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8th International Conference «Engineering and Telecommunication — En&T-2021»

The Conference is held online

PROGRAM

November 24–25, 2021

Moscow
MIPT
2021

Organizers

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ПУБЛИЧНОЕ АКЦИОНЕРНОЕ ОБЩЕСТВО РАДИОФИЗИКА

НПО АЛМАЗ

ЭКСПОНЕНТА
ЦЕНТР ИНЖЕНЕРНЫХ ТЕХНОЛОГИЙ И МОДЕЛИРОВАНИЯ

NATIONAL INSTRUMENTS

NOVEMBER 24, 2021

9:30-10:00
To register as a participant, use the link

10:00-10:20

Welcome speech by Prof. Sergey Garichev, Chairman of the Conference Organizing Committee, Vice-Rector MIPT on Research and Developments, Laureate of the Russian Government Prize, Russia

Welcome speech by Prof. Alexander Dvorkovich, Chairman of the Conference Program Committee, Corresponding Member RAS, MIPT, Russia

Welcome speech by Prof .Vadim A. Kaloshin, Chair of Russia Section AP Chapter & Russia Section ED/MTT/AES Joint Chapter, Kotelnikov Institute of Radioengineering and Electronics of RAS, Russia

Plenary Session

Moderator: ***Prof. Alexander Dvorkovich, Corresponding Member RAS, MIPT, Russia***

10:20-10:40

Interactive Reflex Biometrics

Valery A. Konyavsky, Doctor of Technical Sciences, Head of the Department of Information Security, MIPT, Russia

Nikolay A. Kuznetsov, Acadevician of the RAS, Doctor of Technical Sciences, Professor, Head of Head of the Department of Infocommunication systems and networks, MIPT, Russia

Andrey M. Raigorodskii, Doctor of Physical and Mathematical Sciences, Professor, Head of the MIPT-Sberbank laboratory, MIPT, Russia

S. A. Trenin, I. A. Abdullaeva, MIPT-Sberbank laboratory, MIPT, Russia

10:40-11:00

Information Processing Methods in Ergatic Robotic Systems

Roman V. Meshcheryakov, Doctor of Technical Sciences, Professor, Institute of Control Sciences RAS, Russia

11:00-11:20

Modern Photonic Communication Systems and Perspectives of Their Development

Vladimir M. Vishnevsky, Doctor of Technical Sciences, Professor, V. A. Trapeznikov Institute of Control Sciences RAS, Russia

Konstantin A. Vytovtov, Doctor of Technical Sciences, Professor, V. A. Trapeznikov Institute of Control Sciences RAS, Russia

Elizaveta A. Barabanova, Doctor of Technical Sciences, V. A. Trapeznikov Institute of Control Sciences RAS, Russia

NOVEMBER 24, 2021

11:20-11:40

Internet of Light: System Design and Applications
Jintao Wang, Professor, Department of Electronic Engineering, Tsinghua University, China

11:40-12:00

Multi-beam Antennas for New Applications
Vadim A. Kaloshin, Doctor of Physical and Mathematical Sciences, Kotel'nikov Institute of Radio Engineering and Electronics of RAS, Russia

12:00-13:30 Lunch

13:30-17:10

Round-table «6G Absorption and 3D-connectivity» colocated with the International Summit on 6G networks (6G Summit R&D Russia)

Moderators: ***Prof. Konstantin E. Samouylov, Dr. Tech. Sc., RUDN University, Russia***
Prof. Yevgeni A. Koucheryavy, Dr. Tech. Sc., Tampere University, Finland

The 6G Summit R&D Russia is a continuation of the series of international summits held annually by RUDN University. The Summit will provide a convenient platform for the industry leaders, innovators, and researchers from both industry and academia to collaborate and share their ideas related to the novel 6G technology that can, in turn, facilitate its development, standardization, and implementation.

Summit language is ***English***

13:30-13:45

Welcoming remarks. Purpose and order of Summit
Konstantin E. Samouylov, professor, Dr. Tech. Sc., RUDN University, Russia
Yevgeni A. Koucheryavy, professor, Dr. Tech. Sc., Tampere University, Finland

13:45-14:05

COST Action CA20120 — Intelligence-Enabling Radio Communications for Seamless Inclusive Interactions (INTERACT)
Laurent Clavier, IMT Nord Europe, France)

14:05-14:15 Questions

14:15-14:35
Innovations in Applied AI and 5G: Space, Biometrics and Healthcare
Rami Qahwaji, University of Bradford, United Kingdom

14:35-14:45 Questions

14:45-15:05
Enabling Massive Industrial Applications in 5G+ Ecosystem
Jiri Hosek, Brno University of Technology, Czech Republic

15:05-15:15 Questions

15:15-15:30 **Break**

15:30-15:50
Towards 6G Non-Terrestrial Networks
Giuseppe Araniti, University Mediterranea of Reggio Calabria, Italy

15:50–16:00 **Questions**

16:00–16:20
Exploring the Potential of Blockchains with BoCA A Blockchain-of-Custody Application for Data Preservation
Thomas Martin, Mohammad Hammoudeh, Manchester Metropolitan University, United Kingdom

16:20–16:30 **Questions**

16:30–16:50
Cyber Threat Hunting and Intelligence in IoT Environments
Ali Dehghantanha, University of Guelph, Canada

16:50–17:00 **Questions**

17:00-17:10 **Closing**

NOVEMBER 25, 2021

10:00-19:00 Session 1. Telecommunication technologies and networks

Moderators: ***Prof. Alexander V. Dvorkovich, MIPT, Russia***

Efficient Implementation of Interleaved Partition-based PTS with Low Complexity
Kien Vu Van, Nghia Tran Van, Hieu Dang Trung

New Clipping-and-Filtering for Peak-to-Average Power Ratio Reduction in OFDM
Tran Nghia, Dang Hieu

Nonlinear MIMO Receiver with Low Complexity
Ivan N. Kolesnikov, Michail Kirichenko, Vladimir Lyashev

A Study of the Impact of the Contention Window on the Performance of IEEE 802.11bd Networks with Channel Bonding
Viktor A. Torgunakov, Vyacheslav A. Loginov, Evgeny M. Khorov

Methods for Improving the Accuracy of Frequency Shift Estimation in 5G NR
Edgar M. Dmitriyev, Vladimir Milyutin, Eugeny Rogozhnikov, Kirill Petrovskiy, Dmitiy Pokamestov, Serafim Novichkov

The Transmission Test and Demonstration for 8K Ultra-high Definition TV Services Using DTMB-A
Yunchuan Huang, Changyong Pan, Chao Zhang, Ying Chen

The Model of Conjoint Servicing of Real Time and Elastic Traffic Streams Through Processor Sharing (PS) Discipline with Access Control
Andrabi Umer Mukhtar, Sergey N. Stepanov, Mikhail S. Stepanov, Margarita G. Kanishcheva, Habinshuti Francois Xavier

On the Concatenated Code Construction for Slotted Non-Orthogonal Multiple Access
Aleksey Kuvshinov, Fedor Ivanov

Frequency Selective MIMO precoding in Time Domain
Alexander I. Sherstobitov, Natalia Solomennikova, Vladimir Lyashev

Spatial-consistently shifted antenna methodology for DAS modeling in NR V2X applications
Sergey N. Trushkov, Vitaliy V. Kuptsov, Oleg A. Shmonin, Alexander O. Kokarev

Code-Domain NOMA Solutions for Wireless Uplink
Daria T. Ustinova, Anton A. Glebov, Serafim A. Novichkov

Enabling Synchronous Uplink NOMA in Wi-Fi Networks
Aleksey A. Kureev, Grigory Korolev, Evgeny M. Khorov, Andrey Lyakhov

An automatic Alignment Bidirectional Visible Light Communication System Based on Red Laser Diode
Li Jiaming, Chai Shuzhou, Zheng Di, Zhang Hongming, Song Jian

Simplified Single-Scatter Path Loss Model of LED-based Non-Line-of-Sight Ultraviolet Communications
Gao Xinyu, Tian Cao, Hongming Zhang, Changyong Pan, Jian Song

Energy Efficiency Comparison of the OFDM and FBMC Modulations for Wi-Fi 7 in the Presence of the Complex Nakagami-m Fading
Tatiana K. Artemova, Aleksey S. Gvozdarev, Ilya V. Kanaev, Konstantin S. Artemov

Implementation of 2-ray Modeling for Mimo outdoor Scenario
AL Tahar Inas Anouar

Statistical Correlations in Active Matter Based on Robotic Swarms
Vadim Porvatov, Alexey Dmitriev, Alina Rozenblit, Anastasia Molodtsova, Ekaterina Puhtina, Oleg Burmistrov, Dmitry Filonov, Anton Souslov, Nikita Olekhno

Scheduling Algorithms in Cellular MIMO Systems
Vladislav Matyukhin, Alexey Chernov, Maksim Zherebyatew, Artem Teleluhin, Yaroslav Bogdanov, Julia Chernova

The fast CU splitting method based on CU size, quantization parameters and difference of variances ***Vsevolod Sergeev, Alexander V. Dvorkovich***

An integrated indoor VLC+PLC system for video broadcasting and positioning
Pan Changyong, Li Dejian, Hu Yi, Zhang Guodong, Yang Hui, Song Jian

A Scheme of Visible Light Indoor Positioning Based on Image Communication
Li Dejian, Hu Yi, Wu Feng, Yang Fang, Yang Hui, Zhang Hongming

10:00-19:00 Session 2. Radio Communication and radar systems (Subsession 1)

Moderator: ***Prof. Sergey P. Skobelev, PJSC «Radiophysics», Russia***

Simple Polynomial Windows for Spectral Analysis of Signals That Minimize the Spectrum Sidelobe Level on a Segment of the Frequency Axis
Gennady V. Zaytsev, Alexander D. Khzmalyan

Design and Simulation of Nano scale FIN FET Using Silvaco TCAD
Saurabh Raman, Tripathi Pramod Narayan, Bhasme Sarang Balasaheb, Alexey Nazarov

A Method of Auxiliary Surface Currents in 2D Problems of Electromagnetic Scattering by Penetrable Cylinders
Dmitrii A. Borisov, Sergei P. Skobelev

A Modification of the Hybrid Projection Method for Analysis of Doubly Periodic Structures with Inhomogeneous Magneto-Dielectric Elements
Yana I. Chizhevskaya

Block Structure of the Mathematical Models of Dipole Arrays
Maksim G. Vakhitov, Denis S. Klygach, Amur B. Khashimov

Permittivity Measurement for Powder Materials Using a Volumetric Strip-slot Junction
Maksim G. Vakhitov, Denis S. Klugach, Amur B. Khashimov, Nikolay V. Dudarev, Dmitrii G. Fomin

Multilayer Printed Radiator on Two Circular Polarizations for Wide-Angle Scanning Kaband Tx/Rx Phased Array
Ruslan A. Kolesnikov, Yuri B. Korchemkin, M. S. Uhm, S. H. Yun

Shaping of Flat-Topped Element Patterns in Phased Arrays of Coupled Multimode aveguides of Hexagonal Cross Section
Kirill M. Sidorov, Sergei P. Skobelev

Features of Calibration of Large Stationary Phased Array Antennas
Alexander M. Shitikov, Yegor V. Korotetskiy, Vladimir V. Denisenko

Some Features of Generalized Mikaelian Lens with Negative Refractive Index
Mikhail M. Kushneryov, Sergei P. Skobelev

Millimeter Wave Reflector Antenna with Wide Angle Mechanical Beam Scanning
Alexey Tobolev, Alexander V. Shishlov

Modelling of a Small-sized Waveguide Radiator with Elliptical Polarization
Elchin V. Gadzhiev, Elena Ovchinnikova, Nguen Dinh To, Svetlana G. Kondratyeva, Pavel A. Shmachilin, Maxim Sokov

A Miniaturized Planar Antenna with Optimized Slots and DGS for UWB Applications
Singh Aditya Kumar, Dwivedi Ajay Kumar, Signh Vivek, Yadav R.S

Scattering Matrix Simulation of Broadband Band-pass Filter Based on a Multilayer Technology
Dmitry G. Fomin, Nikolay V. Dudarev, Stanislav N. Darovskikh

The Design of a Directional Coupler Made on Microstrip Structures
Abdulmusavvir A. Karimov, Chorshanbe B. Ravshanov, Dilshod Ch. Ravshanov

Microstrip High Bandwidth Directional Couplers with Reduced Area
Abdulmusavvir A. Karimov, Dilshod Ch. Ravshanov, Khairullo M. Khojanazarov, Rakhmonali Z. Makhmadulloev

A Diagram-Forming Scheme Implemented According to the Butler Matrix Scheme
Abdulmusavvir A. Karimov, Chorshanbe B. Ravshanov, Dilshod Ch. Ravshanov

10:00-19:00 **Session 2. Radio Communication and radar systems (Subsession 2)**

Moderator: ***Prof., Vladimir E. Farber, PJSC «Radiophysics», Russia***

Experimental Study of Channel Frequency-Correlation in an Indoor Multipath Environment for Wireless Key Generation
Aidar A. Galiev, Amir I. Sulimov, Arkadiy V. Karpov

Beam-Domain Interference Mitigation System Concept in Application to Automotive Radar
Igor V. Artyukhin, Ilya M. Averin, Victor T. Ermolaev, Alexey E. Rubtsov, Alexander G. Flaksman, Evgeny A. Dombrovsky, Denis D. Bareev

The Perspective of Inverse Synthesis Application for SAR Satellite Acceptance Tests
Denis V. Orlov, Alexander I. Kovalenko

A Two-frequency Compact Klystron Three-gap Resonator with a Suspended Dielectric Substrate
Maxim Chernyshev, Yuri Miroshnichenko, Vladislav Tsarev, Natalia Akafyeva

Double-Gap Klystron Photonic Crystal Resonator with Stripe Lines on a Dielectric Substrate
Alexey Miroshnichenko, Vladislav Tsarev, Andrey Gnusarev, Natalia Akafyeva

Satellite Signal Attenuation due to Dust Storms
Nasir Samah Abbas, Alexander Samoilov, Al Tahar Inas

Analytical Description of Chaotic Radio Pulse Receiver
Yuri V. Andreyev

Satellite Radio Monitoring Stations Observation Planning: Time Alignment Observation Algorithm ***Vasiliy S. Grigorev, Alexander V. Ksendzuk***

Technique for Suppressing Additive and Multiplicative Noises
Gennadiy V. Slyozkin, Andrey N. Degtyaryov

Analysis of the Efficiency of Radar Target Classification by Heinen Polarization Parameters in the Monostatic Configuration ***Artyom A. Kopylov, Igor V. Zimin***

Height Estimation of Atmospheric Reentry of Vehicle Tracked With LFM Waveforms
Mariya A. Murzova, Vladimir E. Farber, Boris A. Levitan, Sergey Topchiev

Data Association for Multi-Object Tracking Using Assignment Algorithms
Le Ba Thanh

Low Complexity DVB-S2X Frequency Synchronization for LEO Satellites
Konstantin K. Iansitov, Semyon V. Dorokhin, Sergey A. Levichev, Liubov A. Antiufrieva, Alexander V. Dvorkovich

10:00-19:00 Session 3. Computing systems and data processing

Moderator: ***Roman V. Meshcheryakov, Dr. Tech. Sc., Professor, Russia***

Embedded Online Machine Learning
Nikita E. Yudin, Dmirty Kamzolov, Vadim V. Sinolits, Alexey V. Erchenko, Pavel G. Golovkin

Security of the Cryptosystem GPT Based on Rank Codes and Term-rank Codes
Pham Huu Loc, Le Thi Trang Linh, Nguyen Du Hoan

Implementation of the Reputation Model for Secure Routing Based on the OLSR Protocol
George A. Litvinov, Evgeny V. Shcherba

Algorithm of Risk Assessment System in the Task of Identifying Destructive Content in Social Networks
Mark V. Mamchenko, Anastasiya S. Rey

Xtext Grammar of Driver Logical Condition Factor
Habinshuti Francois Xavier, Umer Mukhtar Andrabi

Efficient Hardware-agnostic DBMS Operator Implementation Using SYCL
Petr Kurapov, Daria Nikolskaia, Daniil Kulikov

Model for Analysis and Classification of User Actions of the Same Type
Pavel V. Pilkevich, Vitaliy Lutsishen, Mariya Ozhiganova

Trust Model, Reliability Theory in Theory of Secrecy
Alexander I. Kolybelnikov

Guest System Call Execution by the Application Level Binary Compiler x86-Elbrus
Elizaveta S. Noskova, Alexander F.Rozhin

Optimization of the Prediction of the near-Earth Space Objects Trajectory by Interpolation of Gravitational Pulling Force and Atmospheric Density
George Martvel

Specifics of Communication Organization and Attacks on Medical Cyber-Physical Devices
Maria A. Poltavtseva, Anna N. Kharitonova, Daria S. Lavrova

On the Efficiency of Combinatorial Generation for Adaptive Image Steganography
Anna S. Melman, Oleg O. Evsutin, Yuriy V. Shablya

Simulation of high-dimensional neurons based on memristive devices
Sergey Shchanikov, Alexey Mikhaylov, Victor Kazantsev, Valeri Makarov

Performance Impact of Error Correction Codes in RNS with Returning Methods and Base Extension
Mikhail G. Babenko, Egor Shiryaev, Ekaterina Bezuglova, Andrei Tchernykh, Pulido-Gaytan Bernardo, Cortés-Mendoza Jorge M.

Elbrus-2C3: a Dual-Core VLIW Processor with Integrated Graphics
Yuri A. Nedbailo, Mikhail V. Slesarev, Alexander I. Troosh, Ignat N. Bychkov, Pavel A. Chuchko, Egor G. Panchenko

10:00-19:00 Session 4. Artificial intelligence systems (AI) in telecommunications

Moderator: ***Mikhail S. Burtsev, Head Laboratory of Neural Systems and Deep Learning, MIPT, Russia***

Are Neural Networks the Best Way for Encrypted Traffic Classification
Danil Shamsimukhametov, Mikhail Liubogoshchev, Evgeny M. Khorov, Ian Akyildiz

StyleTtransfer in NLP: a Framework and Multilingual Analysis with Friends TV Series
Maria Tikhonova, Sergey Mirzoev, Stanislav Petrov, Elina Telesheva, Polina Tarantsova, Alena Fenogenova

Applying Convolutional Neural Networks for Security in VANET
Denis I. Parfenov, Lyubov S. Grishina, Arthur Yu. Zhigalov, Irina P. Bolodurina

High-performance Software for Memristor-Based Neural Network Simulation and Optimization
Ilya A. Bordanov, Roman R. Mineev, Sergey N. Danilin

Accelerating Extreme Search Based on Natural Gradient Descent with Beta Distribution
Ruslan I. Abdulkadirov, Pavel A. Lyakhov

Development and Research of Algorithms for Recognition of Breast Diseases by Mammographic Images Using Neural Networks
Ilya A. Bordanov, Yulia A. Podgornova, Ivan R. Mankov, Sergey N. Danilin

Research of Financial Time-series Statistical Properties
Ivan Makarov, Maria Kovaleva, Victoria Zinkovich, Valentina Kolovertnova

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A Deep Neural Network Architecture for Solving Classification Problems on Multidimensional Time Series of Financial Markets
Ivan Makarov, Maria Kovaleva, Ekaterina Pankovets, Dmitry Konstantinov

Applicability of the kNN Algorithm in the Problem of Pattern Classification on Time Series of Financial Markets
Ekaterina Zakharova, Ivan Makarov, Maria Kovaleva, Roman Gorbachev

Intelligent Module for System Trading of Financial Markets Assets Based on an Ensemble of Deep Neural Networks and the DQN Learning Algorithm
Ivan Makarov, Maria Kovaleva, Timur Fakhrutdinov, Roman Gorbachev

Forecasting in Financial Markets Using the ADAM Architecture and Reinforcement Learning Methods
Ivan Makarov, Timur Fakhrutdinov, Margarita Kichik, Konstantin Mamontov, Oleg Baskov, Sergey Shumsky

Software and Methodological Toolkit for the Design and Development of Technical Devices in the Model-Based Systems Engineering Paradigm
Denis Shpotya, Alexey Romanov

Notes on the Pursuit-Evasion Games between Unmanned Aerial Vehicles Operating in Uncertain Environments
Mikhail V. Khachumov, Vyacheslav M. Khachumov

Development and Research of a Deep Neural Network Architecture for Solving Regression Problems on Multidimensional Time Series of Financial Markets
Dmitry Konstantinov, Ekaterina Pankovets, Ivan Makarov, Roman Gorbachev

Composite Data Preparation Algorithm for SAR Imagery Object Recognition
Nikita Grishin, Arina Lozhkina, Kirill Bukharov, Daniil Makhotkin, Vladislav Semenkin

Hardware Implementation of Classical and Bipolar Morphological Models for Convolutional Neural Network
Daniil M. Alfonso, Mark O. Tsoy, Elena E. Limonova

Signalization of Objects on the Sonar Images Using Neural Network Segmentation Methods
Daniil R. Makhotkin, Nikita Koltok, Nikita Grishin, Kirill Bukharov, Vladislav Semenkin

Memory Transformer with Hierarchical Attention for Long Document Processing
Mikhail S. Burtsev, Al Adel Arij

19:00 **Conference closing**