre de Bruxelles, Belgium); Dominique Derauw (Centre Spatial de Liège, Belgium & Instituto de Investigación en Paleobiología y Geología - Universidad Nacional de Río Negro-CONICET, Argentina); Christian Barbier (Centre Spatial de Liège, Belgium); Frank Pattyn (Université libre de Bruxelles, Belgium)	
<i>Sentinel-1 TOPS Interferometry for Ice Flow Mapping</i>	855
Anders Kusk, Jonas Kvist Andersen and John Peter Merryman Boncori (Technical University of Denmark, Denmark)	
A.7: Challenges for next generation SAR	
Chairs: Dirk Geudtner (European Space Agency, The Netherlands), Guy Seguin (INSARSAT Inc., Canada)	
<i>A MirrorSAR Case Study Based on the X-Band High Resolution Wide Swath Satellite (HRWS)</i>	860
Josef Hermann Martin Mittermayer (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany); Allan Bojarski (German Aerospace Center, Germany); Mariantonietta Zonno, Michelangelo Villano and Alberto Moreira (German Aerospace Center (DLR), Germany)	
<i>GEO-SAR Orbit Characteristics derived from the Hydroterra Mission Performance Model</i>	866
Carsten Jonas, Carmen Velarde, Simone Gabrielli, Egemen Imre and Ann-Theres Schulz (OHB System AG, Germany)	
<i>HRWS: The upcoming German X-Band Spaceborne SAR Mission</i>	872
Michael Bartusch, Christian Bruens, Samuel Stettner and Adriana Elizabeth Nuncio Quiroz (German Aerospace Center (DLR), Germany)	
B.7: Change Detection	
Chair: Ulrike Pestel-Schiller (Leibniz Universität Hannover, Germany)	
<i>Potential of MEO SAR for Global Deformation Mapping</i>	876
Jalal Matar (German Aerospace Center (DLR), Germany); Marc Rodriguez-Cassola and Gerhard Krieger (DLR, Germany); Mariantonietta Zonno and Alberto Moreira (German Aerospace Center (DLR), Germany)	
<i>Enhancement of Coherence Images for Coherent Change Detection</i>	881
Horst Hammer (Fraunhofer Institute of Optics, System Technologies and Image Exploitation IOSB, Germany); Fabian Lorenz (Fraunhofer IOSB, Karlsruhe Institute of Technology, Germany); Erich Cadario and Silvia Kuny (Fraunhofer IOSB, Germany); Antje Thiele (Fraunhofer IOSB & Karlsruhe Institute of Technology (KIT), Germany)	
<i>Change Categorization in Short-Term SAR Time Series</i>	887
Markus Boldt and Erich Cadario (Fraunhofer IOSB, Germany)	
<i>Improving PSI processing of mining induced large deformations with external models</i>	892
Sen Du (Universitat Politècnica de Catalunya, Spain); Jordi J. Mallorqui (Universitat Politècnica de Catalunya (UPC), Spain); Hongdong Fan (China University of Mining and Technology (CUMT), China)	

C.7: Ionosphere, Wave Propagation, Refection Effects

Chairs: Boris Kutuza (Kotel'nikov Institute of Radioengineering and Electronics of RAS, Russia),
Konstantinos P. Papathanassiou (German Aerospace Center, Germany)

[Compensation of ionospheric effects for InSAR stacks by means of a split-spectrum method](#)..... 898
Victor D Navarro Sanchez, Giorgio Gomba, Francesco De Zan and Karsten Kretschmer (German Aerospace Center (DLR), Germany)

[The influence of ionospheric inhomogeneities on remote sensing of the Earth from space](#)..... 902
Boris Kutuza (Kotel'nikov Institute of Radioengineering and Electronics of RAS, Russia); Andrew S. Kryukovsky (Russian New University & Institute of Radio-engineerihg and Electronics, Russia); Yulia Bova (Russian New University, Russia); Vladimir Stasevich (NPP ROBIS, I, Russia)

[Combined Estimation of Ionospheric Scintillations in SAR Images exploiting Faraday Rotation and Autofocus for the Biomass Mission](#) 908
Valeria Gracheva (German Aerospace Center (DLR), Germany); Jun Su Kim (DLR, Germany); Pau Prats (German Aerospace Center (DLR), Germany); Marc Rodriguez-Cassola (DLR, Germany); Konstantinos P. Papathanassiou (German Aerospace Center, Germany)

[Polar Ionosphere Irregularity Structure and Dynamics by means of X-band Space-borne Synthetic Aperture Radar](#)..... 914
Jun Su Kim (DLR, Germany); Konstantinos P. Papathanassiou (German Aerospace Center, Germany)

[RCS analysis of 3-Dimensional ship for SAR performance evaluation](#)..... 918
Marta Tecla Falconi (Thales Alenia Space Italia & CETEMPS, L'Aquila, Italy); Marco Iorio (Thales Alenia Space, Italy)

D.7: Interferometry II

Chair: Marwan Younis (German Aerospace Center (DLR), Germany)

[Performance-Optimized Quantization for InSAR Applications](#)..... 922
Michele Martone and Nicola Gollin (German Aerospace Center, Germany); Paola Rizzoli (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany)

[Interferometric Orbital Tracking of SAR Missions with Large Processing Gain](#) 928
Jorge Nicolás-Álvarez (Universitat Politècnica de Catalunya, Spain); Xavier Carreño-Megias (Carrer de Jordi Girona, 1, 3 & Universidad Politecnica de Catalunya, Spain); Oriol Fusté (Universitat Politècnica de Catalunya, Spain); Albert Aguasca (Universitat Politecnica de Catalunya (UPC), Spain); Antoni Broquetas (Universitat Politècnica de Catalunya, Spain)

[Systematic Interferometric Phase Biases and their Impact on Earth Surface Deformation Monitoring](#) 932
Homa Ansari, Francesco De Zan and Alessandro Parizzi (German Aerospace Center (DLR), Germany)

[Unwrapping SAR interferograms with localized subsidence signal using deep neural network](#)..... 938
Zhipeng Wu (Aerospace Information Research Institute, Chinese Academy of Sciences & University of Chinese Academy of Sciences, China); Teng Wang (School of Earth and Space Sciences, Peking University, China); Robert Yu Wang (Aerospace Information Research Institute, Chinese Academy of Sciences, China)

E.7: Advanced SAR Methods for Snow and Ice Observations (invited)

Chair: Giuseppe Parrella (German Aerospace Center (DLR), Germany)

[Estimation of snow and firn properties by means of multi-angular polarimetric SAR measurements](#)..... 943
Giuseppe Parrella (German Aerospace Center (DLR), Germany); Irena Hajnsek (ETH Zurich, DLR Oberpfaffenhofen, Germany); Konstantinos P. Papathanassiou (German Aerospace Center, Germany)

<u>Multi-Baseline Pol-InSAR Inversion of the Subsurface Scattering Structure of Ice Sheets</u>	947
Georg Fischer and Alberto Alonso-González (German Aerospace Center (DLR), Germany); Konstantinos P. Papathanassiou (German Aerospace Center, Germany); Irena Hajnsek (ETH Zurich, DLR Oberpfaffenhofen, Germany)	

<u>Modified watershed processing with SAR velocities for individual glacier drainage basins on ice sheets</u> ...	951
Lukas Krieger (German Aerospace Center (DLR), Germany); Dana Floricioiu (DLR, Germany)	

A.8: Airborne & Ground Based SAR Systems I

Chair: Paulo Marques (ISEL-IT Lisboa, Portugal)

<u>Detection in low target to clutter ratio by massive multilooking. Application to the recovery of engine fragments buried in Greenland ice-sheet</u>	955
Hubert M.J. Cantalloube (ONERA Université Paris-Saclay, France)	

<u>Evaluation of design parameters for formation flying SAR</u>	961
Alfredo Renga, Maria Daniela Graziano, Marco Grasso and Antonio Moccia (University of Naples Federico II, Italy)	

<u>Design and performance analysis of the MetaSensing StarSAR-X, the phased array SAR payload of the NOCTUA project</u>	965
Adriano Meta (MetaSensing, Italy); Filippo Speziali (MetaSensing Italia Srl, Italy); Julien Marini (MetaSensing Italia, Italy)	

<u>High-Performance Polar Airborne Ultra-Wideband Radar Imaging Capability with a Light Turboprop Aircraft</u>	969
Abhishek K Awasthi (University of Alabama & Remote Sensing Center, USA); Charles O'Neill, Ryan Taylor, Stephen Yan, Prasad Gogineni and Sameer Mulani (University of Alabama, USA); Linfeng Li (The University of Alabama, USA); Deepak Elluru, Natalie Nickerson and Adam Horstman (University of Alabama, USA); Joohan Lee and Changhyun Chung (Korea Polar Research Institute, Korea (South))	

B.8: SAR Automated Object Recognition (via Machine/Deep Learning) (invited)

Chair: Xiao Zhu (Technical University of Munich, Germany)

<u>Very high resolution Airborne PolSAR Image Classification using Convolutional Neural Networks</u>	973
Minh-Tan Pham (Université Bretagne Sud & IRISA, France); Sébastien Lefèvre (Université de Bretagne-Sud & IRISA, France)	

<u>Towards SAR Tomographic Inversion via Sparse Bayesian Learning</u>	977
Kun Qian (Technical University of Munich & German Aerospace Center, Germany); 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)	

<u>Deep Learning for SAR Applications: Port Monitoring, Airbase Monitoring and Land Cover Classification with RADARSAT-2</u>	983
Jayanti J. Sharma, Sebastien Tremblay-Johnston, Oliver Meynberg and Ron Caves (MDA, Canada)	

<u>Unsupervised learning method for SAR image classification based on spiking neural network</u>	988
Jiankun Chen (University of Chinese Academy of Sciences, China); Xiaolan Qiu (Institute of Electronics, Chinese Academy of Sciences, China); Han Chuanzhao (Beijing Remote Sensing Institute, China); YiRong Wu (National Key Laboratory of Microwave Imaging Technology, China)	

<u>Ship Detection based on M2Det for SAR images under Heavy Sea State</u>	992
Yingbo Dong (Institute of Remote Sensing and Digital Earth, CAS, China); Bo Zhang (Institute of Remote Sensing and Digital Earth Chinese Academy of Sciences, China); Hong Zhang and Chao Wang (Institute of Remote Sensing and Digital Earth, CAS, China); Liutong Li (Aerospace Information Research Institute, CAS, China)	

C.8: Advanced Processing Techniques I

Chair: Joachim H. G. Ender (Fraunhofer FHR & Universität Siegen, Germany)

- [Statistical based CNN algorithm for SAR image despeckling](#)..... 996
Sergio Vitale (Università di Napoli Parthenope); Giampaolo Ferraioli and Vito Pascazio (Università di Napoli Parthenope, Italy)
- [Multistatic SAR Image Formation for Nonzero Cross Track Baselines](#)..... 1001
Ozan Dogan (Delft & TU Delft, The Netherlands); Faruk Uysal and Paco Lopez Dekker (Delft University of Technology, The Netherlands)
- [An Innovative Spaceborne SAR Concept with Low PRF: Using Inner-Pulse Doppler Effects for Doppler Spectrum Recovery](#)..... 1005
Zi-Xuan Zhou (University of Chinese Academy of Sciences, China); Yunkai Deng and Robert Yu Wang (Aerospace Information Research Institute, Chinese Academy of Sciences, Beijing, China)
- [Reflector-Based SAR Systems with Digital Beamforming: Optimizing Performance by Variable Transmit Signal Bandwidth](#)..... 1010
Sigurd Huber (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany); Alberto Moreira (German Aerospace Center (DLR), Germany)
- [Polar Format Algorithm Based Azimuth-Range Decouple for Sparse SAR Imaging](#)..... 1015
Zhonghao Wei and Yuekun Wang (Nanjing Research Institute of Electronics Technology, China); Long Zhuang (Nanjing Research Institute of Electronics, China)

D.8: Vegetation Structure Measurement by means of multi-baseline SAR (invited)

Chairs: Matteo Pardini (German Aerospace Center (DLR), Germany), Stefano Tebaldini (Politecnico di Milano, Italy)

- [Simulating BIOMASS Tomographic Stacks from Real Data on Forests](#)..... 1019
Mauro Mariotti d'Alessandro and Stefano Tebaldini (Politecnico di Milano, Italy)
- [Analysis of the Requirements for Tomographic SAR Acquisitions for 3-D Forest Structure Applications](#).. 1024
Victor Cazcarra-Bes and Matteo Pardini (German Aerospace Center (DLR), Germany); Konstantinos P. Papathanassiou (German Aerospace Center, Germany)
- [Discrimination of scattering contributions within a structured vegetated volume using PolTomSAR](#)..... 1030
Ray Abdo (IETR- University of Rennes 1, France); Laurent Ferro-Famil (University of Rennes 1, France)
- [A Comparison of Function Bases For Polarization Coherence Tomography in Forest Scenarios](#)..... 1036
Roman Guliaev and Matteo Pardini (German Aerospace Center (DLR), Germany); Konstantinos P. Papathanassiou (German Aerospace Center, Germany)
- [A Comparison of L-band and S-band Interferometry and Tomography of the BERMS Borel Forest with UAVSAR and F-SAR Datasets](#)..... 1039
Scott Hensley (Jet Propulsion Laboratory & Radar Science and Engineering Section, USA); Razi Ahmed (Jet Propulsion Laboratory, USA); Bruce Chapman (Jet Propulsion Laboratory, California Institute of Technology, USA); Brian P Hawkins (Jet Propulsion Laboratory, USA); Marco Lavallo (Jet Propulsion Laboratory, California Institute of Technology, USA); Naiara Pinto (Jet Propulsion Laboratory, USA); Matteo Pardini (German Aerospace Center (DLR), Germany); Konstantinos P. Papathanassiou (German Aerospace Center, Germany); Paul Siqueira (University of Massachusetts, USA); Robert Treuhaft (Jet Propulsion Laboratory, USA)

E.8: Advanced SAR Technology

Chair: Ernst Krogager (Danish Defence Acquisition and Logistics Organization (DALO) & LU-VV06, Denmark)

- [Range Ambiguity Smearing and Suppression: Comparison of Different Azimuth Phase Codes and Opportunities from Multi-Focus Post-Processing](#)..... 1043
Luca Dell'Amore (German Aerospace Center (DLR), Germany); Maxwell Nogueira Peixoto (Aeronautics Institute of Technology (ITA), Brazil); Michelangelo Villano (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany)

<u>High-Resolution Wide-Swath ScanSAR: Opportunities and Trade-Offs of a Novel Exploitation of Radar Bandwidth and PRF</u>	1048
Federica Bordoni (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany)	
<u>A Novel High-Resolution and Wide-Swath SAR Imaging Mode Using Frequency Diverse Planar Array</u> ..	1052
Yashi Zhou (University of Chinese Academy of Science, China); Wei Wang (Chinese Academy of Science, China); Zhen Chen and Qingchao Zhao (University of Chinese Academy of Science, China); Yunkai Deng and Robert Yu Wang (Institute of Electronics, Chinese Academy of Sciences, China)	
<u>A Framework of Multi-Baseline PolInSAR Methods for Robust Forest Height Estimation</u>	1057
Yanzhou Xie and Haiqiang Fu (Central South University, China); Jianjun Zhu and Changcheng Wang (Central South University, China); Qinghua Xie (China University of Geosciences (Wuhan), China & Institute for Computing Research (IUII), University of Alicante, Spain)	

A.9: Airborne & Ground Based SAR Systems II

Chairs: Hubert M.J. Cantalloube (ONERA Université Paris-Saclay, France), Simona Verde (CNR-IREA, Italy)

<u>Experimental results of a K-band SAR system for automotive applications</u>	1063
Damian Gromek (Warsaw University of Technology, Poland); Krzysztof Stasiak (Warsaw University of Technology, Institute of Electronic Systems & XY-Sensing Ltd., Poland); Piotr Samczynski and Krzysztof Radecki (Warsaw University of Technology, Poland)	
<u>Recent results of a UAV-based Synthetic Aperture Radar for remote sensing applications</u>	1068
Marius Engel, Andreas Heinzl, Eric Schreiber, Stephan Dill and Markus Peichl (German Aerospace Center (DLR), Germany)	
<u>Introducing a non-invasive monitoring approach for bridge infrastructure with ground-based interferometric radar</u>	1073
Chris Michel and Sina Keller (Karlsruhe Institute of Technology, Germany)	
<u>High resolution multi-aspect SAR imaging of military vehicles</u>	1078
Patrick Berens, Ingo Walterscheid, Olaf Saalman and Gabriel El-Arnauti (Fraunhofer FHR, Germany)	
<u>IDBSAR : A Weighting on IF Signal Airborne DBF-SAR System and Flight Mission</u>	1082
Yashi Zhou (University of Chinese Academy of Science, China); Robert Yu Wang (Institute of Electronics, Chinese Academy of Sciences, China); Wei Wang (Chinese Academy of Science, China); Pei Wang (Institute of Electronics, Chinese Academy of Sciences, China); Qingchao Zhao (University of Chinese Academy of Science, China); Yunkai Deng and Weidong Yu (Institute of Electronics, Chinese Academy of Sciences, China)	

B.9: Classification via ML/DL

Chairs: Chao Wang (Institute of Remote Sensing and Digital Earth, CAS, China), Xiao Xiang Zhu (German Aerospace Center (DLR), Remote Sensing Technology & Technical University of Munich (TUM), Signal Processing in Earth Observation, Germany)

<u>Land Cover Classification with Generated Full-Polarization SAR Data From Single-Polarization SAR Data Using Deep Convolutional Neural Network</u>	1086
Yancui Duan and Si-Wei Chen (National University of Defense Technology, China)	
<u>High-resolution SAR image large area built-up extraction based on improved BN U-Net --a case study of the North China Plain</u>	1090
Juanjuan Li, Fan Wu, Hong Zhang and Chao Wang (Institute of Remote Sensing and Digital Earth, CAS, China)	
<u>SAR Target Recognition Based on Enhanced Discriminant Feature Learning</u>	1094
Jun Guo, Ling Wang, Daiyin Zhu and Chang yu Hu (Nanjing University of Aeronautics and Astronautics, China)	

<i>Generative Adversarial Networks for Synthesizing InSAR Patches</i>	1099
Philipp Sibler (Hensoldt Sensors GmbH & TUM-DLR, Germany); Yuanyuan Wang (Technical University of Munich & German Aerospace Center, Germany); Stefan Auer and Syed Mohsin Ali (German Aerospace Center, Germany); Xiao Zhu (Technical University of Munich, Germany)	

C.9: Advanced Processing Techniques II

Chair: Paco Lopez Dekker (Delft University of Technology, The Netherlands)

<i>Staggered SAR: Recent Advances and Design Trade-Offs</i>	1105
Michelangelo Villano (German Aerospace Center (DLR), Germany); Maxwell Nogueira Peixoto (Aeronautics Institute of Technology (ITA), Brazil); Nertjana Ustalli (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany); Alberto Moreira (German Aerospace Center (DLR), Germany)	

<i>A New Approach of Terrain Estimation using Multi-aspect Satellite SAR Imagery</i>	1111
Shanshan Feng (Aerospace Information Research Institute, Chinese Academy of Sciences & Key Laboratory of Technology in Geospatial Information Processing and Application System, Institute of Electronics, Chinese Academy of Sciences, China); Yun Lin, Yanping Wang and Wenjie Shen (North China University of Technology, China); Fei Teng (Aerospace Information Research Institute, Chinese Academy of Sciences, China); Wen Hong (National Key Laboratory of Microwave imaging Technology & Institute of Electronics, Chinese Academy of Sciences, China)	

<i>Unconventional Sources of Error in High-Resolution Wide-Swath SAR Systems based on Scan-On-Receive</i>	1116
Federica Bordoni (German Aerospace Center (DLR), Germany); David Lind (DLR, Germany; Lund University, Sweden); Andreas Jakobsson (Lund University, Sweden); Gerhard Krieger (DLR, Germany)	

<i>Antenna Pattern Synthesis Using GA-PMA for Range Ambiguity Suppression of Spaceborne SAR</i>	1120
Ce Yang (University of Chinese Academy of Sciences & Chinese Academy of Sciences, China); Naiming Ou and Yunkai Deng (Institute of Electronics, Chinese Academy of Sciences, China); Nan Wang (Institute of Electronics, China); Robert Yu Wang (Institute of Electronics, Chinese Academy of Sciences, China); Zhang Yan Yan (Chinese Academy of Sciences & University of Chinese Academy of Sciences, China)	

<i>Analysis of Elevation-based Distributed SAR Imaging Concepts</i>	1125
Nguyen Phuong Mai (Microwaves and Radar Institute, DLR, Germany); Marc Rodriguez-Cassola and Gerhard Krieger (DLR, Germany)	

D.9: Sparse, MIMO, Distributed, and Circular-SAR

Chair: Ingo Walterscheid (Fraunhofer FHR, Germany)

<i>Parameter Design of Circular SAR System Based on Near-space Supersonic Vehicle</i>	1131
Yu Hong and You-lin Wang (Nanjing Research Institute of Electronics Technology, China)	

<i>On feasibility of a distributed SAR formation of mini satellites aiming at emulating the present state-of-the-art SAR systems</i>	1135
Daniele Mapelli (ARESYS, Italy); Davide Giudici (Aresys srl, Italy); Pietro Guccione (Politecnico di Bari, Italy); Adriano Persico (Aresys srl, Italy); Andrea Monti-Guarnieri (Politecnico di Milano, Italy); Fabio Rocca (Politecnico di Milano (emeritus), Italy); Nicolas Gebert (European Space Agency & ESTEC, The Netherlands)	

<i>Study on millimeter-wave imaging method for sparse cylindrical array</i>	*
WeiXian Tan and Lizhen Hu (College of Information Engineering, Inner Mongolia University of Technology, Hohhot, China)	

E.9: Advanced SAR Modes & Techniques

Chair: Christoph Heer (Airbus Defence and Space, Germany)

<i>Detection of Structure Lines in 2D and 3D Synthetic Aperture Radar Data</i>	1141
Tobias Bolz and Uwe Soergel (Institute for Photogrammetry, University of Stuttgart, Germany)	

<u>Two-Dimensional Range Ambiguity Suppression in Multichannel SAR using Blind Source Separation Method</u>	1146
Ershad Junus Amin (DLR Institut für Hochfrequenztechnik und Radarsysteme, Germany); Marwan Younis (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany)	
<u>Chirp Selection and Data Compression for Spaceborne Wide-Swath SAR in FScan-Mode</u>	1151
Rolf Scheiber (German Aerospace Center (DLR), Germany); Michele Martone and Nicola Gollin (German Aerospace Center, Germany)	
<u>NewSpace SAR: Disruptive Concepts for Cost-Effective SAR System Design</u>	1157
Michelangelo Villano (German Aerospace Center (DLR), Germany); Maxwell Nogueira Peixoto (Aeronautics Institute of Technology (ITA), Brazil); Luca Dell'Amore (German Aerospace Center (DLR), Germany); Se-Yeon Jeon (DLR, Germany); Nertjana Ustalli (German Aerospace Center (DLR), Germany); Jan Krecke (The University of Auckland, New Zealand); Josef Hermann Martin Mittermayer (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany); Alberto Moreira (German Aerospace Center (DLR), Germany)	
<u>A TerraSAR-X Experiment for Validation of Nadir Echo Suppression through Waveform Encoding and Dual-Focus Post-Processing</u>	1163
Se-Yeon Jeon (DLR, Germany); Thomas Kraus (German Aerospace Center (DLR), Germany); Ulrich Steinbrecher (DLR, Germany); Michelangelo Villano (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany)	

A.10: COSMO-SkyMed

Chairs: Filippo Biondi (University of L'Aquila & Italian Ministry of Defence, Italy), Diego Calabrese (Thales Alenia Space Italia, Italy)

<u>Very High Resolution and Frequent Revisiting SAR Systems Applied to the Environmental Protection: a contribution based on the use of COSMO-SkyMed Interferometric Data</u>	1168
Gianfranco Fornaro, Carlo Noviello, Antonio Pauciuolo, Diego Reale, Eugenio Sansosti, Simona Verde and Virginia Zamparelli (CNR-IREA, Italy); Leonardo Cascini (University of Salerno, Italy); Lucrezia Cascini (University of Naples Federico II, Italy); Nicola D'Agostino (INGV, Italy); Caterina Di Maio (Università della Basilicata, Italy); Roberta Giuliani (Civil Protection Department, Italy); Giovanni Gullà (CNR-IRPI, Italy); Gianfranco Nicodemo and Dario Peduto (University of Salerno, Italy)	
<u>Detecting aquaculture platforms using COSMO SkyMed</u>	1173
Armando Marino (The University of Stirling, United Kingdom (Great Britain)); Ferdinando Nunziata (Università di Napoli Parthenope, Italy); Luis Gonzalez Vilas (The University of Vigo, Spain)	
<u>Update on Mosul dam destabilization. Displacement, velocity and acceleration estimation for infra-image vibrations versus multi-temporal phenomena</u>	*
Filippo Biondi (University of L'Aquila & Italian Ministry of Defence, Italy); Matthias Weiß (Fraunhofer FHR, Germany)	

C.10: Advanced Technology & Concepts

Chair: Martin Stangl (Airbus Defence and Space, Germany)

<u>W-band Multifunctional 4-by-4 MIMO SAR System for Advanced SAR Operations</u>	1179
Jeongbae Kim, Sumin Kim and Uimin Lee (Yonsei University, Korea (South)); Se-Yeon Jeon (DLR, Germany); Minh Ka (Yonsei University, Korea (South))	
<u>IED Command Wire Detection with Multi-Channel Drone Radar</u>	1185
Matern Otten and Miguel Caro Cuenca (TNO, The Netherlands); María García Fernández (University of Oviedo, Spain)	
<u>A Novel High-Resolution and Wide-Swath SAR Imaging Mode</u>	1189
Yanyan Zhang (University of Chinese Academy of Sciences & Chinese Academy of Sciences, China); Robert Yu Wang (Institute of Electronics, Chinese Academy of Sciences, China)	

<i>An Accurate Resampling Strategy for Spaceborne SAR with PRI Variation</i>	1195
Zi-Xuan Zhou (University of Chinese Academy of Sciences, China); Yunkai Deng and Robert Yu Wang (Aerospace Information Research Institute, Chinese Academy of Sciences, Beijing, China)	

<i>On-Ground RFI Removal from SAR Images with DBF-based Measurements and Autoregressive Modelling</i>	1200
Tobias Bollian (Microwaves and Radar Institute & German Aerospace Center (DLR), Germany); Marwan Younis (German Aerospace Center (DLR), Germany); Gerhard Krieger (DLR, Germany)	

D.10: Bi-, Multistatic, and Passive SAR

Chair: Fabrizio Santi (Sapienza University of Rome, Italy)

<i>Preliminary Result of Unmanned Vehicle MIMO SAR Tomography</i>	1205
Linghao Li, Yan Wang, Zegang Ding, Minkun Liu, Gen Li and Guanxing Wang (Beijing Institute of Technology, China)	

<i>Analysis of a POD-based Approach for Phase and Time Synchronization of Bistatic and Multistatic SAR Systems</i>	1210
Eduardo R Silva, Filho (German Aerospace Center, Germany); Marc Rodriguez-Cassola (DLR, Germany)	

<i>Synchronization Signal Interference Analysis for Tandem-L</i>	1216
Maximilian Schandri (DLR - HR, Germany); Patrick T.P. Klenk and Markus Bachmann (German Aerospace Center (DLR), Germany)	

<i>An Advanced Non-Interrupted Phase Synchronization Scheme with Internal Calibration for LT-1</i>	1220
Da Liang (Aerospace Information Research Institute, Chinese Academy of Sciences, China); Heng Zhang and Robert Yu Wang (Institute of Electronics, Chinese Academy of Sciences, China)	

<i>Data-driven clock drift compensation for airborne bistatic SAR</i>	1225
Karlus Alexander Camara de Macedo (Metasensing c/o Karlus AC de Macedo, The Netherlands); Gerard Masalias and Alex Coccia (MetaSensing, The Netherlands); Adriano Meta (MetaSensing, Italy)	

E.10: SAR Processing and Correction

Chair: Filippo Biondi (University of L'Aquila & Italian Ministry of Defence, Italy)

<i>Efficient Clutter and Noise Filtering for Improved ISAR Imaging</i>	1229
Stefan V. Baumgartner (German Aerospace Center (DLR), Germany); Sushil Kumar Joshi (German Aerospace Center (DLR), Germany)	

<i>How to handle spatial correlations in SAR despeckling? Resampling strategies and deep learning approaches</i>	1233
Emanuele Dalsasso (Télécom Paris, France); Loic Denis (Université Jean Monnet, France); Florence Tupin (Télécom ParisTech, France)	

<i>Range Migration Algorithm with Improved Two-Step Motion Compensation</i>	1239
Angel Ribalta (Fraunhofer FHR, Germany)	

<i>A Novel Nonlinear Frequency Modulation Waveform Optimization Method Based on Time-Frequency structure Design</i>	1244
Yajun Long (Aerospace Information Research Institute, Chinese Academy of Sciences & University of Chinese Academy of Sciences, China); Fengjun Zhao and Robert Yu Wang (Aerospace Information Research Institute, Chinese Academy of Sciences, China); Guodong Jin (Nanjing University of Aeronautics and Astronautics, China)	

* Paper was not available