DRAFT PROGRAM

31ST SAINT PETERSBURG INTERNATIONAL CONFERENCE ON INTEGRATED NAVIGATION SYSTEMS 27-29 May 2024

MONDAY, 27 MAY

10.00 – 10.15 **O P E N I N G C E R E M O N Y**

SESSION I – INTEGRATED NAVIGATION AND CONTROL SYSTEMS

P L E N A R Y P A P E R S

10.15 – 10.35
10
1. **S.V. Bronnikov, D.Yu. Karavaev, A.S. Rozhkov, D.N. Rulev** (*S.P. Korolev Rocket and Space Corporation Energia, Korolev, Moscow Region, **Russia***), **O.S. Rurin, A.K. Kalifatidi** (*RuCap LLC, Moscow, **Russia***)
Testing of the Local Positioning Systems on board the ISS RS

10.35 – 10.55
141
2. **S. Zhao, J.W. Guo, Y.L. Zhou, T.C. Huang** (*Zhejiang University, Hangzhou, **China***)
A GNSS/SINS Integrated Navigation Algorithm Based on AI-Assisted Pseudometric Estimation

10.55 – 11.25 C O F F E E B R E A K

P L E N A R Y P A P E R

11.25 – 11.45
31
3. **Chunfeng Gao, Wanqing Liu, Guo Wei, Chengzhi Hou, Wenjian Zhou, Jiayi Cheng, Xu Zhu, Xudong Yu** (*National University of Defense Technology, Changsha, **China***)
Indoor High Dynamic Positioning Technology UWB/MIMU Integrated Navigation System with Extended Kalman Particle Filter

P O S T E R P A P E R S[1]

11.45 – 12.35
2/3
4. **Ye.I. Somov, S.A. Butyrin, S.E. Somov** (*Samara State Technical University, Russia*)
Regional Earth Survey Planning and Control of Mini-Satellites in Low-Orbit Constellations

82
5. **E.S. Kashirov, R.N. Sadekov** (*JSC Cognitive, National University of Science and Technology MISIS, Moscow, **Russia***)
An Approach to Tuning of Hydraulic Unit Control Regulators for Autonomous Driving of Agricultural Machinery

84
6. **E.A. Kasulin** (*S.P. Korolev Rocket and Space Corporation Energia, Korolev, Moscow Region, **Russia***)
Testing the Methods for GNSS-Based Relative Navigation of Moving Objects

[1] *The authors of poster papers at the plenary session are given 3 min to present the main idea of the paper with 1-2 slides, if any; further discussion will continue at the posters.*

19. **G.M. Dovgobrod, V.V. Khanychev, K.A. Dvornikov, D.S. Bakhtin** (*CSRI Kurs, Moscow, **Russia***)
23 Combating Saturation of the Ship Motion Control System Using a Hybrid Algorithm

12.35 – 13.00 **Discussion of poster papers**

13.00 – 14.00 LUNCH

PLENARY PAPERS

14.00 – 14.20
20. **D.N. Sevastyanov, Yu.R. Banit** (*JSC Gazprom Space Systems*), **M.Yu. Belyaev** (*S.P. Korolev Rocket and Space Corporation Energia, Korolev, Moscow Region, Mytishchi branch of the Bauman Moscow State Technical University, **Russia)***
21 Applying Procedures Used for Space Experiments on board Orbital Stations to Attitude Control of Yamal Geostationary Communication Satellites

14.20 – 14.40
21. **S.H. Quan** (*Zhejiang University, Hangzhou, **China***), **S.H. Chen** (*Institute of Intelligent Perception, Hangzhou; Nanjing University of Aeronautics and Astronautics, **China***), **Y.L. Zhou, S. Zhao** (*Zhejiang University, Hangzhou, **China***), **H.Z. Hu** (*Zhejiang University, Institute of Intelligent Perception, Hangzhou, **China***), **Q. Zhu** (*Institute of Intelligent Perception, Hangzhou, **China***)
116 A Robust IMU/GNSS/ODO Integrated Navigation System Based on Factor Graph

POSTER PAPERS[1]

15.00 – 15.40
22. **N.P. Starostin** (*Ramenskoye Design Company, Ramenskoye, Moscow Region, **Russia***), **A.V. Chernodarov** (*NaukaSoft Research & Production Association, Ltd., Moscow, **Russia***)
61 Optical-Inertial Positioning of Remotely Piloted Aircraft during GNSS Signal Outages

23. **A.V. Chernodarov, P.S. Gorshkov, A.P. Patrikeev, A.A. Polyakova** *(NaukaSoft Research & Production Association, Ltd., Moscow, **Russia**)*
54 Flight Testing of an Integrated Navigation System Based on MEMS Sensors, Resistant to Unstable Satellite Information

24. **A.A. Golovan** (*Lomonosov Moscow State University, **Russia***), **D.I. Smolyanov** (*Lomonosov Moscow State University, JSC Cognitive, Moscow, **Russia***)
94 On the Navigation Problem of Unmanned Wheeled Agricultural Machinery Using MEMS-based INS, GNSS and Odometry

25. **Guangyi Shi** (*Peking University; Chinese University of Hong Kong, **China**)*
117 Dynamic Calibration for Accuracy Enhancement Based on IMU and Optical Fusion Strategy

26. **K.K. Veremeenko, M.V. Zharkov, R.Yu. Zimin, I.M. Kuznetsov, A.N. Pronkin** (*Moscow Aviation Institute, **Russia***)
147 Navigation Systems of Unmanned Aerial Vehicles with Artificial Intelligence Units

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27. **N.N. Vasilyuk** (*Electrooptika LLC, Moscow, **Russia***)
13 Receiving Astronomical Measurements in a Strapdown Astroinertial Navigation System for Atmospheric Applications

28. **D.B. Pazychev** (*Integral Ltd, Moscow, **Russia***), **K.S.Bakulev** (*National Univer-*
15 *sity of Science and Technology MISIS, Moscow, **Russia***)
Navigation Complex for UAV

29. **Mingming Zhang, K.A.Neusypin, Bin He** (*Bauman Moscow State Technical*
57 *University,**Russia***)
Research on GPS-Assisted Inertial/Stellar High-Precision Information Fusion Algorithm

30. **O.A. Stepanov, V.P. Zolotarevich, A.V. Motorin, M.S. Ivanov**
111 *(Concern CSRI Elektropribor, JSC, ITMO University, St. Petersburg, **Russia**)*
Comparing Recursive and Nonrecursive Bayesian Estimation Algorithms in Trajectory Tracking Using Bearing-Only Measurements

31. **V.P. Lopatin** *(Russian Metrological Institute of Technical Physics and Radio Engineering VNIIFTRI, Mendeleevo, Moscow region, **Russia**),* **V.B. Pudlovsky**
69 *(VNIIFTRI; Moscow Power Engineering Institute, **Russia***), **O.V. Denisenko** *(VNIIFTRI, **Russia***)
Assessing the Influence of Temperature on Zero Bias of Slicon Accelerometers

32. **V.A. Pogorelov** (*Don State Technical University, Rostov-on-Don, **Russia***)
Algorithmic Support of a Tightly Coupled Navigation System of a Ground-Based
12 Mobile Object

33. **D.A. Cherginets, A.A. Vedyakov** (*ITMO University, St. Petersburg, **Russia***)
149 Design of Visual-Inertial Odometry Algorithm for a Four-Legged Walking Robot with a Stereo Camera

15.40 – 16.00 **Discussion of poster papers**

16.00 – 16.30 COFFEE BREAK

PLENARY PAPER

16.30 – 16.50 34. **M.Yu. Belyaev, P.A. Borovikhin, D.Yu. Karavaev** (*S.P.Korolev Rocket and Space Corporation Energia, Korolev, Moscow Region, **Russia***)
20 Refining the Methods for Determining the Orbital Parameters from Planetary Images in Vektor-T Space Experiment on board the ISS

POSTER PAPERS[1]

16.50 – 17.35 35. **I.V. Kotov, A.A. Arzhannikov, V.D. Glotov** *(Information and Analysis Center for Positioning, Navigation and Timing (IAC PNT), JSC TsNIIMash, Korolev,*
107 ***Russia***)
Estimation of Characteristics for Different GNSS Augmentation Systems

[1] *The authors of poster papers at the plenary session are given 3 min to present the main idea of the paper with 1-2 slides, if any; further discussion will continue at the posters.*

48. **A. Voronov** (*The United Institute of Informatics Problems of National Academy*
150 *of Sciences, Minsk, **Belarus),* **A. Moroz, P. Zhuk** (*Belarusian State University, Minsk, **Belarus***)
Research of Neural Network Model for Predicting Satellite Emergency Situations Based on Telemetry Data

17.35 – 17.55 **Discussion of poster papers**

18.00-21.30 **Sight-seeing guided tour of the city**

TUESDAY, 28 May

SESSION II – INTEGRATED NAVIGATION AND CONTROL SYSTEMS

PLENARY PAPERS

9.30 – 9.50 49. **N.S. Guzhva, R.N. Sadekov** (*Cognitive Technologies, National University of Science and Technology MISIS, Moscow, **Russia***)
11 Traffic Lights Localization and Matching Algorithms For Tram ADAS

9.50 –10.10 50. **X. Wang, Y. Zhang, Y. Zou, S. Wang** (*Dalian Maritime University, Dalian, **China***)
47 Ship-to-Ship Negotiation Protocol for Collaborative Collision Avoidance in Mixed Navigation Scenario

POSTER PAPERS

10.10 – 10.35 51. **Qing Guo, Bingchuan Zhang, Shanwu Wang, Shichao Li, Chuang Xu** (*Aerospace Times Feipeng Co., Ltd., Beijing, **China***)
132 The Research Progress of Autonomous Navigation Technology for Unmanned Transport Aircraft in Satellite-Denied Environments

52. **V.V. Matveev, A.N. Khomyachkova, I.A. Bekhler, M.G. Pogorelov,**
91 **M.D. Kirsanov** (*Tula State University, **Russia***)
Information-Measuring System of a Rotation-Stabilized Spacecraft

53. **A.Yu. Knyazhsky, A.V. Nebylov, V.A. Nebylov** (*St. Petersburg State University of Aerospace Instrumentation, **Russia***)
24 Relative Navigation of Flying Vehicle Using an Optical Surveillance System

54. **D.G. Gryazin, O.O. Belova** (*Concern CSRI Elektropribor, JSC, St. Petersburg, **Russia***)
104 Experimental Estimation of the Dynamic Error of Navigation Aids Using the Spectral Method

55. **R.R. Bikmaev** (*Institute of Engineering Physics, Serpukhov, **Russia***)
Algorithm for Constructing a Digital Model of the Subsurface Layer of a
25 Vehicle's Route Using a Neural Network in a Georadar Measurement Model

56. **Jin Jun, Shen Xin, O.A. Veselovskaya** (*Bauman Moscow State Technical University, **Russia***)
130 Simultaneous Localization and Semantic Mapping Based on Neural Implicit Representation

57. **V. N. Kovregin, G. M. Kovregina** (*St. Petersburg State University of Aerospace Instrumentation, **Russia***)
6 Method of Combined Micronavigation Measurements with a Quasi-Continuous Wave Radar during a Survey of Airspace against the Earth Background

58. **V. N. Kovregin, G. M. Kovregina** (*St. Petersburg State University of Aerospace Instrumentation, **Russia***)
7 Methods and Algorithms for Active Adaptive-Robust Tracking of an Aerial Object and Accompanying (Micro)Navigation Measurements with Quasi-Continuous Wave Radars

10.35 – 10.50 **Discussion of poster papers**

10.50 – 11.20 COFFEE BREAK

PLENARY PAPER

11.20– 11.40 59. **Chengzhi Hou, Jiayi Cheng, Wenjian Zhou, Xu Zhu, Mailun Chen, Chunfeng Gao, Xudong Yu, Guo Wei** (*National University of Defense*
44 *Technology, Changsha, **China***)
Vehicle Vector Gravimetry Method Based on SINS/GNSS/LDV Integrated System

POSTER PAPERS

11.40 – 12.20 60. **O.A. Stepanov, A.A. Krasnov, A.V. Motorin, E.V. Dranitsyna** (*Concern CSRI Elektropribor, JSC, St. Petersburg, **Russia***)
100 Comparing the Gravity Anomaly Estimation Algorithms Using a Strapdown Scalar Gravimeter

61. **Ruiying Wu**, **Dongming Li** (*Beijing Institute of Aerospace Control Devices, Beijing, **China***)
134 Application of Gravity Interpolation Refinement in Gravity Matching Navigation

62. **T.V. Sazonova, M.S. Shelagurova, E.G. Korneva** (*JSC Ramenskoye Design Company, Ramenskoye, **Russia***)
26 Study of Accuracy Characteristics of Aircraft Navigation using Micro-Relief with Artificial and Natural Object Composition

63. **Tijing Cai, Zhiqian Lu, Shuaipeng Gao** (*Southeast University, Nanjing, **China***)
113 Gravity Matching Method Based on Optimized Particle Filtering

64. **V.V. Deryabin** (*Admiral Makarov State University of Maritime and Inland Shipping, St. Petersburg, **Russia***)
4 Depth-Based Vessel Navigation with the Use of a Neural Network

65. **Wenjian Zhou, Chunfeng Gao, Guo Wei, Chengzhi Hou, Jiayi Cheng, Xu Zhu, Xudong Yu** (*National University of Defense Technology, Changsha, **China***)

33 A Refinement Method of Ocean Gravity Datum Map Based on Improved Kriging Algorithm

66. **R.M. Antonov, M.O. Kalinina, A.V. Nekrasov, A.N. Pushkin** (*JSC Inertial Technologies of Technocomplex, Ramenskoye, **Russia***)

79 Strapdown Inertial Navigation System Correction Using Information on Geolocated Landmarks

67. **Da Li** (*Harbin Engineering University, Tianjin Navigation Instrument Research Institute, **China***)**, Wei Gao, Cheng-suo Li, Zhong Li** (*Tianjin Navigation Instrument Research Institute, **China***)**, Lin Zhao** (*Harbin Engineering University, **China***)**, Rui Li** (*China Aero Geophysical Survey and Remote Sensing Center for Land and Resources, Beijing, **China***)

34 Method of Constructing Gravity Gradient Map Based on the Earth's Gravity Field Model

68. **A.F. Shcherbatyuk** (*Institute of Automation and Control Processes of FEB RAS, Vladivostok, **Russia***), **F.S. Dubrovin, A.Y. Rodionov** (*Institute of Marine Technology Problems of FEB RAS, Vladivostok, **Russia***)

64 On Improving the Accuracy of the Acoustic Navigation System with a Short Baseline for AUV Group Positioning

69. **L.A. Martynova, I.V. Pashkevich** (*Concern CSRI Elektropribor, JSC, St. Petersburg, **Russia***)

81 Increasing the Navigation Safety of an Autonomous Underwater Vehicle during Observation in Ice Conditions

70. **I.A. Smirnov, N.V. Sudakov** (*Central Research Institute of Chemistry and Mechanics, Moscow, **Россия***)

65 Application of Generative Machine Learning Methods in Solving Underwater Vehicle Navigation Problems by Hydroacoustic Data

71. **V.G. Karaulov** (*ITMO University, Concern CSRI Elektropribor, JSC, Petersburg, **Russia***), **A.M. Gruzlikov** (*Concern CSRI Elektropribor, JSC, Petersburg, **Russia**)*, **Yu.A. Litvinenko** (*ITMO University, St. Petersburg, Concern CSRI Elektropribor, JSC, Petersburg, **Russia***)

122 Solution of the Problem of AUV Positioning Relative to a Stationary Docking Station Using a Factor Graph Optimization Algorithm

12.20 – 12.40 **Discussion of poster papers**

12.40 – 13.40 LUNCH

SESSION III – INERTIAL SYSTEMS AND SENSORS

PLENARY PAPERS

13.40 – 14.00

72. **S.E. Perelyaev** *(Ishlinsky Institute for Problems in Mechanics of RAS, Moscow, **Russia**),* **B.P. Bodunov, S.B. Bodunov** (*SPE MEDICON, Miass, **Russia***)
27 Experimental Studies of the Basic Parameters of a Solid-State Wave Gyroscope in the Whole Angle Mode

14.00 – 14.20

73. **Ang Li, Hong Yi** (*Microsystem & Terahertz Research Center, China Academy of Engineering Physics (CAEP), Chengdu, Institute of Electronic Engineering, CAEP, Mianyang, **China***)**, Wei Su** (*Institute of Electronic Engineering, CAEP,*
142 *Mianyang, **China***)**, Shengwei Dong, Min Meng, He Li, Jie Zhang, Kai Yang, Xi Wang** (*Microsystem & Terahertz Research Center, China Academy of Engineering Physics (CAEP), Chengdu, Institute of Electronic Engineering, CAEP, Mianyang, **China***)
A Combined Simulation of Molding Blow-Torch and Silica Reflow Process Used for Micro Hemispheric Resonator Fabrication Error Analysis

POSTER PAPERS[1]

14.20 – 15.00

74. **B.S. Lunin, M.A. Basarab** (*Bauman Moscow State Technical University, **Russia***), **E.A. Chumankin** (*JSC TEMP-AVIA, Arzamas, **Russia)***
75 Dissipation of the Oscillation Energy in Adhesive Joints of Mechanical HRG Resonators

75. **D.I. Martynenko, A.S. Malyugin, L.E. Kochegizova, S.V. Fetisov**
(*JSC Inertial Technologies of Technocomplex, Rameskoye, **Russia***)
52 Development of a Methodology for Analysis of Vibration Damping of a Hemispherical Resonator Gyroscope Cluster

76. **N. Wang, G.X. Yi, Z.N. Wei, Y. Huo, L.S. Yuan, Y.W. Sun** (*Harbin Institute of Technology, **China***)
136 Suppression of Anchor Loss in Hemispherical Resonator Based on Vibration Mode Optimization

77. **A.A. Maslov, D.A. Maslov, I.V. Merkuryev** (*Moscow Power Engineering Institute, Moscow, **Russia***)
60 Electrical Balancing of Wave Solid-State Gyroscope with Flat Electrodes

78. **A. Li, S.L. Zhang, X.B. Xu, F.Y. Gao, N.F. Song** (*Beihang University, **China***)
Simulation and Modeling of a High-Shock-Resistance Micro Hemispherical
114 Resonator with Operational Frequency of 2K~20KHz

79. **Y. Tao, K. Deng, Y. Pan, W. Wu, K. Yang, H. Luo** (*National University*
39 *of Defense Technology, Changsha, **China***)
Simulation of the Frequency Mismatch Caused by the Inclined Errors of the Assembly of the Hemispherical Resonator Gyroscope

[1] *The authors of poster papers at the plenary session are given 3 min to present the main idea of the paper with 1-2 slides, if any; further discussion will continue at the posters.*

80. **S.E. Perelyaev** (*Ishlinsky Institute for Problems in Mechanics of RAS, Moscow, **Russia***), **A.V. Alekhin** (*Ramensky Instrument Engineering Plant, Ramenskoye, **Russia***)

28 A Digital Method for Estimating the Resonant Frequency of a Solid-State Wave Gyro under Conditions of Switching Measurement Signals

81. **Hui Li, Qingzhong Cai (***Beihang University, Beijing, **China***), **Gongliu Yang** (*Zhejiang University, Hangzhou, **China***)

131 Stochastic Characteristic Simulation Method of Inertial Devices Based on Allan Variance Matching

82. **A.N. Korolev** (*St. Petersburg Electrotechnical University LETI, **Russia***), **A.Ya. Lukin** (*Peter the Great St. Petersburg Polytechnic University, **Russia***), **E.D. Bokhman, P.A. Ivanov, Yu.V. Filatov** (*St. Petersburg Electrotechnical University LETI, **Russia***)

18 Investigation of the Accuracy Characteristics of Matrix Methods of Linear-Angular Measurements

83. **A.V. Frolov, Yu.V. Mikhaylov, P.A. Shapovalov** (*Central Research Institute of Automation and Hydraulics TsNIIAG, Moscow, **Russia***)

92 A Technique for Calculating the Transient Temperature Profile in the Internal Volume of the SINS Unit

84. **S.V. Smirnov, Yu.G. Egorov, G.Yu. Kiryachenko, G.S. Taranenko** *(Central Research Institute of Automation and Hydraulics TsNIIAG, Moscow, **Russia**)*

112 Synthesis of Calibration Programs for a Triad of Accelerometers

85. **Z.Q. Shang** (*Zhejiang University, Hangzhou, **China***), **S.H. Chen** (*Institute of Intelligent Perception, Zhejiang Lab, Hangzhou, **China***), **G. Li** *(Zhejiang*

135 *University, Hangzhou, **China***), **Y. Zheng** (*Institute of Intelligent Perception, Zhejiang Lab, Hangzhou, **China***), **J. Dai** (*Shanghai Institute Co. Ltd,, China Coal Technology & Engineering Group, **China***), **H.Z. Hu** (*Zhejiang University, Hangzhou, **China***)

Effect of Installation Noncoincidence of Shearer Inertial Navigation System on Straightness Deviation of the Fully Mechanized Mining Face

86. **S.V. Topilskaya** (*Branch of the Experimental Design Bureau Mars - Dukhov Automation Research Institute, Moscow, **Russia***)

148 Simulink Model of Vibration Protection Systems for Strapdown Inertial Navigation System

15.00– 15.20 **Discussion of poster papers**

15.20– 15.50 COFFEE BREAK

PLENARY PAPERS

15.50 – 16.10 87. **Yu.Yu. Broslavets, A.A. Fomichev, E.A. Polukeev, V.G. Semenov, D.S. Redichkina, A. R. Pokrovskaya** (*Moscow Institute of Physics and Technology, JSC Lasex, Dolgoprudny, **Russia***)

78 Noise Suppression in the Output Signal of a Solid-State Laser Gyroscope Based on YAG:Cr^{4+} when Perimeter Control and Frequency Control Systems Operate in Mode Locking Regime

16.10 – 16.30

88. **A.O. Sinelnikov, N.V. Tikhmenev, A.A. Ushanov, S.I. Nazarov, E.V. Korotitsky** (*GosNIIP, Moscow, St. Petersburg State Marine Technical University, **Russia***)

137/139 Study of Dithered Ring Laser Gyroscope Parameters under External Influences

POSTER PAPERS

16.30 – 17.00

89. **D. Li, H. Li, G. Wei, C. Gao, H. Luo, X. Yu** (*National University of Defense Technology, Changsha, **China***)

22 A Modeling and Calibration Method for the Jerk Error of a Mechanically Dithered Ring Laser Gyro Inertial Navigation System

90. **Yu.Yu. Broslavets, A.A. Fomichev, E.A. Polukeev, V.G. Semenov, D.S. Redichkina, A. R. Pokrovskaya** (*Moscow Institute of Physics and Technology, JSC Lasex, Dolgoprudny, **Russia***)

88 Four-Frequency Zeeman Laser Gyroscope: System for Separating Counterpropagating Waves Beat Signals for Orthogonal Polarizations and Control of the Cavity Perimeter Using the Co-Directed Wave Beat Signal

91. **I.N. Khokhlov, Yu.D. Golyaev, E.A. Petrukhin** (*POLYUS Research Institute, Moscow, **Russia***)

49 Measurement Method, Statistics and Sources of the Lock-In Zone in a Zeeman Laser Gyroscope

92. **S.I. Nazarov, A.O. Sinelnikov, N.V. Tikhmenev, A.A. Ushanov, S.A. Bolotnov** (*GosNIIP, Moscow, St. Petersburg State Marine Technical*

139 *University, **Russia***)
Computer Simulation of Piezo Drives for Perimeter Control of Ring Laser Gyroscopes

93. **Shaojun Du, Lin Zhang, Jiangang Guo, Lei Wang, Shitao Huang** (*Beijing Aerospace Times Laser Navigation Technology Co., Ltd Beijing, **China***)

133 Simulation of Installation Error Calibration of Uniaxial Rotating Laser Inertial Navigation System Assisted by Total Station

94. **A. Dumitrascu** (*Maritime University of Constanta,**Romania**),* **A.S.Tasu** (*Ovidius University of Constanta, **Romania***)

58 Fault Detection of Systems on board Vehicles by Means of Vibration Analysis Using Inertial Sensors

95. **L.V. Vodicheva, V.L. Yakimov, Yu.V. Parysheva, D.I. Kabanova** (*Academician N.A. Semikhatov Scientific and Production Association of*

66 *Automatics, Yekaterinburg, **Russia***)
Gyrocompassing Technique for a Strapdown Inertial Measurement Unit with Two Angular Rate Sensors

96. **D.G. Gryazin, T.V. Paderina** *(Concern CSRI Elektropribor, JSC, St. Petersburg, **Russia**)*

102 Results of Field Tests of a Magnetic Compass Using a New Correction System

97. **V.A. Zarubin, A.V. Prokhortsov, V.A. Smirnov** (*JSC VNII Signal, Kovrov,*

89 *Russia, Tula State University, **Russia***)
Quaternion Algorithm for Strapdown Gyro Vertical

98. **D.V. Furtas, A.V. Nekrasov, A.N. Kostornoy, I.H. Shaymardanov, E.V. Babaev, A.A. Dzuev** (*JSC Inertial Technologies of Technocomplex, Ramenskoye, **Russia***)
144 Evaluating the Possibilities of IMU Design Based on an Array of Micromechanical Inertial Sensors

99. **V.M. Bogolyubov, O.V. Tsyganov, L.U. Bakhtieva** (*Kazan National Research Technical University named after A.N. Tupolev (KNRTU-KAI), **Russia***)
Three-component angular velocity sensor based on a modulation micromechanical gyroscope

100. **S.Yu. Perepelkina, A.A. Fedotov** (*Academician N.A. Semikhatov Scientific and Production Association of Automatics, Yekaterinburg, **Russia***)
101 Usage of Differential Optical Measurements for Mutual Orientation of Navigation Devices

17.00 – 17.20 **Discussion of poster papers**

17.30 – 20.00 **Drink reception**

WEDNESDAY, 29 May

SESSION IV – INERTIAL SYSTEMS AND SENSORS

PLENARY PAPER

9.00 – 9.20 101. **C.C. Liu, N.F. Song, X.B. Xu, S.L. Zhang** (*Beihang University, **China***)
115 Characteristics of Asymmetric Mach–Zehnder Interferometer Coupler-Based Fiber Ring Resonator System for Brillouin Gyroscopes

POSTER PAPERS

9.20 – 9.55 102. **G. Wang, H.G. Chen, Y.J. Li, W. Hong** (*No.16 Institute The 9th Academy, China Aerospace Science and Technology Corporation, Xi'an, **China***)
б/н The Influence of Power Supply Switching Frequency Noise on Zero Bias of Fiber Optic Gyroscope

103. **L.G. Li, B. Ren, Y.H. Wang, R.F. Xu, Y. Liu, J.W. Li, F.J. Li** (*No.16 Institute The 9th Academy China Aerospace Science and Technology Corporation, Xi'an;*
125 ***China***)
Research on Input Axis Misalignment Angle Error Suppression Technology for Fiber Optic Gyroscopes Using the Fiber Coil with Skeleton

104. **P. Zhang, Y.C. Wu, W. Hong, H.G. Chen, B. Huang, L.G. Li, W. Jiang, Y. Bai** (*No.16 Institute The 9th Academy China Aerospace Science and*
126 *Technology Corporation, Xi'an, **China***)
Research on the Technology for Improving Scale Factor Stability of High Precision Fiber Optic Gyroscope

105. **Y.C. Wu, P. Zhang, W. Hong, Z.W. Pan, B. Huang, Y.J. Li , H. CAO, Y. Bai** (*No.16 Institute The 9th Academy China Aerospace Science and*
127 *Technology Corporation, Xi'an, **China***)
Research on the Technologyfor Suppressing Magnetic Field Error of High Precision Fiber Optic Gyroscope

106. **Y.J. Li, B. Huang, W. Hong, Y.L. Zhao, S.F. Lou, G. Wang, Y.C. Wu** (*No.16 Institute The 9th Academy China Aerospace Science and Technology*
119 *Corporation, Xi'an, **China***)
Improvement of Precision of High-Accuracy Fiber Optic Gyroscope Based on the Application of "Three-Self" Inertial Combination

107. **W. Jiang, H.G. Chen, Z.W. Pan, B.J. Lin, W.Hong** (*No.16 Institute The 9th Academy China Aerospace Science and Technology Corporation, Xi'an, **China***)
120 Mathematical Model of Polarization Error in Fiber Optic Gyroscope

108. **M.A. Belousov, A.I. Krivosheev** (*Perm Scientific-Industrial Instrument Company, **Russia***)
41 Evaluating Temperature Stability of Power Balance in Fiber-Optic Gyroscope with Compensation of Relative Intensity Noise of a Light Source

109. **D.M. Kalikhman** (*Yu. A. Gagarin State Technical University of Saratov, Branch of Academician Pilyugin Center – Production Association Korpus, Saratov, **Russia***), **V.A. Turkin, A.A. Akmaev** (*Branch of Academician Pilyugin Center –*
37 *Production Association Korpus, Saratov, **Russia***)
Principles of Software Development for Checking the Parameters of Inertial Measurement Units with Nonorthogonal Measuring Axes

110. **D.M. Kalikhman, E.A. Deputatova, N.V. Tarakanov** (*Yu. A. Gagarin State Technical University of Saratov, Branch of Academician Pilyugin Center – Pro-*
36 *duction Association Korpus, Saratov, **Russia***)
Investigating the Effect of Structural Nonrigidity of a Precision Test Bench with Inertial Sensing Elements for Testing the Angular Rate Sensors on its Accuracy Characteristics

111. **A.V. Polushkin, I.V. Slistin, N.A. Kaldymov, A.A. Ivanov, I.A. Nazarov, V.F. Vasil'ev, A.K. Gerte, A.V. Pugovkin** (*Branch of Academician Pilyugin Center – Production Association Korpus, Saratov, **Russia***)
45 Improving Accuracy Characteristics and Functionality of a Rotary Turntable for Testing of Navigation Devices and Their Elements

112. **E.M. Ivashchenko, P.A. Pavlov** (*St. Petersburg Electrotechnical University*
38 *LETI, **Russia***)
The Goniometric Stand for Angle Encoder Calibration. Research Methods and Results

9.55 – 10.15 **Discussion of poster papers**

10.15 – 10.45 COFFEE BREAK

SESSION IV – RELEVANT ISSUES OF THEORY

PLENARY PAPERS

10.45 – 11.05 113. **A.V. Molodenkov, Ya.G. Sapunkov** (*Institute for Problems of Precision Mechanics and Control of the Russian Academy of Sciences (RAS), Saratov,*
1 ***Russia***), **T.V. Molodenkova** (*Yuri Gagarin State Technical University of Saratov, **Russia***)
Quasi-Optimal Angular Acceleration of Spacecraft Obtained on the Basis of the Poinsot Concept

11.05 – 11.25 114. **S.E. Perelyaev** (*Ishlinsky Institute for Problems in Mechanics of RAS, Moscow, **Russia***), **A.A. Skripkin** (*Yuri Gagarin State Technical University of Saratov, **Russia***)
29/30 Equations of Elastic Oscillations of a Solid Symmetrical Body in the Basis of Eigenmodes. Three-Axis Solid-State Wave Gyro

11.25 – 11.45 115. **O. A. Stepanov, V.P. Zolotarevich, Yu.A. Litvinenko, A.M. Isaev, A.V. Motorin** (*Concern CSRI Elektropribor, JSC, ITMO University, St. Petersburg, **Russia***)
90 Estimation Algorithms Based on Factor Graph Optimization vs. Bayesian Estimation Algorithms for Navigational Data Processing: Differences and Interrelation

11.45 – 12.05 116. **M.A. Basarab** (*Bauman Moscow State Technical University, **Russia***), **B.S. Lunin** (*Lomonosov Moscow State University, **Russia***)
103 Study of Noise Characteristics of Signals from Navigation System Units Using Wavelet-Like Generalized Allan Variances

POSTER PAPERS

12.05 – 12.45 117. **Yu.N. Chelnokov, A.V. Molodenkov, M.Yu. Loginov** (*Institute for Problems of Precision Mechanics and Control of RAS, Saratov, **Russia***)
9 Biquaternion Quasi-Optimal Analytical Solution of the Problem of the Minimum Time Program Control of Spacecraft Spatial Motion

118. **I.A. Pankratov** (*Saratov State University, Institute for Problems of Precision Mechanics and Control of RAS, Saratov, **Russia***), **Yu.N. Chelnokov** (*Institute for*
5 *Problems of Precision Mechanics and Control of RAS, Saratov, **Russia***)
Biquaternion Solution to the Problem of Energy-Optimal Control of Spacecraft Spatial Motion

119. **A. V. Doroshin, M. M. Krikunov** (*Samara University, Samara, **Russia***)
14 Study of the Stabilizing Properties of a Jet in Spacecraft Angular Motion

120. **V.M. Nikiforov, A.V. Soloviev, M.L. Simakov, A.A. Gusev, K.A. Andreev, A.V. Shevchenko** (*Academician Pilyugin Scientific-Production Center*
42 *of Automatics and Instrument-Making, Moscow, **Russia***)
Controlling the Sensing Element of a Pendulum Compensation Accelerometer Using a Static Modal Combined Controller H_2/H_∞

121. **V.M. Kotlov** (*State Research Institute of Aviation Systems, Moscow, **Russia***), **S.E. Perelyaev** (*Ishlinsky Institute for Problems in Mechanics of RAS,*
32 *Moscow, **Russia***)
Derivation of the Dynamics Equations for a Hemispherical Resonator of Solid-State Wave Gyroscope by the d'Alembert-Suslov Method

122. **I.D. Kostin, Yu.V. Fadeeva, A.A. Shevchik, I.A. Yakovlev**
(*D.F. Ustinov Baltic State Technical University Voenmeh, St. Petersburg, **Russia***)
74 Adaptive Control of Small Satellites Constellation in Projection Orbits Using Implicit Reference Model

123. **A.V. Nebylov, V.A. Nebylov** (*St. Petersburg State University of Aerospace*
73 *Instrumentation, **Russia***)
Features of the Synthesis of a Robust Radio-Inertial Integrated Speed Meter

124. **E.V. Barinova, I.A. Timbai, E. Mironov** (*Samara University, **Russia***)
Numerical-Analytical Determination of Equilibrium Positions of a CubeSat
72 Nanosatellite under Gravitational and Aerodynamic Moments

125. **P.K. Kuznetsov, B.V. Martemyanov** (*Samara State Technical University, **Russia***)
85 Technique for Detecting and Determining Ship Motion Parameters from Images of Wakes in Stormy Conditions

126. **Shen Xin, Jin Jun, V.V. Lukyanov, K.A. Neusypin** (*Bauman Moscow State Technical University, **Russia***)
129 Application of Adaptively Maximum Correntropy Based Robust Kalman Filter in Integrated Navigation System

127. **M.A. Samokhina, A.S. Samokhin** (*V.A. Trapeznikov Institute of Control*
95 *Sciences of RAS, Moscow, **Russia***)
The Problem of Interception of a Group of Targets on Sun Synchronous Orbits of an Artificial Earth Satellite with Consideration of the Second Zonal Harmonic in Impulse Formulation

128. **M.A. Samokhina, A.S. Samokhin** (*V.A. Trapeznikov Institute of Control*
96 *Sciences of RAS, Moscow, **Russia***)
A Circular Perimeter Breaching Problem in a Conflict Environment

12.45 – 13.00 **Discussion of poster papers**

13.00 – 13.45 LUNCH

13.45 – 15.45 **PANEL DISCUSSION**
Artificial Intelligence.

Presentations **The titles of presentations are being defined**

Discussion

Presentations **The titles of presentations are being defined**

15.45 – 16.00 **CLOSING CEREMONY**