

**XXV International Conference
WECONF-2022**

**«2022 WAVE ELECTRONICS AND ITS
APPLICATION IN INFORMATION
AND TELECOMMUNICATION SYSTEMS»**

(IEEE Conference Record #55058)

30 May to 03 June 2022

CONFERENCE PROGRAM

**St-Petersburg
2022**

CONFERENCE ORGANIZERS

SAINT PETERSBURG STATE UNIVERSITY OF AEROSPACE INSTRUMENTATION (ST. PETERSBURG, RUSSIA)

IEEE – INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS

INSTITUTE OF RADIO AND INFORMATION SYSTEMS – IRIS (VIENNA, AUSTRIA)

INSTITUTE OF RADIOENGINEERING AND ELECTRONICS OF RUSSIAN ACADEMY OF SCIENCES (MOSCOW, RUSSIA)

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CONFERENCE SECTIONS*

CHAPTER 1. Acoustooptics (*Акустооптика*)

CHAPTER 2. Acoustoelectronics (*Акустоэлектроника*)

CHAPTER 3. Methods and devices of information processing
(*Методы и устройства обработки информации*)

CHAPTER 4. Data processing and transmission in information and telecommunication systems
(*Обработка и передача информации в инфокоммуникационных системах*)

CHAPTER 5. Round table «Acoustoelectronics and acoustooptics: problems, prospects and applications»
(*Круглый стол «Акустооптика и акустоэлектроника: проблемы, перспективы и области применения»*)

CHAPTER 6. Electromechanics and control systems
(*Встроенные микроэлектронные системы*)

CHAPTER 7. Microelectronic Embedded Systems
(*Электромеханика и системы управления*)

CHAPTER 8. Modeling and situational quality management in electronics and instrumentation
(*Моделирование и ситуационное управление качеством в радиоэлектронике и приборостроении*)

CHAPTER 9. Instrumentation and Intelligent Transportation Systems
(*Приборостроение и интеллектуальные транспортные системы*)

*Доклады в программе внутри секций перечислены в алфавитном порядке по фамилии первого автора. По согласованию с председателем секции порядок следования докладов может быть изменен.

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MAY 30 (10:30 – 14:30)

10:30 – 11:00 REGISTRATION OF PARTICIPANTS

11:00 – 11:30 CONFERENCE OPENING

11:30 – 14:30 PLENARY SESSION

MAY 31 – JUNE 2

SECTION MEETINGS

JUNE 3 (11:00 – 12:00)

**CLOSING OF THE CONFERENCE. SUMMING UP,
AWARDING THE BEST SPEAKERS**

MAY 31 (10:00 – 17:00)

**CHAPTER 1
ACOUSTOOPTICS**

S.P. Anikin, A.I. Chizhikov, V.V. Gurov, V.Ya. Molchanov, K.B. Yushkov

National University of Science and Technology MISIS, Moscow, Russia

**GENERALIZED APPROACH TO SYNTHESIS OF ACOUSTO-OPTIC FILTER
TRANSFER FUNCTIONS BASED ON FRESNEL TRANSFORM**

A.S. Beliaeva, G.E. Romanova

ITMO. ITMO University, St. Petersburg, Russia

A.S. Beliaeva, Y.A. Ryvkina, D.R. Ryabov

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**DESIGN FEATURES OF A TUNABLE SOURCE BASED ON
AN ACOUSTO-OPTICAL TUNABLE FILTER**

Vladimir N. Belyi, Nikolai S. Kazak, Nikolai A. Khilo

Institute of Physics of the NAS of Belarus, Minsk, Belarus

Piotr A. Khilo

Sukhoi State Technical University of Gomel, Gomel, Belarus

**ACOUSTOOPTIC DIFFRACTION OF BESSEL LIGHT BEAMS
OF HALF-INTEGER ORDER IN ANISOTROPIC CRYSTALS**

G.V. Kulak

Mozyr State Pedagogical University named after I.P Shamyakin, Mozyr, Belarus

A.P. Ropot

Institute of Physics of the NAS of Belarus, Minsk, Belarus

O.V. Shakin

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**COLLINEAR ACOUSTO-OPTICAL FILTRATION OF POLYCHROMATIC
AIRY LIGHT BEAMS IN UNIAXIAL CRYSTALS**

S.V. Kulakov

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

G.V. Kulak

Mozyr State Pedagogical University named after I.P Shamyakin, Mozyr, Belarus

A.P. Makarevich

Institute of Physics of the NAS of Belarus, Minsk, Belarus

O.V. Shakin

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

ACOUSTO-OPTICAL MODULATION OF AIRY LIGHT BEAMS IN CRYSTALS

M.I. Kupreychik, V.I. Balakshy, S.N. Mantsevich

Lomonosov Moscow State University, Moscow, Russia

**SPECTRAL-POLARIZATION ACOUSTO-OPTIC FILTRATION
BASED ON ALPHA-IODIC ACID BIAXIAL CRYSTALS**

M.V. Marunin, N.V. Polikarpova

Lomonosov Moscow State University, Faculty of Physics, Moscow, Russia

**POLARIZATION OF ACOUSTIC MODES IN A TWO-DIMENSIONAL
PHONONIC CRYSTAL**

V.Ya. Molchanov, K.B. Yushkov, P.V. Kostryukov, N.F. Naumenko, A.N. Darinskii

National University of Science and Technology MISIS, Moscow, Russia

**ACOUSTO-OPTIC DISPERSIVE DEVICES FOR HIGH-POWER PULSED
LASER OPTICS**

A.I. Morozov, V.E. Pozhar

*Scientific and Technological Center of Unique Instrumentation of Russian Academy
of Sciences, Moscow, Russia*

**STUDY OF ACOUSTO-OPTICAL FILTER CHARACTERISTICS
IN FREQUENCY MODULATION MODE**

N.V. Polikarpova, E.A. Djakonov, I.K. Chizh

Lomonosov Moscow State University, Faculty of Physics, Moscow, Russia

**INVESTIGATION OF THE ACOUSTIC WAVES BEHAVIOR
AT THE MULTIPLE REFLECTION IN PARATELLURITE CRYSTAL**

M.O. Sharikova, A.A. Bykov

NRU "Moscow Power Engineering Institute", Moscow, Russia;

Scientific and Technological Center of Unique Instrumentation of RAS, Moscow, Russia

Y.A. Eliovich, V.I. Akkuratov, Yu.V. Pisarevsky

FSRC «Crystallography and Photonics» of RAS, Moscow, Russia

**HYPERSPECTRAL VISUALISATION OF CRYSTALL INTERNAL
STRUCTURE**

Sergey Titov, Lydia Zykova

Scientific and Technological Center of Unique Instrumentation of RAS, Moscow, Russia

Chih-Chung Huang

National Cheng Kung University, Tainan, Taiwan

Alexander Burlakov

Moscow State University, Moscow, Russia

Aleksey Bogachenkov

Institute of Biochemical Physics of RAS, Moscow, Russia

**HIGH-FREQUENCY ULTRASOUND ECHOCARDIOGRAPHY
OF HEART ACTIVITY OF DANIO RERIO EMBRYO**

MAY 31 (10:00 – 17:00)

**CHAPTER 2
ACOUSTOELECTRONICS**

O.L. Balysheva

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

SAW FILTERS SUBSTRATES FOR 5G FILTERS

T.V. Chernysheva, O.B. Popov, K.V. Orlov, P.S. Sapronov

Moscow Technical University of Communications and Informatics, Moscow, Russia

NOTICEABILITY OF PHASE DISTORTIONS IN CONSONANCE

A.G. Kozlov, T.N. Torgash

*Omsk Scientific Center SB RAS (Institute of Radiophysics and Physical Electronics),
Omsk, Russia*

**ANALYTICAL STUDY OF MICROELECTRONIC PIEZOELECTRIC
RESONATORS BASED ON BULK ACOUSTIC WAVES WITH
AN ALUMINUM-ALUMINUM OXIDE FILM ELECTRODE**

Svetlana N. Kurilkina, Vladimir N. Belyi

Institute of Physics of the NAS of Belarus, Minsk, Belarus

Sergei V. Kulakov

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**SPIN ANGULAR MOMENTUM OF BESSEL ACOUSTIC BEAMS
IN TRANSVERSELY ISOTROPIC CRYSTALS**

O.B. Popov, T.V. Chernysheva, K.V. Orlov, P.S. Sapronov

Moscow Technical University of Communications and Informatics, Moscow, Russia

**RECOGNIZABILITY OF THE SUBSTITUTION OF A CONTINUOUS
SOUND SIGNAL BY A DISCRETELY CHANGING SOUND SIGNAL**

T.N. Torgash, A.G. Kozlov, N.A. Chirikov, V.I. Strunin

*Omsk Scientific Center SB RAS (Institute of Radiophysics and Physical Electronics),
Omsk, Russia*

**INVESTIGATION OF TEMPERATURE EFFECT ON ELECTRICAL
CHARACTERISTICS OF SOLIDLY MOUNTED RESONATOR**

A.R. Zhezherin, A.S. Paraskun

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**ANALYSIS POSSIBILITY APPLICATION SAW STRUCTURE
FOR TEMPERATURE SENSOR**

JUNE 1 (10:00 – 17:00)

**CHAPTER 3.
METHODS AND DEVICES OF INFORMATION PROCESSING**

Polina Y. Afonichkina (*Member IEEE*), **Dmitry S. Silnov**, **Natalia M. Leonova**,
Alexey D. Modyaev

*National Research Nuclear University MEPhI (Moscow Engineering Physics Institute),
Moscow, Russia*

MODEL OF PASSIVE ENDURE ECHOLOCATION

A.R. Bestugin, A.D. Filin

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**THE CONCEPT OF THE DEVELOPMENT OF VIRTUAL ELECTRONIC
COMPLEXES WITH COGNITIVE FUNCTIONS FOR THE TRAINING
OF AVIATION SPECIALISTS**

S.V. Dvornikov, Bestugin A.R., Dvornikov S.S.

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**EVALUATION OF IMMUNITY OF SIGNALS WITH POSITION-PULSE
MODULATION IN OPTICAL COMMUNICATION CHANNELS**

Sergey S. Dvornikov

Military academy of communication, VAS, Saint-Petersburg, Russia

Sergey V. Dvornikov

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

NOISE IMMUNITY OF DUAL MODULATION SIGNALS

Alexandr K. Ermakov, Timur I. Tagaev, Nikolai V. Povarenkin

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**INVESTIGATION OF THE MUSIC SUPER-RESOLUTION ALGORITHM
FOR THE TASKS OF MEASURING THE ANGULAR COORDINATES
OF LOW-FLYING TARGETS**

A.D. Filin, I.A. Kirshina

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**EVALUATION OF THE EFFECTIVENESS OF THE INTRODUCTION
OF AVIATION VIRTUAL ELECTRONIC POLYGONS IN AVIATION**

Grigoriy A. Fokin (*Member IEEE*), **Ilya V. Grishin**

*The Bonch-Bruевич Saint Petersburg State University of Telecommunications,
Saint-Petersburg, Russia*

**DIRECTION OF ARRIVAL POSITIONING REQUIREMENTS
FOR LOCATION-AWARE BEAMFORMING IN 5G MMWAVE UDN**

S.E. Grychkin, E.P. Stroganova

Moscow Technical University of Communications and Informatics, Moscow, Russia

INFLUENCING FACTORS AND UNCERTAINTY IN MEASUREMENTS OF TRANSMITTING RADIO ELECTRONIC EQUIPMENT CHARACTERISTICS

Anastasia V. Guryleva, Valeriya I. Bukova

Scientific and Technological Center of Unique Instrumentation, Russian Academy of Sciences, Moscow, Russia;

Bauman Moscow State Technical University, Moscow, Russia

Alexander S. Machikhin

Scientific and Technological Center of Unique Instrumentation, Russian Academy of Sciences, Moscow, Russia

APPLICATION SOFTWARE FOR VISUALIZATION AND QUANTIFICATION OF CAPILLARY NETWORKS

A.A. Ivanov (Member IEEE), E.P. Denisenko, P.E. Denisenko, A.A. Lustina, V.D. Andreev

Kazan National Research Technical University n. a. A.N. Tupolev-KAI, Kazan, Russia

HARDWARE-SOFTWARE SPECTRUM ANALYZER FOR RADIOPHOTONIC DEVICES FOR DOPPLER FREQUENCY SHIFT AND ITS SIGN MEASUREMENT

Vasily I. Kazakov

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

THERMAL CONVECTIVE FLOW REGISTRATION BY LASER BEAMS SPATIAL CHARACTERISTICS ANALYSIS

I.A. Kirshina, S.V. Dvornikov, S.S. Dvornikov

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

SIGNAL DETECTION AND LOCALISATION IN THE PROCESSED INPUT IMPLEMENTATION MONITORED RADIO COMMUNICATION LINE

Dmitry A. Kostenko

Peter the Great St.-Petersburg Polytechnic University, Saint-Petersburg, Russia

Anton A. Sentsov

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

Sergey A. Ivanov

JSC «SCPA «Leninets», Saint Petersburg, Russia

APPLICATION OF COGNITIVE TECHNOLOGIES IN SOLVING THE RECOGNITION TASK

Valery N. Kovregin, Galina M. Kovregina, Aleksei S. Murzaev

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

METHOD FOR DETECTION/IDENTIFICATION OF SEVERAL AIR OBJECTS WITH A COMPLEX SPECTRUM IN RADARS WITH QUASI-CONTINUOUS CHIRP RADIATION

V.F. Lebedev (*Member IEEE*)

*Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia;
ITMO University, Saint Petersburg, Russia*

**PECULIARITIES OF THE STRUCTURE ANALYSES AND IMPURITY
COMPOSITION OF HPHT- DIAMONDS AT LASER-INDUCED SURFACE
TRANSFORMATION**

Oleg S. Litvinov, Aleksandr N. Zabelin

Bauman Moscow State Technical University, Moscow, Russia

**COMPARISON OF INTERFERENCE SUPPRESSION ALGORITHMS
IN ADAPTIVE ANTENNA ARRAYS BASED ON NEURAL NETWORK,
KALMAN AND TRADITIONAL CONTROL**

A.I. Lyashenko, M.O. Sharikova, V.A. Kukushkin, O.V. Polschikova

*Scientific and Technological Center of Unique Instrumentation, Russian Academy
of Sciences, Moscow, Russia*

Y.V. Pichugina

*Prokhorov General Physics Institute, Russian Academy of Sciences, Moscow, Russia;
The Russian Federal Nuclear Center – All-Russian Scientific Research Institute of
Experimental Physics, Sarov, Russia*

7-WAVELENGTH PULSED LASER SYSTEM

Andrei A. Monakov (*Member IEEE*)

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**TARGET VELOCITY ESTIMATION IN SYNTHETIC APERTURE RADARS
USING THE MELLIN MATCHED FILTER**

Dmitry O. Moskaletz

Saint-Petersburg State Electrotechnical University (LETI), Saint-Petersburg, Russia

Oleg D. Moskaletz, Vasily I. Kazakov

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

Pavel V. Bondar

Saint-Petersburg State Electrotechnical University (LETI), Saint-Petersburg, Russia

**FINITE APERTURE PHOTODETECTORS IN OPTICAL INFORMATION
PROCESSING DEVICES**

O.D. Moskaletz, K.V. Serdiuk, V.I. Kazakov, A.S. Paraskun

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**MULTI-ALTERNATIVE AUTOMATIC CONTROL BASED ON SPECTRAL
MEASUREMENTS BY DIFFRACTION DEVICES IN THE OPTICAL RANGE**

D.A. Muzafarov, N.V. Povarenkin, T.I. Tagaev, A.K. Ermakov
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**IMPLEMENTATION OF THE MUSIC SUPER-RESOLUTION ALGORITHM,
APPLIED TO THE DIGITAL ANTENNA ARRAY OF A RADAR STATION
FOR DETECTING LOW-FLYING TARGETS**

Ruslan V. Sharapov
Murom Institute, Vladimir State University, Murom, Russia
USING LINEAR REGRESSION FOR WEATHER PREDICTION

Alexander V. Sorokin (Member IEEE), Alex P. Shepeta
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**ANALYSIS OF THE CURRENT APPROACHES TO ANTI-COLLISION
IDENTIFICATION OF PASSIVE IDENTIFICATION TAGS**

T.I. Tagaev, N.V. Povarenkin, D.A. Muzafarov, A.K. Ermakov
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**ABOUT COMPARATION OF SEQUENTIAL SUPERRESOLUTION
ALGORHYTHMS FOR DISTINGUISHING TARGETS SEPARATED
BY SMALL ANGLE**

A.A. Tarasenkov, A.A. Monakov (Member IEEE)
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**A LOW LEVEL RADAR ALTIMETER WITH PHASE LOCKED LOOP
ESTIMATOR**

Valentina I. Teplikova,
JSC "Kotlin-Novator", Saint-Petersburg, Russia
Anton A. Sentsov, Sergey A. Nenashev
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**ANALYSIS OF THE RADIATION PATTERN OF A FLAT MULTI-ELEMENT
ACTIVE PHASED ARRAY ANTENNA**

Ilya V. Tokarevskiy
JSC "Kotlin-Novator", Saint-Petersburg, Russia
Anton A. Sentsov, Mikhail B. Sergeev
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
FEATURES OF MATRIX MASKING OF DIGITAL RADAR IMAGES

V.A. Tyurinova

Saint-Petersburg State University of Aerospace Instrumentation, Saint Petersburg, Russia

G.M. Wattimena

State Polytechnic of Ambon, Indonesia

D.A. Shepeta

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

ALGORITHMS FOR INPUT SIGNALS SIMULATION OF COMPLEX SYSTEMS

SYNTHESIZED BASED ON EMPIRICAL DATA

M.A. Vaganov

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

SPECTROSCOPIC SYSTEM FOR COMBUSTION PROCESSES DIAGNOSTIC

OF GASEOUS HYDROCARBONS

Vladimir Yu. Volkov

Saint-Petersburg State Electrotechnical University (LETI), Saint-Petersburg, Russia;

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

DETECTION AND SELECTION OF COMPACT OBJECTS IN IMAGES

A.N. Yakimov, A.R. Bestugin, I.A. Kirshina

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

PARAMETRIC OPTIMIZATION OF THE CORNER REFLECTOR

OF ELECTROMAGNETIC WAVES

MAY 31 (10:00 – 17:00)

1 JUNE (14:00 – 17:00)

CHAPTER 4.

**DATA PROCESSING AND TRANSMISSION IN INFORMATION
AND TELECOMMUNICATION SYSTEMS**

A.S. Adzhemov (*Member IEEE*), **A.Y. Kudryashova**

Moscow Technical University of Communications and Informatics, Moscow, Russia

**DEVELOPMENT OF A GENERAL METHOD FOR EVALUATING
THE EFFECTIVENESS OF PRIMARY CODING**

B.K. Akopyan, A.P. Shepeta

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**DISTRIBUTION LAW OF THE BLOOD PRESSURE ESTIMATION
BASED ON SUFFICIENT STATISTICS**

R.R. Belgibaev, D.V. Ivanov (*Member IEEE*), **V.A. Ivanov, N.V. Ryabova** (*Member IEEE*)

Volga State University of Technology, Yoshkar-Ola, Russia

**DEPENDENCE OF THE AVAILABILITY OF RADIO CHANNELS
ON THE THRESHOLD LEVEL OF MAN-MADE INTERFERENCES**

Sergey V. Bezzateev (*Member IEEE*), **Svetlana G. Fomicheva, Georgiy A. Zhemelev**

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

QUANTUM CONTROL MECHANISMS OF SUPERDENSE CODING

D.V. Bolotov, M.S. Kuzmin, A.P. Nasaraia, N.V. Pchelkina

Moscow Technical University of Communications and Informatics, Moscow, Russia

S.N. Kuznetsov

MOSTKOM JSC, Ryazan, Russia

**A METHOD FOR ESTIMATING LOSSES IN A QUANTUM CHANNEL
FOR IMPLEMENTING QUANTUM KEY DISTRIBUTION TECHNOLOGY
FOR ATMOSPHERIC LASER COMMUNICATION TERMINALS**

Anna V. Borisovskaya, Andrey M. Turlikov, Aleksey S. Fonfrygin

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**NUMERICAL CALCULATION OF RANDOM ACCESS CHARACTERISTICS
FOR SENSORS WITH CORRELATED ACTIVATION**

V.A. Burlakova

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**INVESTIGATION OF THE CHARACTERISTICS OF THE INTERNAL STAGE
OF THE CONCATENATED CODING SCHEME FOR MULTILEVEL FLASH
MEMORY**

O.G. Chertova, D.S. Chirov (*Member IEEE*)

Moscow Technical University of Communications and Informatics, Moscow, Russia

DEVELOPMENT PROSPECTS OF THE ERA-GLONASS SYSTEM

Yuri Choni (*Member IEEE*), **Anatoly Dardymov**

Kazan National Research Technical University – KAI, Kazan, Russia

RECONSTRUCTION OF A DISTORTED REFLECTOR OF A LARGE HYBRID SATELLITE ANTENNA BY PROCESSING ITS SIGNALS FROM A TERRESTRIAL SOURCE

Dmitry Dikarev, Alexei Davydov, Alexander Maltsev

Lobachevsky University, Nizhny Novgorod, Russia

PHASE NOISE ROBUST CODE BLOCK MAPPING FOR SUB-THZ SYSTEM WITH DFT-S-OFDM

S.N. Eliseev

Moscow Technical University of Communications and Informatics, Moscow, Russia

L.N. Filimonova

Povolzhskiy State University of Telecommunications and informatics (PSUTI), Samara, Russia

CENSORING FADING IN THE REPORTING CHANNEL OF SPECTRUM SENSING SYSTEMS

Gregory A. Ermolaev, Olesya V. Bolkhovskaya and Alexander A. Maltsev

Lobachevsky University, Nizhny Novgorod, Russia

MULTI-SLOT TRANSMISSION WITH EFFECTIVE FREQUENCY HOPPING AND DMRS BUNDLING FOR 5G NR COVERAGE ENHANCEMENT

V.G. Eryshov, D.V. Ilina

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

MARKOV MODEL OF THE COMPUTER INTELLIGENCE PROCESS THAT PROVIDES UNAUTHORIZED ACCESS AND OBTAINING CONFIDENTIAL INFORMATION FROM INFORMATION SYSTEMS OF ORGANIZATIONS

D.V. Gadasin, A.V. Shvedov, O.G. Klygina

Moscow Technical University of Communications and Informatics, Moscow, Russia

ORGANIZATION OF INTERACTION BETWEEN THE CONCEPT OF FOG COMPUTING AND SEGMENT ROUTING FOR THE PROVISION OF IOT SERVICES IN SMART GRID NETWORKS

B.G. Ibrahimov (*Member IEEE*), **M.Y. Orujova** (*Member IEEE*),
Z.A. Ismaylov (*Member IEEE*)

Azerbaijan Technical University, Baku, Azerbaijan

I.M. Mammadov (*Member IEEE*)

Azerbaijan Technological University, Ganja, Azerbaijan

**ABOUT ONE PROBLEM OF CONTROL NETWORK AND CHANNEL
RESOURCES IN COMMUNICATION NETWORKS DURING PROCESSING
USEFUL AND SERVICE MESSAGE SIGNALS**

M.N. Isaeva, A.A. Ovchinnikov (*Member IEEE*)

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**ABOUT ONE METHOD OF CONSTRUCTING A CODE-BASED
CRYPTOSYSTEM BASED ON QUASI-CYCLIC CODES**

Dmitry Ivanov (*Member IEEE*), **Vladimir Ivanov, Natalya Ryabova** (*Member IEEE*),
Nikita Konkin, Vladimir Ovchinnikov

Volga State University of Technology, Yoshkar-Ola, Russia

**METHOD FOR DETECTING MODES OF RECEIVED ECHO SIGNAL
ON IMAGE OF IONOGRAM OF RADIO SOUNDING WITH THE USE
OF MACHINE LEARNING**

Dmitriy K. Kim

Narxoz University, Almaty, Kazakhstan

Georgi D. Georgiev

3K Solar Corporation, Varna, Bulgaria

Natalya V. Markovskaya

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**A MODEL OF RANDOM MULTIPLE ACCESS IN UNLICENSED SPECTRUM
SYSTEMS**

A.B. Kondybayeva, E.A. Kalashnikov

National University of Science and Technology MISiS, Moscow, Russia

**RECOMMENDER SYSTEMS IN THE DESIGN OF SOFTWARE
ARCHITECTURE SELECTION TOOLS**

Data processing and transmission in information and telecommunication systems

V.V. Kos'yanchuk, N.I. Sel'vesyuk, V.M. Novikov, A.Yu. Chekin

*Federal State Unitary Enterprise State Research Institute of Aviation Systems
(GosNIIAS), Moscow, Russia*

D.A. Fofanov

ARLI spetstechnika LLC, Moscow, Russia

**ARCHITECTURE OF A FAULT-TOLERANT INFORMATION-SENSOR
NETWORK OF HIGH-SPEED ROTARY-WING AIRCRAFT**

Galina M. Kovregina, Yuliana A. Novikova, Maksim B. Ryzhikov
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**DETECTION OF UNMANNED AERIAL VEHICLES IN THE X-BAND RADAR
WITH AN AVERAGE PULSE REPETITION RATE**

A.F. Kryachko (Member IEEE), M.E. Neveykin
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**ITERATIVE ALGORITHMS FOR ESTIMATING THE ANGULAR
COORDINATE OF THE TARGET**

A.Y. Kudryashova, A.S. Adzhemov (Member IEEE)
Moscow Technical University of Communications and Informatics, Moscow, Russia
**INVESTIGATION OF CODING VALUES OF SIGNAL SAMPLES DURING
ANALOG-TO-DIGITAL CONVERSION**

I.M. Lerner, R.R. Fayzullin, R.F. Zaripov, V.L. Odintsov
*Kazan National Research Technical University n.a. A.N. Tupolev – KAI (KNRTU-KAI),
Kazan, Russia*
**TO SOFTWARE IMPLEMENTATION ANALYTICAL METHOD
FOR ESTIMATING THE PARAMETERS OF A FREQUENCY MIXTURE
WITHOUT COMBINATION FREQUENCIES. SECOND CASE**

I.V. Mazhnik, V.F. Mikhailov
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**THE INFLUENCE OF LATERAL WAVES ON THE RADIO TECHNICAL
CHARACTERISTICS OF A RECTANGULAR WAVEGUIDE WITH THERMAL
PROTECTION**

V.F. Mikhailov
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**COMPUTATIONAL APPROACH TO EVALUATING THE CHARACTERISTICS
OF AN ONBOARD ANTENNA WITH COMPLEX THERMAL PROTECTION**

V.A. Mylnikov, S.V. Bezzateev (Member IEEE)
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
N.V. Mylnikov
St. Petersburg State University, St. Petersburg, Russia
**MODELING THE SECURITY SYSTEM OF THE CLOUD IOT PLATFORM
OF AN SMART SUPERMARKET**

Oleg Nesterenkov, Artem Chemodanov, Andrey Turlikov
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**DELAY ANALYSIS OF MASSIVE UNSOURCED ALOHA-BASED PROTOCOLS
WITH USER AUTHENTICATION**

V.M. Novikov, N.I. Selvesyuk

State Research Institute of Aviation Systems, Moscow, Russia

V.L. Olenev

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

A.M. Solovyov

JSC «Concern «Sozvezdie», Voronezh, Russia

M.E. Semenov

Military Educational Scientific Center of Air Forces, Voronezh, Russia

DETERMINISTIC REAL-TIME OPTICAL NETWORK

Yuliana A. Novikova, Maksim B. Ryzhikov, Valeriy N. Kovregin

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

IMPLEMENTATION OF UNAMBIGUOUS ESTIMATION OF ANGULAR COORDINATES IN MONOPULSE RADARS USING AN ADDITIONAL ANTENNA

A.A. Ovchinnikov (Member IEEE), A.A. Fominykh

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

A TWO-STAGE DECODING BASED ON ITERATIVE BOUNDED DISTANCE APPROACH

Vladislav V. Pinchukov, Anton Yu. Poroykov, Ekaterina V. Shmatko,

Artem D. Bogachev, Nikita Yu. Sivov

National Research University "Moscow Power Engineering Institute", Moscow, Russia

COMPARISON OF THE NEURAL NETWORKS WITH CROSS-CORRELATION ALGORITHM FOR THE DISPLACEMENTS ON IMAGES ESTIMATION

V.A. Ryndyuk

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

Y. S. Varakin, E. A. Pisarenko

Pyatigorsk State University, Pyatigorsk, Russia

NEW ARCHITECTURE OF TRANSFORMER NETWORKS FOR GENERATING NATURAL DIALOGUES

Maksim B. Ryzhikov, Valeriy N. Kovregin, Yuliana A. Novikova

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

SELECTION OF PULSE REPETITION FREQUENCY IN RADAR FOR FLIGHT PREDICTION TO DETECT FLIGHT TRAJECTORIES OF SMALL AIRCRAFT AND UNMANNED AERIAL VEHICLES AT LOW ALTITUDES

Darya D. Savelyeva, Tatiana M. Tatarnikova

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

INTERNET OF THINGS TRAFFIC CONSUMPTION CONTROL SYSTEM

A.M. Sergeev

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

ON AN APPROACH TO THE COMPUTATION OF QUASI-ORTHOGONAL CYCLIC MATRICES AS THE BASIS OF CODES

Victor A. Sergeev, Olesya V. Bolkhovskaya, Alexander A. Maltsev

Lobachevsky University, Nizhny Novgorod, Russia

TESTING THE HYPOTHESIS OF A PLANE WAVEFRONT OF A SIGNAL RECEIVED BY A MULTI-ELEMENT ANTENNA ARRAY

M.B. Sergeeva, V.V. Voskobovich, A.M. Kukhareenko

Moscow Technical University of Communications and Informatics, Moscow, Russia

DATA PROCESSING IN INDUSTRIAL INTERNET OF THINGS (IIOT) APPLICATIONS

O.I. Sheluhin, S.Y. Rybakov, A.V. Vanyushina

Moscow Technical University of Communications and Informatics, Moscow, Russia

DETECTION OF NETWORK ANOMALIES WITH THE METHOD OF FIXING JUMPS OF THE FRACTAL DIMENSION IN THE ONLINE MODE

Elena A. Suvorova

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

AN APPROACH TO DESIGNING HETEROGENEOUS NETWORKS FOR HIGH PERFORMANCE COMPUTING SYSTEMS BASED ON A UNIFIED RECONFIGURABLE ROUTER CORE

Tatiana M. Tatarnikova, Aleksander V. Sverlikov

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

METHODOLOGY FOR DETECTING ANOMALIES IN THE TRAFFIC OF THE INTERNET OF THINGS

Ioanis I. Triandafilidi, Tatiana M. Tatarnikova

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

Anton S. Poponin

Saint Petersburg State University of Telecommunications, Saint-Petersburg, Russia

SPEECH SYNTHESIS SYSTEM FOR PEOPLE WITH DISABILITIES

Alina M. Veresova, Andrei A. Ovchinnikov (Member IEEE)

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

COMPARISON OF THE PROBABILITY OF REED – SOLOMON AND LDPC CODES DECODING ERROR IN THE GILBERT – ELLIOTT CHANNEL

Yuriy Vyboldin

Saint-Petersburg Mining University, Saint Petersburg, Russia

Sergey Malinin

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

GENERALIZING THE ANALYTICAL CALCULATION OF THE ENERGY SPECTRUM OF A PSEUDORANDOM PULSE SEQUENCE

N.A. Yankovskii, K.V. Afanasev, A.Y. Kolesnikova, N.V. Stepanov

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

ENHANCED ALGORITHM FOR DYNAMIC CHANGING OF FRAME SIZE IN RADIO FREQUENCY IDENTIFICATION SYSTEMS

Elnur S. Yusifov, Irina S. Sineva (*Member IEEE*)

Moscow Technical University of Communications and Informatics, Moscow, Russia

AN INTELLIGENT SYSTEM FOR ASSESSING THE EMOTIONAL CONNOTATION OF TEXTUAL STATEMENTS

MAY 31 (10:00 – 13:00)

**CHAPTER 6.
ELECTROMECHANICS AND CONTROL SYSTEMS**

O.M. Filonov, P.A. Okin

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**APPLICATION OF SIMOX TECHNOLOGY FOR PARAMETRIC
CORRECTION OF RESONANT MEMS**

**Victor A. Golubkov, Andrey G. Fedorenko, Elizaveta Yu. Vataeva,
Sergey Yu. Melnikov**

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**THE PROCESS OF DIAGNOSING THE INTENSITY OF STEADY –
STATE WEAR OF FRICTION UNITS MATERIALS**

1 JUNE (10:00 – 13:00)

**CHAPTER 7.
MICROELECTRONIC EMBEDDED SYSTEMS**

Sergey V. Bogoslovsky, Alexander R. Zhezherin, Vladimir V. Perliouk
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**DEVELOPMENT AND RESEARCH OF A SURFACTANT SENSOR
FOR MEASURING MECHANICAL DEFORMATION**

S.I. Shershnev, M.A. Vaganov
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**IMPROVING THE CHARACTERISTICS OF DIRECTIONAL MICROSTRIP
COUPLERS USING LOW-TEMPERATURE CERAMICS TECHNOLOGY**

1 JUNE (10:00 – 13:00)

**CHAPTER 8.
MODELING AND SITUATIONAL QUALITY MANAGEMENT
IN ELECTRONICS AND INSTRUMENTATION**

Alexander V. Chabanenko (*Member IEEE*)

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**METHODS OF MODELING ADDITIVE PROCESSES OF LAYER-BY-LAYER
CONSTRUCTION OF THE OBJECT**

E.A. Frolova, V.A. Tushavin, A.S. Tur

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**PROACTIVE QUALITY MANAGEMENT OF THE COMPONENT
PROCUREMENT PROCESS**

Abdulmusavvir A. Karimov

Moscow Polytechnic University, Moscow, Russia

Khusen Kh. Begimov

Tajik State Pedagogical University Named after Sadriddin Aini, Dushanbe, Tajikistan

Dilshod Ch. Ravshanov (*Member IEEE*)

Tajik Technical University named after Academician M.S. Osimi, Dushanbe, Tajikistan

**IMPLEMENTATION OF A POWER DIVIDER WITH REDUCED DIMENSIONS
IN PLANAR DESIGN**

Sergey V. Kozlov

*Federal Research Center “Computer Science and Control” Russian Academy of Sciences,
Moscow, Russia*

Alexander N. Kubankov

Moscow Technical University of Communications and Informatics, Moscow, Russia

Alexander P. Shabanov

*Federal Research Center “Computer Science and Control” Russian Academy of Sciences,
Moscow, Russia*

**SOFTWARE-DEFINED NETWORKING MODEL FOR UNMANNED SYSTEMS
PROJECTS**

Chorshanbe B. Ravshanov, Dilshod Ch. Ravshanov (*Member IEEE*)

Tajik Technical University Named after Academician M.S. Osimi, Dushanbe, Tajikistan

Abdulmusavvir A. Karimov

Moscow Polytechnic University, Moscow, Russia

**DESIGN OF A MINIATURE AND BROADBAND MICROWAVE POWER
DIVIDER**

Dilshod Ch. Ravshanov (*Member IEEE*), **Rajab Sh. Umaralizoda**
Tajik Technical University named after Academician M.S. Osimi, Dushanbe, Tajikistan
Evgeniy B. Bablyuk, Abdulmusavvir A. Karimov
Moscow Polytechnic University, Moscow, Russia
**MODELING OF A MINIATURE DIRECTIONAL COUPLER
ON PLANAR STRUCTURES**

Elizaveta A. Skorniakova (*Member IEEE*)
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
Vasiliy M. Vasykov, Sergey A. Meshkov
*Baltic State Technical University «VOENMEH» named after D.F. Ustinov,
Saint-Petersburg, Russia*
**FEATURES OF COMPONENTS REQUIRED NUMBER CALCULATION
PROCESS FOR MANUFACTURING FLEXIBILITY ENSURING**

Aleksandr O. Smirnov, Eugene A. Frolov
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**ON A METHOD FOR CONSTRUCTING SOLUTIONS TO EQUATIONS
OF NONLINEAR OPTICS**

**Anna S. Stepashkina, Kirill V. Zolotukhin, Ekanetrina A. Gushchina,
Olga V. Chuprinova**
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
REMOTE METHOD FOR CHECKING THE QUALITY OF WELDED JOINTS

N.A. Zhilnikova, A.A. Baranova, V.M. Milova
Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia
**THE METHOD OF REDISTRIBUTION OF TECHNOGENIC LOAD FROM
RADIO-ELECTRONIC AND INSTRUMENT-MAKING INDUSTRIES USING
ONLINE GEO-INFORMATION SYSTEM**

MAY 31 (10:00 – 13:00)

**CHAPTER 9.
INSTRUMENTATION AND INTELLIGENT
TRANSPORTATION SYSTEMS**

A.S. Kostin, Silin Y.A.

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**DEVELOPMENT OF AN INSULATED CONTAINER FOR THE
IMPLEMENTATION OF THE DELIVERY OF SPECIAL CARGO
USING AN UNMANNED AERIAL SYSTEM**

G.M. Revunov, A.F. Kryachko (*Member IEEE*)

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**EVALUATION OF OWN OSCILLATIONS OF AN OPEN RESONATOR
FOR THE CASE OF A HETEROGENEOUS HYPERSONIC PLASMA**

B.Ya. Lichtsender, S.A. Chernysheva

Federal State Budgetary Educational Institution of Higher Education “Povolzhskiy State University of Telecommunications and Informatics”, Samara, Russia

DIGITAL TWINS

N.N. Maiorov, A.A. Dobrovolskaia

Saint-Petersburg State University of Aerospace Instrumentation, Saint-Petersburg, Russia

**RESEARCH OF VARIANTS OF MODERNIZATION OF TRANSPORT
TERMINAL INFRASTRUCTURE BASED ON STOCHASTIC MODELS**

Mikhail G. Gorodnichev, Maxim D. Gromov, Ksenia A. Polyantseva, Marina S. Moseva

Moscow Technical University of Communications and Informatics, Moscow, Russia

**RESEARCH AND DEVELOPMENT OF A SYSTEM FOR DETERMINING
ABNORMAL HUMAN BEHAVIOR BY VIDEO IMAGE BASED
ON DEEPSTREAM TECHNOLOGY**

Ksenia A. Polyantseva, Mikhail G. Gorodnichev

Moscow Technical University of Communications and Informatics, Moscow, Russia

**NEURAL NETWORK APPROACHES IN THE PROBLEMS OF DETECTING
AND CLASSIFYING ROADWAY DEFECTS**

Ekaterina V. Shmatko, Anton Yu. Poroykov

National Research University "Moscow Power Engineering Institute", Moscow, Russia

**THE ESTIMATION OF INERTIAL MEASUREMENT UNITS ACCURACY
USING DIGITAL IMAGE PROCESSING ALGORITHMS**

Evgeniy N. Tourouta, Mikhail G. Gorodnichev, Ksenia A. Polyantseva

Moscow Technical University of Communications and Informatics, Moscow, Russia

**ENSURING FAULT TOLERANCE OF A COMPUTING SYSTEM WITH
A CLIENT-SERVER ARCHITECTURE BASED ON FAULT-TOLERANT
COMPUTING PLANNING**