

**International Conference Program**

**«2020 Systems of Signal Synchronization,  
Generating and Processing in  
Telecommunications  
SYNCHROINFO-2020»**

**IEEE Conference Record #49631**

**1-3 July 2020**

**Russia, Nekrasova Street 3, Svetlogorsk, Kaliningrad region, Russia**

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**Victor N. Kochemasov:** Ph.D, General Director of LLC Radiocomp (*IEEE member*)

**Oleg V. Varlamov:** Doctor of Technical Sciences, Professor

**Andrei V. Grebennikov:** Ph.D., Sumitomo Electric Europe, UK (*Senior IEEE member*)

**Oleg G. Morozov:** Doctor of Technical Sciences, Professor, Head of the Department of Radiophotonics and Microwave Technologies of KNRTU-KAI (*IEEE member*)

**Artem S. Adzhemov:** Doctor of Technical Sciences, Professor (*IEEE member*)

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**Alexander V. Pestryakov:** Doctor of Science (Engineering), Professor

**Valentin N. Kuleshov:** Doctor of Science (Engineering), Professor of National Research University “MPEI”, Vice-Chairman of Russian (Moscow) IEEE Circuits and Systems (CAS04) Chapter, Senior IEEE Member

**Oleg V. Varlamov:** Doctor of Technical Sciences, Professor

**Elena R. Khasianova:** Program Committee Coordinator, IEEE Member

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## PLENARY SESSION

### FOREWORD

**Pestryakov A.V.**, *Chairman of the Organizing Committee, Moscow, Russia*

### FOREWORD

**Ivanyushkin R.Yu.**, *Chairman of Russian (Moscow) IEEE Circuits and Systems (CAS04) Chapter, Branch Director of the IEEE Worldwide Limited in the Russian Federation, IEEE Member*

**N. Klenov, A. Schegolev, I. Soloviev, M. Tereshonok**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

**SUPERCONDUCTING NEURAL NETWORKS FOR BROADBAND SIGNAL RECEIVING AND PROCESSING**

**Aleksandr.V. Ivchenko** (*Member IEEE*), **Pavel A. Kononyuk, Alexander V, Dvorkovich** (*Member IEEE*), **Liubov A. Antiufrieva**

*Laboratory of Multimedia Systems and Technology, Moscow Institute of Physics and Technology, Moscow, Russia*

**STUDY ON THE ASSESSMENT OF THE QUALITY OF EXPERIENCE OF STREAMING VIDEO**

**Mark I. Zhodzishsky,**

*Moscow Aviation Institute (National Research University); Topcon Positioning Systems, Moscow, Russia*

**Roman V. Kurynin,**

*National Research University Higher School of Economics; Topcon Positioning Systems, Moscow, Russia*

**Andrey V. Veitsel,**

*Moscow Aviation Institute (National Research University); Topcon Positioning Systems, Moscow, Russia*

**A RADICAL APPROACH TO REDUCING EFFECTS OF QUARTZ CRYSTAL OSCILLATOR INSTABILITY ON GNSS RECEIVER PERFORMANCE**

**Oleg G. Morozov** (*IEEE Member*), **Ilnur I. Nureev, Airat Zh. Sakhabutdinov** (*IEEE Member*), **Artem A. Kuznetsov, Ildaris M. Gabdulkhakov**

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

**INTEGRATED MICROWAVE QUANTUM SENSING FOR RADAR TYPE PROBLEMS DECISIONS**

### FOREWORD

**Dymkova S.S.**, *Conference Publication Program Coordinator («Media Publisher»), Moscow, Russia*

**SECTION 1**  
**Synchronization Systems and Devices**  
**02.07.2020**

**SECTION CHAIR**

**Roman Y. Ivanyushkin:** *PhD, Associate Professor of Moscow Technical University of Telecommunications and Informatics, Moscow, Russia*

**14-10: 14-20**

**1. Vladimir A. Babkin, Elena P. Stroganova,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

INTEGRAL QUALITY INDICATORS OF MODERN COMMUNICATION NETWORK FUNCTIONING

**14-20 : 14-30**

**2. Vladimir L. Karyakin,**

*Volga region state university of telecommunications and informatics, Samara, Russia*

ALGORITHM FOR IMPLEMENTING THE METHOD OF INCREASING THE RELIABILITY OF THE REGIONAL DIGITAL TV BROADCASTING NETWORK

**14-30 : 14-40**

**3. Boris V. Khlopov, Grigory I. Andreev, Nikolai P. Kolesnikov,**

*JSC "Central research radio engineering Institute named after A. I. Berg's academic", Moscow, Russia*

**Vasily D. Shashurin, Sergey A. Meshkov,**

*Bauman Moscow state technical University, Moscow, Russia*

THE POSSIBILITY AND PROSPECTS FOR USING MULTIFERROIC MATERIALS IN THE PRODUCTION

**14-40 : 14-50**

**4. Alexander N. Kubankov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

**Sergey V. Kozlov,**

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

INNOVATIVE WAYS TO ENSURE THE INTEROPERABILITY OF A COMPLETE GROUP OF PROCESSES IN THE LIFECYCLE OF AN INTEGRATED MANAGEMENT SYSTEM BASED ON THEIR SYNCHRONIZATION

**14-50 : 15-00**

**5. Sergey V. Kozlov,**

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

SCIENTIFIC AND METHODOLOGICAL APPROACHES TO DETERMINING THE CONDITIONS FOR THE EMERGENCE OF SYNERGETIC PROCESSES IN THE LIFE CYCLE OF INTELLIGENT INTEGRATED MANAGEMENT SYSTEMS

**15-00 : 15-10**

**6. Michael I. Kuptsov,**

*Ryazan State Radio and Technical University, Ryazan, Russia*

**V. A. Minaev,**

*Bauman Moscow State Technical University, Moscow, Russia*

**S. L. Yablochnikov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

**V. B. Dzobelova (Member IEEE),**

*North Ossetian State University named after Kosta Levanovich Khetagurov, Vladikavkaz, Russia*

**A. V. Sharopatova,**

*Krasnoyarsk State Agrarian University, Krasnoyarsk, Russia*

SOME STATISTICAL FEATURES OF THE INFORMATION EXCHANGE IN SOCIAL NETWORKS

**15-10 : 15-20**

**7. Dzhennet I. Magomedova, Oleg I. Sheluhin,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

FRACTAL MODELS AND ALGORITHMS FOR CREATING A PROTECTIVE MARKING FOR INTEGRITY AND AUTHENTICITY BITMAP IMAGES

**15-20 : 15-30**

**8. Alexander L. Makarevich, Rodion S. Goncov, Julia V. Smelyanec,**

**Sergey M. Sokovnich,**

*GOU “Pridnestrovian State University. TG Shevchenko” (PSU), Pridnestrovie, Tiraspol, Moldova*

ANALYSIS OF THE POSSIBILITY OF IMPLEMENTING SYNCHRONIZATION DEVICES OPERATING ON OFDM TECHNOLOGY ON CMOS TRANSISTORS WITH SUBMICRON DESIGN STANDARDS IN HIGH-SPEED DATA TRANSMISSION SYSTEMS

**15-30 : 15-40**

**9. Vladimir A. Minaev,**

*Bauman Moscow State Technical University, Moscow, Russia*

**Sergey L. Yablochnikov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

**Valentina B. Dzobelova (Member IEEE),**

*Federal State Budget Educational Institution of Higher Education (FSBEI HE)*

*North Ossetian State University named after Kosta Levanovich Khetagurov,*

*Vladikavkaz, Russia*

**Sergey V. Gerasimov,**

*Saint-Petersburg State University of Economics, Saint-Petersburg, Russia*

ASPECTS OF DYNAMIC MODELING OF INFORMATION IMPACTS IN  
SOCIAL NETWORKS

**15-40 : 15-50**

**10. Alexey M. Romanov (Member IEEE), Maria A. Volkova,**

*MIREA - Russian Technological University (RTU MIREA), Moscow, Russia*

**Axel Sikora,**

*Offenburg University of Applied Sciences, Offenburg, Germany*

A NOVEL LOW-JITTER INTERFACE FOR SYNCHRONIZATION WITH  
LOW-COST INTEGRATED IEEE802.11 CHIPS

**15-50 : 16-00**

**11. Oleg I. Sheluhin, Mikhail V. Polkovnikov, Dzhennet I. Magomedova,**

*Moscow Technical University of Communications and Informatics, Moscow,*

*Russia*

FORECASTING THE STATE OF INFOCOMMUNICATION SYSTEMS USING  
TIME SERIES WITH DEFINED FRACTAL PROPERTIES

**16-00 : 16-10**

**12. Vladimir V. Shestakov, Irina V. Manonina,**

*Moscow Technical University of Communications and Informatics, Moscow,*

*Russia*

DEFINITION OF PARAMETERS OF THE SOURCE OF ERROR MODEL FOR  
COMMUNICATION SYSTEMS WITH MOBILE OBJECTS

**16-10 : 16-20**

**13. Igor O. Yuskov, Elena P. Stroganova,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

APPLYING A NEURAL NETWORK APPROACH TO MONITORING  
CORPORATE NETWORKS WITH VARIOUS CONFIGURATIONS

**16-20 : 16-30**

**14. Vadim V. Ziyadinov, Maxim V. Tereshonok,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

ANALYTICAL SURVEY ON MANET AND VANET CLUSTERISATION  
ALGORITHMS

**16-30 : 16-40**

**15. Daniyar R. Mukhametov (IEEE Member),**

*Financial University under the Government of the Russian Federation, Moscow, Russia*

SELF-ORGANIZATION OF NETWORK COMMUNITIES VIA BLOCKCHAIN  
TECHNOLOGY: REPUTATION SYSTEMS AND LIMITS OF DIGITAL  
DEMOCRACY



**SECTION 2**  
**Signal Generating and Shaping Devices**  
**03.07.2020**

**SECTION CHAIR**

**Valentin N. Kuleshov**, *Doctor of Science (Engineering), Professor of National Research University "MPEI", Moscow, Russia*

**Leonid A. Belov**, *PhD, Professor of National Research University "MPEI", Moscow, Russia*

**10-30 : 10-40**

**1. Mikhail V. Balashkov, Vyacheslav M. Bogachev, Ivan N. Leonov**,  
*National Research University «Moscow Ural Federal University », Moscow, Russia*

OPTIMIZATION IN OSCILLATORS AND AUTODYNES WITH  
STABILIZING RESONATORS

**10-40 : 10-50**

**2. Kirill Bykov, Leonid N. Kazakov, Ekaterina A.Selyanskaya**,  
*Yaroslavl State University, Yaroslavl, Russia*

SIGNAL-CODE DESIGN FOR SPREAD SPECTRUM CHANNELS WITH  
PACKET ERRORS OCCURRING

**10-50 : 11-00**

**3. Olga V. Biryukova**,  
*National Research University "Moscow Power Engineering Institute", Moscow, Russia*

**Irina V. Koretskaya**,  
*National Research University "Moscow Power Engineering Institute", Moscow, Russia*

SELECTION OF ULTRASONIC SENSORS FOR DISTANCE MONITORING

**11-00 : 11-10**

**4. Vyacheslav M. Bogachev, Ivan N. Leonov**,  
*National Research University «Moscow Power Engineering Institute», Moscow, Russia*

BIFURCATION METHOD IN THE THEORY OF THREE-CIRCUIT  
OSCILLATORS WITH STABILIZING CAVITIES

**11-10 : 11-20**

**5. Tatiana I. Boldyreva, Elena M. Torina,**

*National Research University «Moscow Power Engineering Institute», Moscow, Russia*

FREQUENCY CONTROLLED HARMONIC OSCILLATORS USING DIFFERENTIALLY CONNECTED FETS WITH AUTOMATIC OSCILLATION AMPLITUDE CONTROL

**11-30 : 11-40**

**6. Andrei A. Chernov, M.I. Ryabova, V.V. Ovchinnikov, A.A. Kislitsin,**

*Volga State University of Technology, Yoshkar-Ola, Russia*

SIMULATION STUDY OF VOLUMETRIC MODELS OF DELAY PARAMETERS OF WIDEBAND HF RADIO SIGNALS ON RADIO LINKS OF VARIOUS LENGTHS

**11-40 : 11-50**

**7. Denis S. Chirov (Member IEEE), Yuri A. Kochetkov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

OPTIMIZATION OF THE PLACEMENT TOPOLOGY OF SPATIALLY DISTRIBUTED RECEIVING AND TRANSMITTING POSTS FOR THE DETECTION OF SMALL UAVS IN THE CONDITIONS OF A “SMART CITY”

**11-50 : 12-00**

**8. S.I. Dinges, E.R. Khasianova, A.V. Pestryakov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

RF IMPAIRMENTS ESTIMATION AND COMPENSATION IN SOFTWARE COMPLEX NAMED "VECTOR"

**12-00 : 12-10**

**9. Gennady P. Ermak, Alexander S. Vasiliev,**

*O.Ya. Usikov Institute for Radio Physics and Electronics, Kharkiv, Ukraine*

**Vladislav Ya. Noskov, Kirill A. Ignatkov, Kirill D. Shaidurov,**

*Ural Federal University, Ekaterinburg, Russia*

AUTODYNE RESPONSE OF INJECTION-LOCKED MICROWAVE OSCILLATORS FOR CHANGING OUTPUT POWER

**12-10 : 12-20**

**10. Sergey D. Erokhin, Aleksey P. Zhuravlev,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

A COMPARATIVE ANALYSIS OF PUBLIC CYBER SECURITY DATASETS

**12-20 : 12-30**

**11. Vladimir M. Gevorkyan,**

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

**Victor N. Kochemasov,**

*JSC «Radiocomp», Moscow, Russia*

**Yuri A. Kazantsev, Sergey N. Mikhailin,**

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

**A. V. Chenakin**

*Anritsu company, Morgan Hill, USA*

MODELING OF THE MICROWAVE OSCILLATOR STEADY-STATE MODE,  
WHICH USE A DIELECTRIC RESONATOR

**12-30 : 12-40**

**12. R.R. Gubaidullin (Member IEEE), T.A. Agliullin, O.G. Morozov (Member IEEE), A.Zh. Sakhabutdinov (Member IEEE),**

*KAI (KNRTU-KAI), Kazan, Russia*

**V. Ivanov,**

*Technische Universität Ilmenau, Ilmenau, Germany*

REAL-TIME SIMULATION OF MICROWAVE-PHOTONIC SYSTEM FOR  
ESTIMATING THE TANGENTIAL DEFORMATION OF TIRE

**12-40 : 12-50**

**13. Roman Yu. Ivanyushkin (Member IEEE), Nikita D. Shmakov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

COMPUTER MODELING AND RESEARCH OF PARAMETRIC NONLINEAR  
DISTORTIONS FOR AMPLIFIERS WITH DISTRIBUTED AMPLIFICATION  
OF HF-VHF BAND

**ПЕРЕРЫВ**

**13-00 : 14-00**

**14-00 : 14-10**

**14. Victor N. Kochemasov,**

*JSC «Radiocomp», Moscow, Russia*

**Vladimir M. Gevorkyan, Sergey N. Mikhailin,**

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

**Yuri E. Soloukhin,**

*JSC «Radiocomp», Moscow, Russia*

**Alexander V. Chenakin,**

*Anritsu company, Morgan Hill, USA*

MICROWAVE VOLTAGE-CONTROLLED OSCILLATORS ON THE BASE  
OF MICRO-ASSEMBLES WITH DIELECTRIC RESONATORS

**14-10 : 14-20**

**15. Denis A. Letavin,**

*Ural Federal University, Yekaterinburg, Russia*

DESIGN OF AN IN-PHASE ANTIPHASE COUPLER WHOSE PHYSICAL  
DIMENSIONS ARE REDUCED DUE TO ELECTRODYNAMIC STRUCTURES

**14-20 : 14-30**

**16. Sergey S. Loginov, Maxim Yu. Zuev, Yana G. Agacheva, Olga A.  
Sivintseva,**

*Kazan National Research Technical University named after A. N. Tupolev – KAI,  
Kazan, Russia*

INFORMATION SCRAMBLING BY LORENZ SYSTEM BASED SEQUENCES  
IN OFDM

**14-30 : 14-40**

**17. Alexander S. Luchinin, Ivan V. Malygin,**

*Ural Federal University, Ekaterinburg, Russia*

DIGITAL OSCILLATORS NOISE CHARACTERISTICS

**14-40 : 14-50**

**18. Vladimir Yu. Mikhaylov, Roman B. Mazepa,**

*Moscow Aviation Institute (National Research University), Moscow, Russia*

USRP DEVICES APPLICATION FOR MODELING SIGNAL-LIKE  
INTERFERENCE IN WIRELESS NETWORKS

**14-50 : 15-00**

**19. Vladislav Ya. Noskov, Kirill A. Ignatkov, Kirill D. Shaydurov,**  
*Ural Federal University, Ekaterinburg, Russia*

**Gennady P. Ermak, Anton V. Varavin,**

*O.Ya. Usikov Institute for Radio Physics and Electronics, Kharkiv, Ukraine*

AUTODYNE RADAR SIGNALS IN THE PRESENCE OF ASYNCHRONOUS  
INFLUENCE

**15-00 : 15-10**

**20. Sergei S. Pechnikov, Sergey A. Sherstukov,**

*Voronezh Institute of Russian Ministry of Internal Affairs, Voronezh, Russia*

OPTIMIZATION OF THE STRUCTURE OF SPECTRAL-EFFECTIVE RADIO  
SIGNALS ON THE BASIS OF FUNCTIONAL CONVERTERS AND VECTOR  
MODULATORS IN THE COMPOSITION OF THE PREDISTORTION TRACT

**15-10 : 15-20**

**21. Aleksey S. Pshenichkin,**

*Public Joint-Stock Company "Scientific and Production Association "Almaz  
named after Academician A.A. Raspletina" (PJSC S&P Almaz), Moscow, Russia*

**Konstantin N. Klimov, (IEEE, Member)**

*Federal State Budgetary Educational Institution of Higher Education "Moscow  
Aviation Institute (National Research University)" (MAI), Moscow, Russia*

THE SYSTEM OF SUMMED SIGNALS' PHASE CORRECTION OF SOLID  
STATE AMPLIFIERS IN OUTPUT STAGES OF TRANSMITTERS IN  
PERSPECTIVE RADARS

**15-20 : 15-30**

**22. Dilshod C. Ravshanov,**

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

**Denis A. Letavin, Ilya A. Terebov,**

*Voronezh State University, Yekaterinburg, Russia*

BUTLER MATRIX 4X4 ULTRA HIGH FREQUENCY

**15-30 : 15-40**

**23. I.V. Ryabov, S.V. Tolmachev, N.V. Degtyarev,**

*Volga State University of Technology, Yoshkar-Ola, Russia*

SOFTWARE AND HARDWARE COMPLEX FOR ADAPTIVE HF- AND VHF-  
COMMUNICATION

**15-40 : 15-50**

**24. Andrey D. Scherbinin, Leonid A. Belov,**

*National Research University MPEI; JSC «RSS», Moscow, Russia*

MULTI-BAND MICROWAVE OPTICS FREQUENCY CONVERTER FOR SATELLITE TRANSMITTER

**15-50 : 16-00**

**25. Dmitry A. Solomatin, Vyacheslav M. Bogachev, Mikhail V. Balashkov,**

*National Research University «Moscow Power Engineering Institute», Moscow, Russia*

SIMULATION OF DYNAMIC SYSTEMS BY COMBINED METHODS OF PRONY-LAPLACE-PADE AND MATRIX BEAMS

**16-00 : 16-10**

**26. I.V. Strelnikov, I.V. Ryabov, E.S. Klyuzhev,**

*Volga State University Of Technology, Yoshrar-Ola, Russia*

DIRECT DIGITAL SYNTHESIZER OF PHASE-MANIPULATED SIGNALS, BASED ON THE DIRECT DIGITAL SYNTHESIS METHOD

**16-10 : 16-20**

**27. Elena P. Stroganova, Sergey E. Grychkin,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

INVESTIGATIONS OF MICROWAVE POWER AMPLIFIER ON BIPOLAR ACTIVE DEVICE

**16-20 : 16-30**

**28. Ilya A. Terebov, Denis A. Letavin,**

*Ural Federal University, Ekaterinburg, Russia*

MINIATURE PLANAR POWER DIVIDER WITH TWO WORKING BANDWIDTHS

**16-30 : 16-40**

**29. Oleg V. Varlamov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

POWER CAPACITY OF HF AUTOMATIC ANTENNA TUNER SWITCHED BY PIN DIODES UNDER LOAD MISMATCH CONDITIONS

**16-40 : 16-50**

**30. Evgeniy M. Lobov, Vladimir O. Varlamov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

EXPERIMENTAL TESTING OF CORRECTION ALGORITHMS FOR HYBRID  
FILTER BANKS

**16-50 : 17-00**

**31. Egor N. Vilderman, Leonid A. Belov,**

*JC "Russian Space Systems"; National Research University MPEI, Moscow, Russia*

COMMUNICATION SYSTEM WITH HYPERPHASE SIGNAL

**SECTION 3**  
**Signal Processing Devices**  
**02.07.2020 (PART 1)**

**SECTION CHAIR**

**Denis S. Chirov,**  
*Doctor of Science (Engineering), Moscow Technical University of  
Telecommunications and Informatics, Moscow, Russia*

**16-00 : 16-10**

**1. Artem S. Adzhemov** (*Member IEEE*), **Anastasiya Yu. Kudryashova,**  
*Moscow Technical University of Communications and Informatics, Moscow,  
Russia*

ABOUT INTERFERABLE BINARY CODE CONSTRUCTIONS

**16-10 : 16-20**

**2. Yuri V. Andreyev,**  
*Moscow Institute of Physics and Technology; Kotelnikov Institute of Radio  
Engineering and Electronics, Moscow, Russia*

MULTI-ELEMENT RECEIVER FOR ULTRA-WIDEBAND CHAOTIC  
COMMUNICATIONS

**16-20 : 16-30**

**3. Nikita A. Andriyanov,**  
*Ulyanovsk State Technical University, Ulyanovsk, Russia;  
JSC "RPC "Istok" named after Shokin", Fryazino, Russia*

ANALYSIS OF THE ACCELERATION OF NEURAL NETWORKS  
INFERENCE ON INTEL PROCESSORS BASED ON OPENVINO TOOLKIT

**16-30 : 16-40**

**4. Kamel Baiteche, Rinat A. Gematudinov,**  
*Moscow Automobile and Road Construction State Technical University, Moscow,  
Russia*

**Milana E. Chantieva, Khizar A. Dzhabrailov, Mikhail G. Gorodnichev**  
*Moscow Technical University of Communications and Informatics, Moscow,  
Russia*

VEHICLE SERVICE SYSTEM FOR AUTOMATED WEIGHT AND  
DIMENSIONAL CONTROL DURING THE OPERATION OF ROADS



**16-40 : 16-50**

**5. Igor V. Bogachkov** (*Senior Member IEEE*)  
*Omsk State Technical University, Omsk, Russia*

**Nicolay I. Gorlov,**  
*Siberian State University of Telecommunications and Computer Science,  
Novosibirsk, Russia*

THE BASICS OF AUTOMATED PROCESSING OF OPTICAL FIBER  
REFLECTOGRAMS FOR EVALUATING CHARACTERISTICS OF THE  
MANDELSTAM – BRILLOUIN BACKSCATTER

**16-50 : 17-00**

**6. Kristina V. Boychenko, Joshua Rivory,**  
*University of Queensland, Brisbane, Australia*

**Irina V. Boychenko, Anastasiya Yu. Kudryashova,**  
*Moscow technical university of communications and informatics, Moscow, Russia*  
INTERACTIVE SPACE AS A SIGNAL PROCESSING DEVICE

**17-00 : 17-10**

**7. Valeriy V. Chudnikov, Boris I. Shakhtarin,**  
*Bauman Moscow State Technical University, Moscow, Russia*

**Andrey V. Bychkov, Sarkis M. Kazaryan,**  
*NPP ITELMA LLC, Moscow, Russia*  
DOA ESTIMATION IN RADAR SENSORS WITH COLOCATED ANTENNAS

**17-10 : 17-20**

**8. Vitalii E. Dementyiev,**  
*Ulyanovsk State Technical University, Ulyanovsk, Russia*

**Nikita A. Andriyanov,**  
*JSC "RPC "Istok" named after Shokin", Fryazino, Moscow region; Ulyanovsk  
State Technical University, Ulyanovsk, Russia*

**Konstantin K. Vasilyev,**  
*Ulyanovsk State Technical University, Ulyanovsk, Russia*  
USE OF IMAGES AUGMENTATION AND IMPLEMENTATION OF DOUBLY  
STOCHASTIC MODELS FOR IMPROVING ACCURACY OF RECOGNITION  
ALGORITHMS BASED ON CONVOLUTIONAL NEURAL NETWORKS

**17-20 : 17-30**

**9. Alexander V. Dvorkovich** (*Member IEEE*), **Vladislav F. Petuhov**

*Moscow Institute of Physics and Technology, Moscow, Russia*

**Changyong Pan,**

*Tsinghua University, Beijing, China*

APPLYING OF THE ADAPTED METHODOLOGY FOR PREDICTION OF  
THE INTERFERENCE BETWEEN DVB-T2 AND DTMB-A SYSTEMS IN  
BORDER AREAS

**17-30 : 17-40**

**10. Svetlana S. Dymkova,**

*Moscow Technical University of Telecommunications and Informatics, Moscow, Russia*

**Artem D. Dymkov,**

*ANO "IRIDA", Moscow, Russia*

SYNCHRONIZING OF MOVING OBJECT WITH NOVEL 3D MAPS IMAGING

**17-40 : 17-50**

**11. Robert A. Eshpay, Oleg A. Stepustchenko,**

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

**Ildus U. Kurbiev, Andrey D. Proskuriakov, Vladislav V. Kadushkin,**

*SPC "Sensorika", Ltd., Skolkovo, Russia*

LC-FBG BASED MICROWAVE PHOTONIC SYSTEM FOR WHEELCHAIR  
PATIENT POSE MONITORING

**17-50 : 18-00**

**12. Dmitriy S. Fedorenko, Viktoriya N. Aldohina, Konstantin E. Legkov,**

**Viktor D. Liferenko,**

*Military Space Academy named after A.F. Mozhaisky, St. Petersburg, Russia*

QUANTITATIVE INTERPRETATION METHOD OF REFLECTION SPECTRA  
OBTAINED DURING SPECTROPHOTOMETRIC OBSERVATIONS OF  
SPACE OBJECTS

**SECTION 3**  
**Signal Processing Devices**  
**03.07.2020 (PART 2)**

**SECTION CHAIR**

**Denis S. Chirov,**

*Doctor of Science (Engineering), Moscow Technical University of  
Telecommunications and Informatics, Moscow, Russia*

**10-30 : 10-40**

**13. Alexandr B. Gerasimov, Yuliya V. Kiseleva,**

*P.G. Demidov Yaroslavl State University, Yaroslavl, Russia*

DISAMBIGUATION OF POLARIZATION DECOMPOSITION OF  
ELECTROMAGNETIC WAVE IN CASE OF INCIDENCE OR SCATTERING  
ALONG A NORMAL TO MEDIA BOUNDARY IN A MODEL OF RADIO  
CHANNEL

**10-40 : 10-50**

**14. Nicolay I. Gorlov,**

*Siberian State University of Telecommunications and Computer Science,  
Novosibirsk, Russia*

**Igor V. Bogachkov** (*Senior Member IEEE*)

*Omsk State Technical University, Omsk, Russia*

AN ANALYSIS OF THE INFLUENCE OF THE PHYSICAL LAYERS  
STRUCTURE OF OPTICAL FIBERS ON THE MANDELSTAM – BRILLOUIN  
SCATTERING CHARACTERISTICS

**10-50 : 11-00**

**15. Mikhail G. Gorodnichev, M.S. Moseva, Khizar A. Dzhabraïlov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

**Rinat A. Gematudinov**

*Moscow Automobile and Road Construction State Technical University, Moscow,  
Russia*

DEVELOPMENT OF ALGORITHMS FOR RECOGNITION OF OBJECTS IN  
VIDEO IN REAL TIME

**11-00 : 11-10**

**16. Zaur R. Idiatullov, Marat M. Fatykhov, German I. Il'in,**

*Kazan National Research Technical University n.a. A.N. Tupolev – KAI (KNRTU-KAI), Kazan, Russia*

**Vladimir I. Il'in,**

*Kazan Federal University, Kazan, Russia*

ON THE PECULIARITIES OF THE BEHAVIOUR OF THE INSTANTANEOUS FREQUENCY OF APSK-N-SIGNAL AT THE LINEAR SELECTIVE SYSTEM OUTPUT IN THE PRESENCE OF ISI

**11-10 : 11-20**

**17. Dmitry V. Ivanov (Member IEEE), Vladimir A. Ivanov, Maria I. Ryabova,**

**Vladimir V. Ovchinnikov,**

*Volga State University of Technology, Yoshkar-Ola, Russia*

ADAPTIVE SDR-EQUALIZER FOR FREQUENCY DISPERSION CORRECTION IN SINGLE-MODE WIDEBAND HF RADIO CHANNELS

**11-20 : 11-30**

**18. Ekaterina O. Kandaurova, Denis S. Chirov (Member IEEE)**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

ALGORITHM AND SOFTWARE FOR INTELLIGENT ANALYSIS OF THE FREQUENCY SPECTRUM FOR COGNITIVE RADIO SYSTEMS

**11-30 : 11-40**

**19. Svetlana V. Khadonova, Alexander V. Ufimtsev,**

*ST Technology LLC, Moscow, Russia*

**Svetlana S. Dymkova,**

*Moscow Technical University of Telecommunications and Informatics, Moscow, Russia*

WIDE APPLICATION INNOVATIVE MONITORING SYSTEM WITH PERSONAL SMART DEVICES

**11-40 : 11-50**

**20. Anvar N. Khairullin, Ilya M. Lerner, Vladislav L. Odintsov, Zaur R. Idiatullov,**

*Kazan National Research Technical University n.a. A.N. Tupolev – KAI (KNRTU-KAI), Kazan, Russia*

**Vladimir I. Il'in,**

*Kazan Federal University, Kazan, Russia*

TO THE MATTER OF CHOICE OF PSK-N-SIGNAL CONSTELLATIONS DUE TO DESTABILIZING FACTORS FOR RADIO ENGINEERING DATA TRANSMISSION SYSTEMS BASED ON THE THEORY OF RESOLUTION TIME

**11-50 : 12-00**

**21. Aleksey A. Kislitsin, Nataliya V. Ryabova** (*Member IEEE*), **Nikita A. Konkin**,  
*Volga State University of Technology, Yoshkar-Ola, Russia*

ESTIMATION OF THE GAIN IN THE TRANSIONOSPHERIC RADIO  
CHANNEL CAPACITY UNDER THE PRESENCE OF STOCHASTIC ERROR  
IN EXPERIMENTAL MEASURING TOTAL ELECTRON CONTENT OF THE  
IONOSPHERE

**12-00 : 12-10**

**22. Evgenia T. Kitova**,  
*Novosibirsk State Technical University, Novosibirsk, Russia*

**Nicolay I. Gorlov**,  
*Siberian State University of Telecommunications and Computer Science,  
Novosibirsk, Russia*

**Igor V. Bogachkov** (*Senior Member IEEE*)  
*Omsk State Technical University, Omsk, Russia*

UNAUTHORIZED ACCESS MONITORING IN OPTICAL ACCESS  
NETWORKS

**12-10 : 12-20**

**23. Pavel S. Korolev**,  
*National Research University Higher School of Economics, Moscow, Russia*

DEVELOPMENT OF THE METHODOLOGY FOR ASSESSING THE  
“PRODUCTION QUALITY FACTOR” FOR THE FAILURE RATE MODEL OF  
ARTIFICIAL EARTH SATELLITES ELECTRONIC MEANS

**12-20 : 12-30**

**24. Sergey V. Kozlov**,  
*Kazan National Research Technical University named after A. N. Tupolev-KAI,  
Kazan, Russia*

DATA RATE ESTIMATION METHOD FOR WI-FI NETWORKS OPERATING  
UNDER INTRA-SYSTEM INTERFERENCE INFLUENCE

**12-30 : 12-40**

**25. Vitaly B. Kreyndelin, Elena D. Grigorieva**,  
*Moscow Technical University of Telecommunications and Informatics, Moscow, Russia*

ANALYSIS OF FAST ALGORITHM OF MATRIX-VECTOR  
MULTIPLICATION FOR THE BANK OF DIGITAL FILTERS

**12-40 : 12-50**

**26. Gennady V. Kulikov, Vladimir P. Kulagin** (*Member IEEE*), **Nguyen Van Dung, A.A. Lelyukh,**

*MIREA - Russian Technological University, Moscow, Russia*

INFLUENCE OF SYNCHRONIZATION ERRORS ON THE NOISE IMMUNITY OF RECEIVING MULTI-POSITION M-PSK AND M-QAM SIGNALS

**12-50 : 13-00**

**27. Ilya M. Lerner,**

*Kazan National Research Technical University n.a. A.N. Tupolev – KAI (KNRTU-KAI), Kazan, Russia*

**Vladimir I. Il'in,**

*Kazan Federal University, Kazan, Russia*

NEW PRECISION ALGORITHM TO EFFECTIVE MEMORY ESTIMATION FOR CHANNEL WITH MEMORY

**ПЕРЕПЫВ**

**13-00 : 14-00**

**14-00 : 14-10**

**28. Nikita Yu. Liberovskiy, Vladimir S. Priputin, Andrey A. Kuchumov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

USING THE BLIND TWO REAL SOURCE SEPARATION ALGORITHM IN THE TASK OF DETECTION A USEFUL SIGNAL WITH AN ADDITIVE WHITE GAUSSIAN NOISE

**14-10 : 14-20**

**29. V.D. Liferenko, Denis Yu. Kolesnik, Konstantin E. Legkov,**

*Military Space Academy named after A.F. Mozhaisky, St. Petersburg, Russia*

METHOD FOR RECOGNIZING THE TYPE OF SPACE OBJECT IN AIRSPACE BASED ON THE USE OF RADAR IMAGES

**14-20 : 14-30**

**30. Vladislav I. Lipatkin, Elizaveta O. Lobova,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

BROADBAND NOISE-LIKE SIGNAL PARAMETERS JOINT ESTIMATION QUALITY WITH DISPERSION DISTORTIONS IN THE IONOSPHERIC CHANNEL

**14-30 : 14-40**

**31. Dmitry N. Shubin, Evgeniy M. Lobov, Vladimir O. Varlamov,**  
*Moscow Technical University of Communications and Informatics, Moscow, Russia*  
OVERVIEW OF THE NLOS ULTRAVIOLET COMMUNICATION  
TECHNOLOGY

**14-40 : 14-50**

**32. Vil R. Magsumov, Denis S. Chirov (Member IEEE), Vladimir S. Priputin,**  
*Moscow Technical University of Communications and Informatics, Moscow, Russia*  
DEVELOPMENT AND RESEARCH OF A HF RANGE HYBRID FILTER  
BANK BASED ON ARM PROCESSOR

**14-50 : 15-00**

**33. S. Yu. Maksimov, N. E. Poborchaya,**  
*Moscow Technical University of Communications and Informatics, Moscow, Russia*  
ESTIMATION OF A CHANNEL FACTORS AND SIGNAL DISTORTIONS IN  
THE MIMO SYSTEM WITH A DIRECT TRANSFORM RECEIVER UNDER  
THE CONDITIONS OF RAYLEIGH FADING AND DOPPLER FREQUENCY  
DISPERSION

**15-00 : 15-10**

**34. Ivan V. Malygin, Alexander S. Luchinin, Valeriya A. Surgutskaya,**  
**Yurij V. Kozlov,**  
*Ural Federal University, Ekaterinburg, Russia*  
ONE OF THE WAYS TO PROTECT A SPREAD SPECTRUM  
COMMUNICATION SYSTEM FROM SUCH STRUCTURAL INTERFERENCE

**15-10 : 15-20**

**35. Nataliia E. Miroshnikova (Member IEEE), Gennadyi D. Petruchin, Aleksei**  
**V. Shherbakov, Pavel A. Titovec,**  
*Moscow Technical University of Communications and Informatics, Moscow, Russia*  
A STATISTICAL MODEL OF THE PROPAGATION OF OPTICAL  
RADIATION IN THE HYDROSPHERE

**15-20 : 15-30**

**36. N.I. Moiseev**

*ISS Reshetnev Company, Moscow, Russia*

**L.E. Nazarov**

*Kotelnikov IRE RAS, Moscow, Russia*

**S.S. Adjemov**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

**N.I. Danilovich**

*ISS Reshetnev Company, Moscow, Russia*

**A.A. Kuchumov**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

CONCEPT OF CREATION OF GLOBAL MULTI-POSITION SATELLITE  
RADAR INFORMATION SYSTEM

**15-30 : 15-40**

**37. Aung Kyaw Myo (Member IEEE), Zaw Hein, Evgeni M. Portnov,**

**Vitaly V. Kokin, Sergey V. Tsymbalov,**

*Institute of Systems and Software Engineering and Information Technology,*

*National Research University of Electronic Technology, Zelenograd, Moscow,  
Russia*

DEVELOPMENT OF A METHOD FOR CALCULATING THE ERRORS OF  
AUTO-BALANCE BRIDGE METERS

**15-40 : 15-50**

**38. Denis Yu. Pankratov, Anastasia G. Stepanova,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

NONLINEAR ITERATIVE CHEBYSHEV BASED DEMODULATION  
ALGORITHM WITH EIGENVALUES ESTIMATES OF THE CHANNEL  
MATRIX FOR MASSIVE MIMO SYSTEMS

**15-50 : 16-00**

**39. Natalia E. Poborchaya,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

STATIONARY CHANNEL FACTORS AND SIGNAL DISTURBANCES IN A  
DIRECT CONVERTER RECEIVER IN A SYSTEM WITH MIMO JOINT  
ESTIMATION ALGORITHM



**16-00 : 16-10**

**40. Evgenii V. Potapov, Artem A. Ipatov, Andrey L. Priorov, Alexander A. Romanov**

*P.G. Demidov Yaroslavl State University, Yaroslavl, Russia*

DEVELOPING SPHERICAL MOBILE DEVICES FOR INDOOR EXPLORATION

**16-10 : 16-20**

**41. Vladimir S. Priputin, Kirill Yu. Sokolov, Nikolay A. Kandaurov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

IMPLEMENTATION OF THE DISCRETE FREQUENCY DEMODULATOR ON PROCESSOR WITH ARM ARCHITECTURE

**16-20 : 16-30**

**42. Maria I. Ryabova, Dmitry V. Ivanov (Member IEEE), Andrey A. Chernov, Vladimir V. Ovchinnikov,**

*Volga State University of Technology, Yoshkar-Ola, Russia*

EXPERIMENTAL STUDY OF PHASE-FREQUENCY RESPONSES OF HF RADIO CHANNELS WITH THE USE OF SDR IONOSONDE

**16-30 : 16-40**

**43. Nataliya V. Ryabova (Member IEEE), Dmitriy V. Ivanov (Member IEEE), Vladimir A. Ivanov, Aleksey A. Elsukov,**

*Volga State University of Technology, Yoshkar-Ola, Russia*

PROCESSING MULTICARRIER PHASE CODED SIGNALS WITH OFDM ON THE USRP PLATFORM FOR NVIS SOUNDING OF HF RADIO CHANNELS

**16-40 : 16-50**

**44. Vitaliy V. Ryzhakov, Ekaterina V. Prohorova**

*Surgut State University, Surgut, Russia*

ELECTROCARDIOGRAM SIGNALS DIGITAL PROCESSING IN A DISTRIBUTED COMPUTING SYSTEM

**16-50 : 17-00**

**45. Ekaterina V. Sharapova,**

*Vladimir State University, Murom, Russia*

INCREASE THE SPEED OF SEARCH INDEX IN THE DUPLICATE TEXT DETECTION SYSTEMS

**17-00 : 17-10**

**46. Oleg A. Shorin,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

**Alexandr O. Shorin, German O. Bokk,**

*OJSC NIRIT-XINWEI Telecom Technology (NXTT), Moscow, Russia*

STOCHASTIC FILTRATION FOR MOVING INTENSITY OF POISSON FLOW  
WITH RANDOM JUMPS AT RANDOM MOMENTS

**17-10 : 17-20**

**47. Andrei V. Smirnov** (*Member IEEE*)

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

USE OF REGULARIZATION IN INDIRECT LEARNING IDENTIFICATION  
OF PREDISTORTER

**17-20 : 17-30**

**48. Elena A. Spirina,**

*Kazan National Research Technical University named after A. N. Tupolev-KAI,  
Kazan, Russia*

APPLYING THE COLLECTIVE DYNAMIC ROUTING METHOD IN IEEE  
802.11AX STANDARD WI-FI NETWORKS

**17-30 : 17-40**

**49. Oleg A. Stepustchenko, Robert A. Eshpay,**

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

**Ildus U. Kurbiev, Andrey D. Proskuriakov, Vladislav V. Kadushkin,**

*SPC "Sensorika", Ltd., Skolkovo, Russia*

LC-FBG-BASED MICROWAVE PHOTONIC SYSTEM FOR  
REFRACTOMETRIC BIOSENSORS

**17-40 : 17-50**

**50. Alexandr B. Sylantyev, Andrey V. Golubev, C. Abel Carlos Fernandu,  
Jelson Silva F. Olim,**

*P.G.Demidov Yaroslavl State University, Yaroslavl, Russia*

**Alexandr V. Timoshenko** (*IEEE Member*),

*MIET National Research University of Electronic Technology, Moscow, Russia*

ANALYSIS OF EFFICIENCY OF LONG-TERM MULTI-SCANNING RADAR  
OBSERVATION METHODS

**SPECIAL SECTION 4**  
**«Problems of microwave electronics»**  
**them. V.A. Solntsev**  
**02.07.2020**

**SECTION CHAIR**

**Andrey A. Yelizarov**, *Doctor of Science (Engineering), Professor, National Research University Higher School of Economics, Moscow, Russia*

**14-00 : 14-10**

**1. Oleg V. Arinin, Grigoriy M. Aristarkhov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

SELECTIVE PROPERTIES OF MULTISTEP COMB STRUCTURES WITH VARIOUS METHODS OF THEIR EXCITATION

**14-10 : 14-20**

**2. Grigory M. Aristarkhov, Igor N. Kirillov,**

*Moscow Technical University of Communications and Informatics, Moscow, Russia*

COMPACT MICROWAVE HALF-WAVE RESONATOR FILTERS WITH INCREASED FREQUENCY SELECTIVITY

**14-20 : 14-30**

**3. Andrei Yu. Baikov,**

*Basic Technologies and Components of Vacuum Devices, Ltd. Base, Moscow, Russia*

**Olga Baikova,**

*National Research Nuclear University MEPhI; FSEEP “Medical College”, Moscow, Russia*

METHODS FOR OPTIMIZING THE HIGH EFFICIENT BROADBAND KLYSTRONS

**14-30 : 14-40**

**4. Svyatoslav V. Ballandovich** (*Member IEEE*), **Yuri G. Antonov**,  
**Gregory A. Kostikov**, **Liubov M. Liubina** (*Member IEEE*), **Mikhail I. Sugak**,  
*Saint Petersburg Electrotechnical University "LETI", Saint Petersburg, Russia*  
DEVELOPMENT OF THE ULTRA-WIDEBAND CIRCULAR ANTENNA ARRAY

**14-40 : 14-50**

**5. Ilia R. Lavrukhin**, **S.V. Bashkevich**, **V.A. Tarantsev**,  
**A.A. Yelizarov** (*Member IEEE*)  
*National Research University Higher School of Economics, Moscow, Russia*  
DEVELOPMENT OF ANTENNA MODULE FOR THE INTELLIGENT RFID  
SYSTEM

**14-50 : 15-00**

**6. Yuri B. Nechaev**,  
*Voronezh State University, Voronezh, Russia*  
**Ilia V. Peshkov**, **Nataliya A. Fortunova**, **Irina N. Zaitseva**,  
*Bunin Yelets State University, Yelets, Russia*  
THE RESEARCH OF THE DIGITAL BEAMFORMING ALGORITHM FOR  
OPTIMAL NOISE REDUCTION IN A CYLINDRICAL ANTENNA ARRAY  
WITH DIRECTIVE RADIATORS

**15-00 : 15-10**

**7. Ilia V. Peshkov**, **Nataliya A. Fortunova**, **Irina N. Zaitseva**,  
*Bunin Yelets State University, Yelets, Russia*  
**Yuri B. Nechaev**,  
*Voronezh State University, Voronezh, Russia*  
THE COMPARISON OF DIGITAL BEAMFORMING TECHNOLOGY FOR  
OPTIMAL NOISE REDUCTION IN CONFORMAL ANTENNA ARRAYS  
WITH DIRECTIVE RADIATORS

**15-10 : 15-20**

**8. Andrey A. Skuridin**, **Andrey A. Yelizarov** (*Member IEEE*)  
*National Research University Higher School of Economics, Moscow, Russia*  
**Elmira A. Zakirova**,  
*Federal State Unitary Enterprise Dukhov Automatics Research Institute (VNIIA),  
Moscow, Russia*  
**Aleksandr L. Tuv**, **V.T. Peresadov**,  
*National Research University Higher School of Economics, Moscow, Russia*  
PRECISION GAP SENSOR ON COUPLED RECTANGULAR SPIRALS

**15-20 : 15-30**

**9. Aleksandr V. Suchkov, Vladimir I. Vinnikov,**

*ALMAZ Research & Production Corporation, Moscow, Russia*

**FREQUENCY-SCAN ARRAY ANTENNAS OF THREE-DIMENSIONAL  
SURVEILLANCE RADARS**

**15-30 : 15-40**

**10. Alexander V. Timoshenko (Member IEEE), Anatoliy Yu. Perlov,**

*National Research University of Electronic Technology National Research  
University "MIET", Moscow, Russia*

**Valeriy A. Pankratov, Andrey M. Kazantsev,**

*JSC Radio Technical Institute, Moscow, Russia*

**Kirill V. Lvov,**

*Lomonosov Moscow State University, Moscow, Russia*

**METHODS FOR FAILURES FORECASTING OF COMPLEX RADIO  
ELECTRONIC SYSTEMS**

**15-40 : 15-50**

**11. Andrey A. Yelizarov (Member IEEE), Igor V. Nazarov, Andrey A. Skuridin,**

*National Research University Higher School of Economics, Moscow, Russia*

**Elmira A. Zakirova,**

*Federal State Unitary Enterprise Dukhov Automatics Research Institute (VNIIA),  
Moscow, Russia*

**COMPUTER MODEL OF A FREQUENCY-SELECTIVE SURFACE ON  
MUSHROOM-SHAPED METAMATERIAL**