

**International Scientific Conference**

**«2018 SYSTEMS OF SIGNALS GENERATING  
AND PROCESSING IN THE FIELD  
OF ON BOARD COMMUNICATIONS»**

**(IEEE Conference #43917)**

**14-15 March 2018**

**CONFERENCE PROGRAM**

**Moscow  
2018**

## **ОРГАНИЗАТОРЫ КОНФЕРЕНЦИИ**

МОСКОВСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ СВЯЗИ И ИНФОРМАТИКИ (МТУСИ)  
ИНСТИТУТ ИНЖЕНЕРОВ ПО ЭЛЕКТРОТЕХНИКЕ И ЭЛЕКТРОНИКЕ (IEEE)  
ИЗДАТЕЛЬСКИЙ ДОМ «МЕДИА ПАБЛИШЕР»

## **СЕКЦИИ КОНФЕРЕНЦИИ\***

**СЕКЦИЯ 1.** Antennas and Radio Waves Propagation.

**СЕКЦИЯ 2.** Navigation and Mathematical Algorithms of an Object Space Orientation.

**СЕКЦИЯ 3.** Radiofrequency Applications.

**СЕКЦИЯ 4.** Wire and Optical Communication and Control Systems.

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

## **РАСПИСАНИЕ РАБОТЫ КОНФЕРЕНЦИИ**

### **14 марта 2018 г. Конгресс-центр МТУСИ**

<b>9-00 — 10-00</b>	<b>Регистрация участников</b>
<b>10-00 — 12-30</b>	<b>Пленарное заседание</b>
<b>12.30 — 13.30</b>	<b>Обед</b>
<b>13.30 — 15.30</b>	<b>Посещение лаборатории-музея истории электросвязи (МТУСИ)</b>

### **15 марта 2018 г. Конгресс-центр МТУСИ**

<b>10-00 — 14-00</b>	<b>Работа секций конференции</b>
<b>14-00 — 15-00</b>	<b>Обед</b>
<b>15.00 — 19.00</b>	<b>Продолжение работы секций конференции</b>

## **ИНФОРМАЦИОННЫЕ ПАРТНЕРЫ КОНФЕРЕНЦИИ**

### **НАУЧНЫЕ ЖУРНАЛЫ**

«Т-Comm – Телекоммуникации и транспорт», Москва (ВАК, РИНЦ)

«Наукоемкие технологии в космических исследованиях Земли», Санкт-Петербург (ВАК, РИНЦ)

**ПОВЕСТКА ДНЯ ПЛЕНАРНОГО ЗАСЕДАНИЯ**  
**14 марта 2018 г. Конгресс-центр МТУСИ**

**10-00 — 10-05**

**Вступительное слово**

*Заместитель руководителя Федерального агентства связи*

**ШЕРЕДИН Роман Валерьевич**

**10-05 — 10-10**

**Вступительное слово**

*Ректор МТУСИ*

**ЕРОХИН Сергей Дмитриевич**

**10-10 — 10-25**

**Приветственное слово**

*Директор Филиала IEEE Worldwide Limited в Российской Федерации,*

*Ученый секретарь российского отделения IEEE Circuit and System Society*

**ИВАНИЮШКИН Роман Юрьевич**

**10-25 — 10-40**

**Доклад «Методы и программно-аппаратные средства диагностики ионосферных и трансионосферных радиоканалов для повышения эффективности систем связи»**

**ИВАНОВ Дмитрий Владимирович, член-корреспондент РАН**

**ИВАНОВ Владимир Александрович, д.ф.-м.н., профессор**

**РЯБОВА Наталья Владимировна, д.ф.-м.н., профессор ПГТУ**

**10-40 — 10-55**

**Доклад «Элементная база сверхпроводниковых искусственных нейросетей»**

**КЛЁНОВ Николай Викторович, ведущий научный сотрудник МТУСИ, к.ф.-м.н., доцент**

**ТЕРЕШОНОК Максим Валерьевич, МТУСИ;**

**ЩЕГОЛЕВ Андрей Евгеньевич, МГУ им. М.В. Ломоносова;**

**СОЛОВЬЕВ Игорь Игоревич, НИИ ядерной физики им. Д.В. Скobelцына**

**10-55 — 11-10**

**Доклад «Сверхширокополосные беспроводные средства связи и сети**

**на основе хаотических радиоимпульсов»**

**ДМИТРИЕВ Александр Сергеевич, профессор, Институт радиотехники и электроники**

**им. В. А. Комельникова Российской академии наук д.ф.-м.н.**

**11-10 — 11-25**

**Доклад «Перспективные технологии радиосвязи в системах 5G»**

**КРЕЙНДЕЛИН Виталий Борисович, д.т.н., профессор, заведующий кафедрой МТУСИ**

**11-25 — 11-40**

**Доклад «Моделирование и имитация радиоканалов»**

**САМОЙЛОВ Александр Георгиевич, Зам. директора Института информационных технологий и радиоэлектроники ВлГУ, д.т.н., профессор, профессор кафедры Радиотехники и радиосистем**

**11-40 — 11-55**

**Доклад «Сравнительный анализ развития телекоммуникационной инфраструктуры Арктического региона (Россия – европейские страны) по материалам проекта «Business index north»»**

**БРИКСЕНКОВ Андрей Александрович, заместитель директора представительства в Москве, РИГМУ**

**11-55 — 12-10**

**Доклад «Информационная система для продвижения публикаций сотрудников научных и образовательных организаций»**

**ДЫМКОВА Светлана Сергеевна, начальник сектора информационных ресурсов  
отдела организации научной работы и публикационной активности МТУСИ**

**12-10 — 12-25**

**Доклад «Экспозиции лаборатории-музея истории электросвязи в учебной и профориентационной деятельности МТУСИ»**

**ИВАНИЮШКИН Роман Юрьевич, к.т.н., доцент МТУСИ**

**РАЗИН Олег Александрович, заведующий лабораторией, МТУСИ**

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**SECTION 1. (15 March)**  
**ANTENNAS AND RADIO WAVES PROPAGATION**

**SECTION CHAIRMEN:** **Vadim A. Kaloshin**, *Doctor of Sciences (Engineering), IEEE Region 8, Chair of Russian Section Chapter, MTT/ED*

**Dmitry V. Ivanov**, *Doctor of Sciences (Physical and Mathematical), Corresponding Member of RAS*

**1. Bestugin A.R., Kryachko A.F., Poddubniy S.S., Kayatkin V.N.,  
SUAI, Saint Petersburg, Russia**

**RADIATED SIGNALS MODELS**

**2. Chebychev V.V., Yastrebtsova O.I.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia**

**MODELING OF A SLOT SPIRAL ANTENNA IN A MULTILAYER STRUCTURE**

**3. Choni Yu.I., Danilov I.Yu., Layth T.K., Abuhadma,  
Kazan National Research Technical University, Kazan, Tatarstan, Russia**

**ANTENNA PATTERN RETRIEVAL FROM MEASUREMENTS  
IN NON-IDEAL ANECHOIC CHAMBER**

**4. Ivanov V.A., Ivanov D.V., Elsukov A.A.,  
Ovchinnikov V.V., Ryabova N.V., Ryabova M.I.,  
Volga State University of Technology, Yoshkar-Ola, Russia**

**BPSK SIGNAL SHAPING AND PROCESSING FOR DIGITAL SDR IONOSONDE**

**5. Kravchenko N.P., Kasatkin A.D., Presnyakov S.A., Stromov Yu.V., Mukhin S.V.,  
NRU HSE, Moscow, Russia**

**PROGRAM COMPLEX FOR DESIGNING CM- AND MM-RANGE TWT  
WITH RESONATOR SLOW-WAVE STRUCTURES**

**6. Kreyndelin V.B., Smirnov A.E., Ben Rejeb T.B.K.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia**

**EFFECTIVE PRECODING AND DEMODULATION TECHNIQUES  
FOR 5G COMMUNICATION SYSTEMS**

**7. Lavrushev V.N., Choni Yu.I., Romanov A.G.,  
Kazan National Research Technical University, Kazan, Tatarstan, Russia**

**MEASURING FLAT SURFACE REFLECTIVITY WITH THE HELP  
OF AN OPEN RESONATOR**

8. Malinova O.E., Sidorova T.V., Nazarov I.V., Yelizarov A.A., Karavashkina V.N.,  
NRU HSE, Moscow, Russia;

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

**WAVEGUIDE TERMINATION WITH A MAGNETIC WALL  
ON THE MUSHROOM-SHAPED METAMATERIAL MODELING**

9. Nerobeev A.V., Yakimov A.N., Bestugin A.R., Kryachko A.F., Kirshina I.A.,  
*SUAI, Saint Petersburg, Russia*

**RADIATION INVESTIGATION OF THE ANTENNA ARRAY,  
TAKING INTO ACCOUNT VIBRATION ACTIONS**

10. Ryabova N.V., Ivanov D.V., Ivanov V.A., Elsukov A.A.,  
*Volga State University of Technology, Yoshkar-Ola, Russia*

**STUDYING THE ALGORITHMS OF PROCESSING A FMICW SIGNAL  
FOR VERTICAL INCIDENCE IONOSPHERIC SOUNDING  
WITH THE USE OF A SINGLE ANTENNA**

11. Samoylov A.G., Samoylov S.A., Kurakova T.P.

*Vladimir State University named after Alexander and Nikolay Stoletovs, Vladimir, Russia*

**MODELING OF RADIO CHANNELS OF MILLIMETER WAVES RANGE**

12. Yastrebtsova O.I.,

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

**SCAN BLINDNESS IN ONE-LAYER MICROSTRIP ANTENNA ARRAYS**

13. Zaydullin A.A., Dautov O.Sh.,

*KNRTU-KAI, Kazan, Russia*

**EXCITATION OF THE ISOTROPIC TWO LAYER MEDIA WITH LINEAR  
DEPENDENCE OF IMPEDANCE AND OF THE ISOTROPIC ONE LAYER  
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**SECTION 2. (15 March)**  
**NAVIGATION AND MATHEMATICAL ALGORITHMS**  
**OF AN OBJECT SPACE ORIENTATION**

**SECTION CHAIRMEN:** Liliya I. Voronova, *Doctor of Sciences (Physical and Mathematical),  
Moscow Technical University of Communication and Informatics*

Vladimir A. Dokuchaev, *Doctor of Sciences (Engineering),  
Moscow Technical University of Communication and Informatics*

**1. Balobanov V.G., Balobanov A.V., Vlasyuk I.V., Potashnikov A.M.,  
PSUTI, Samara, Russia  
Moscow Technical University of Communication and Informatics, Moscow, Russia**  
**LOW LATENCY ONM VIDEO COMPRESSION METHOD  
FOR UAV CONTROL AND COMMUNICATION**

**2. Biryukova O.V., Koretskaya I.V., Lapitskaya I.A., Lapitskiy K.M.,  
NRU «MPEI», Moscow, Russia**  
**ORGANIZATION OF WORK PROCESS WITH EXTERNAL STORAGE  
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**3. Dokuchaev V.A., Gorban E.V., Maklachkova V.V.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia**  
**ARCHITECTURE OF THE REGIONAL TRANSPORT NAVIGATION  
AND INFORMATION SYSTEMS**

**4. Ilyichenkova Z.V., Ivanova S.M., Volkov A.I., Ermakova A.Yu.,  
MSTU “STANKIN”, Moscow, Russia;  
Moscow Technological University (MIREA), Moscow, Russia;  
Moscow Technical University of Communication and Informatics, Moscow, Russia**  
**THE USAGE OF NEURAL NETWORKS FOR MATHEMATICAL MODEL  
OF AUTONOMOUS OBJECTS**

**5. Goncharenko A.A., Voronova L.I., Voronov V.I., Ezhov A.A.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia**  
**AUTOMATED SUPPORT SYSTEM DESIGNING FOR PEOPLE  
WITH LIMITED COMMUNICATION**

**6. Kanaev A.K., Lukichev M.M., Login E.V.  
Moscow Technical University of Communication and Informatics, Moscow, Russia**  
**INCREASING THE EFFICIENCY OF THE FUNCTIONING OF TRANSPORT  
COMMUNICATION NETWORKS BY USING A MODIFIED METHOD  
FOR DETERMINING A SET OF INDEPENDENT ROUTES**

**7. Potashnikov A.M., Vlasyuk I.V., Balobanov A.V., Romanov S.G.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia  
IRREGULAR SPATIAL COLOR SAMPLING IN VIDEO SINGLE  
MATRIX SENSORS**

**8. Rogozinsky G.G.,  
St.Petersburg State University of Telecommunications, St.Petersburg, Russia  
PRINCIPLES OF CYBER-PHYSICAL MODELS MAPPING  
ONTO SONIFICATION SOUND SPACES**

**9. Stepanov S.N., Romanov A.I., Stepanov M.S., Vasilev A.P.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia  
ANALYTICAL MODELING OF CALL ADMISSION CONTROL  
FOR REAL-TIME AND ELASTIC SERVICES IN INTER SATELLITE LINK**

**10. Trunov A.S., Voronova L.I., Voronov V.I., Sukhachev D.I., Strelnikov V.G.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia  
LEGACY APPLICATIONS MODEL INTEGRATION  
TO SUPPORT SCIENTIFIC EXPERIMENT**

**11. Voronov V.I., Genchel. K.V., Artemov M.D., Bezumnov D.N.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia  
“SURDOTELEPHONE” PROJECT WITH CONVOLUTIONAL  
NEURAL NETWORK**

**12. Voronova L.I., Tolmachev R.V., Usachev V.A.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia  
RESOURCE DEVELOPMENT TO PREVENT RIOTS AT MASS EVENTS**

**SECTION 3. (15 March)**  
**RADIOFREQUENCY APPLICATIONS**

**SECTION CHAIRMEN:** *Andrey A. Yelizarov, Doctor of Sciences (Engineering),  
National Research University "Higher School of Economics";  
Moscow Technical University of Communication and Informatics*

**Roman Y. Ivanyushkin, PhD, Associate Professor of MTUCI,  
Branch Director of the IEEE Worldwide Limited in the RF,  
Scientific Secretary of Russian (Moscow) IEEE CAS04 Chapter**

**1. Al-odhari A., Fokin G.A., Kireev A.V.,  
University of modern sciences, Sana'a, Yemen;  
SPBGUT, Saint-Petersburg, Russia**

**POSITIONING OF THE RADIO SOURCE BASED ON TIME DIFFERENCE  
OF ARRIVAL METHOD USING UNMANNED AERIAL VEHICLES**

**2. Aristarkhov G.M., Arinin O.V., Kirillov I.N.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia**  
**COMPACT HIGHLY-SELECTIVE MICROSTRIP FILTERS BASED  
ON COUNTER-COMB STRUCTURES**

**3. Balashkov M.V., Bogachev V.M.,  
MPEI, Moscow, Russia**  
**EXPONENTIAL APPROXIMATION BY THE  $\xi$ -TRANSFORM METHOD:  
THEORY AND APPLICATIONS**

**4. Chirov D.S.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia**  
**METHOD OF BACK-OBLIQUE SOUNDING OF THE IONOSPHERE  
IN HF-RANGE FOR OPERATIONAL COMPENSATION OF MEASUREMENT  
ERRORS OF EARLY-WARNING RADARS**

**5. Fokin G.A., Kireev A.V., Al-odhari A.,  
SPBGUT, Saint-Petersburg, Russia;  
University of modern sciences, Sana'a, Yemen**  
**TDOA POSITIONING ACCURACY PERFORMANCE EVALUATION  
FOR ARC SENSOR CONFIGURATION**

**6. Kalashnikov E.A., Kondybayeva A.B., Ositis A.P.,  
National University of Science and Technology "MISiS", Moscow, Russia**  
**INNER PARAMETERS' OPTIMIZATION IN THE ARTIFICIAL  
NEURAL NETWORK FOR THE TRAFFIC DATA CLASSIFICATION  
IN RADIOFREQUENCY APPLICATIONS**

7. Khabibullin R.A., Morozov O.G., Sakhabutdinov A.J., Nureev I.I., Kuznetsov A.A.,  
*IUHFSE RAS, Moscow, Russia;*  
*KNRTU-KAI, Kazan, Russia*

**TWO-FREQUENCY RADIATION FORMING ON CHIRPED FBG  
FOR TUNING TERAHERTZ CARRIERS GENERATION**

8. Kireev A.V., Fokin G.A., Al-odhari A.,  
*SPBGUT, Saint-Petersburg, Russia;*  
*University of modern sciences, Sana'a, Yemen*

**TOA MEASUREMENT PROCESSING FOR POSITIONING ANALYSIS  
IN NLOS CONDITIONS**

9. Kondybayeva A.B., Ositis A.P., Kalashnikov E.A.,  
*National University of Science and Technology "MISiS", Moscow, Russia*

**OPTIMAL TRAFFIC ROUTING IN RADIOFREQUENCY APPLICATIONS  
USING MACHINE LEARNING**

10. Kuznetsov A.A., Nureev I.I., Sakhabutdinov A.J., Misbakhov R.Sh., Feofilaktov S.V.,  
*KNRTU-KAI, Kazan, Russia;*  
*KSPEU, Kazan, Russia;*

*JSC "IRZ", "IRZ TEK", Ltd, Izhevsk, Russia*

**FBG BASED BRUSH LENGTH SENSORS  
FOR ONBOARD MEASUREMENT SYSTEMS**

11. Leonov A.V. (*IEEE member № 92801975*), Litvinov G.A.,  
*Omsk State Technical University, Omsk, Russia*

**APPLYING AODV AND OLSR ROUTING PROTOCOLS TO AIR-TO-AIR  
SCENARIO IN FLYING AD HOC NETWORKS FORMED BY MINI-UAVS**

12. Lerner I.M., Il'in G.I., Fayzullin R.R., Il'in V.I.,  
*Institute of Radioelectronics and Telecommunications Kazan National Research  
Technical University n.a. A.N.Tupolev – KAI, Kazan, Russia;*  
*Kazan State University, Kazan, Russia*

**PRACTICAL ASPECTS OF INCREASING THE SPECTRAL EFFICIENCY  
OF PSK-N-SIGNALS DUE TO INTERSYMBOL SYMBOL INTERFERENCE**

13. Lobov E.M., Lobova E.O., Elsukov B.A.,  
*Moscow Technical University of Communication and Informatics, Moscow, Russia*

**WIDEBAND SIGNALS DISPERSION DISTORTION COMPENSATOR  
BASED ON DIGITAL FILTER BANKS**

14. Ositis A.P., Kalashnikov E.A., Kondybayeva A.B.,  
*National University of Science and Technology "MISiS", Moscow, Russia*

**OPTIMIZED DATA PROTECTION AND NETWORK ATTACKS' ANALYSIS  
THROUGHOUT SECURITY CLASSES IDENTIFICATION WITH MACHINE  
LEARNING METHODS IN RADIOFREQUENCY APPLICATIONS**

**15. Ryabov I.V., Tolmachev S.V., Strelnikov I.V.,**

*Volga State University of Technology, the Republic of Mari El, Yoshkar-Ola, Russia*

**DIRECT DIGITAL SYNTHESIZER FOR RADIO COMMUNICATION**

**SYSTEMS WITH A SPREAD SPECTRUM**

**16. Ryabov I.V., Tolmachev S.V., Strelnikov I.V.,**

*Volga State University of Technology, the Republic of Mari El, Yoshkar-Ola, Russia*

**DIRECT DIGITAL SYNTHESIZER FOR RADIO COMMUNICATION SYSTEMS**

**WITH PROGRAMMABLE TUNING OF THE WORKING FREQUENCY**

**17. Sakhabutdinov A.J., Morozov O.G., Ivanov A.A., Misbakov R.Sh., Feofilaktov S.V.,**

*KNRTU-KAI, Kazan, Russia;*

*KSPEU, Kazan, Russia;*

*JSC "IRZ", "IRZ TEK", Ltd, Izhevsk, Russia*

**MULTIPLE FREQUENCIES ANALYSIS IN FBG**

**BASED INSTANTANEOUS FREQUENCY MEASUREMENTS**

**18. Sannikov V.G.,**

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

**AN ACOUSTIC TOMOGRAPHY METHOD FOR EXTRACTING SPEECH**

**PATTERNS FROM NOISY SPEECH**

**19. Stroganova E.P., Varlamov O.V.,**

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

**MEASUREMENT ACCURACY ANALYSIS**

**FOR ON-BOARD MEASURING DEVICES**

**20. Tikhomirov A.V., Omelyanchuk E.V., Semenova A.Yu.,**

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

**RECOMMENDED 5G FREQUENCY BANDS EVALUATION**

**21. Varlamov O.V., Stroganova E.P.**

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

**FREQUENCY EXTENSION CIRCUIT FOR EER TRANSMITTERS**

**OPERATING WITH ELECTRICALLY SHORT ANTENNAS**

**22. Vintenkova Y.S., Kozlov S.V., Spirina E.A.,**

*KNRTU-KAI, Kazan, Russia*

**BRAN COLLECTIVE DYNAMIC ROUTING OPTIMAL ROUTES**

**EVALUATION ALGORITHM**

**SECTION 4. (15 March)**  
**WIRE AND OPTICAL COMMUNICATION**  
**AND CONTROL SYSTEMS**

**SECTION CHARMEN:** **Vladimir A. Burdin, Doctor of Sciences (Engineering),  
Povelzsiy State University of Telecommunications and Informatics**

**Vladimir A. Efimushkin, PhD, Central Research Institute  
of Communications**

**1. Adzhemov Ar.S., Kudryashova A.Yu.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia**  
**PECULIARITIES OF THE ESTIMATION OF THE QUALITY OF SIGNAL  
CONVERSION FOR SUCCESSIVE TRANSFORMATIONS IN VARIOUS  
METRIC SPACES**

**2. Andreev V.A., Burdin V.A., Bourdine A.V., Dashkov M.V.,  
PSUTI, Samara, Russia**  
**SIMULATION OF TWO-MODE FIBER OPTIC LINK WITH CHROMATIC  
DISPERSION COMPENSATION AT LINE AMPLIFIERS**

**3. Antonnikov D.O., Melnik S.V., Smirnov N.I.,  
Moscow Technical University of Communication and Informatics, Moscow, Russia;  
Federal State Educational Institution "Moscow Suvorov Military School of the Ministry  
of Defense of the Russian Federation", Moscow, Russia;  
Central Research Institute of Communications, Moscow, Russia**  
**WAYS OF OPERATIONAL MEASUREMENT PARAMETERS  
OF POLLUTION OF THE ENVIRONMENT AND DATA TRANSMISSION  
BY ONBOARD COMMUNICATION SYSTEM**

**4. Bogachkov I.V. (Senior Member IEEE #41314129), Trukhina A.I.,  
Omsk State Technical University, Omsk, Russia**  
**RESEARCHES OF INITIAL VALUE OF THE BRILLOUIN  
FREQUENCY SHIFT IN OPTICAL FIBERS OF DIFFERENT TYPES**

**5. Bourdine A.V., Burdin V.A.,  
Povelzskiy State University of Telecommunications and Informatics (PSUTI),  
Samara, Russia**  
**RESEARCH ON THE INFLUENCE OF FMF REFRACTIVE INDEX PROFILE  
DEVIATION FROM THE OPTIMIZED FORM ON DMD DEGRADATION**

**6. Burenin A.N., Legkov K.E., Orkin V.V.,**  
*OJSC «Research Institute «Rubin», St. Petersburg, Russia;*  
*Military Space academy, St. Petersburg, Russia*

**METHOD FOR FORMING OF THE PLAN FOR THE DISTRIBUTION  
OF APPLICATIONS FOR INFORMATION PROVISION  
IN THE INFORMATION SYSTEM**

**7. Efimushkin V.A., FSUE ZNIIS, Moscow, Russia**  
**GRAPH-MATRIX MODEL FOR BROADBAND CHANNEL PARTITION  
IN A COMPLEX IOT SOLUTION**

**8. Elagin V.S., Goldshtain B.S., Zarubin A.A., Onufrienko A.V., Savelieva A.A.,**  
*Federal State Educational Budget-Financed Institution of Higher Education;*  
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