PROGRAM

8.00–9.50   **REGISTRATION OF THE CONFERENCE PARTICIPANTS**

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

SESSION I – INTEGRATED SYSTEMS

Chairmen   **Dr. B.S. Rivkin**, *Russia*
                     Dr. G. Schmidt, *USA*

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

10.15–10.35   1.   **E.A.Mikrin, M.Yu. Belyaev, P.A. Borovikhin, D.Yu. Karavaev** (*S.P. Korolev Rocket and Space Corporati Energia, Korolev, Moscow region, **Russia***)
A Novel Autonomous Navigation Technique Using Pictures in Support of a Circumlunar Mission: Development Testing Aboard the ISS

10.35–10.55   2.   **C. Doer, G. Scholz, J. Ruppelt** (*Institute of Systems Optimization (ITE), Karlsruhe Institute of Technology (KIT), Karlsruhe**, Germany***), **G.F. Trommer** (*Institute of Systems Optimization (ITE), Karlsruhe Institute of Technology (KIT), Karlsruhe, **Germany**; ITMO University, Saint Petersburg, **Russia***)
Inertial Sensor Data Based Motion Estimation Aided by Image Processing and Differential Barometry

10.55–11.25   COFFEE BREAK

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

11.25–11.45   3.   **N.V. Krapukhina, R.V. Senchenko** (*The National University of Science and Technology MISiS, Moscow, **Russia***)
Specific Features of Methods and Algorithms for Planning Unmanned Vehicles' Routes in Dynamically Changing Road Scene

| 11.45–12.05 | 4. | **D. Kwaśniak, S. Cellmer, K. Nowel** *(University of Warmia and Mazury in Olsztyn Institute of Geodesy, Olsztyn, **Poland**)* Precise Positioning Using the Modified Ambiguity Function Approach with Combination of GPS and Galileo Observations |

POSTER PAPERS[1]

12.05–12.50	5.	**G.I. Emeliantsev, A.P. Stepanov, E.V. Dranitsyna** (*Concern CSRI Elektropribor, JSC, ITMO University, St. Petersburg, **Russia***), **B.A. Blazhnov, D.A. Radchenko, I.Yu. Vinokurov, D.P. Eliseev, P.Yu. Petrov** (*Concern CSRI Elektropribor, JSC, St. Petersburg, **Russia***) Dual-Mode GNSS Gyrocompass Using Primary Satellite Measurements
	6.	**L. C. Feng, S. H. Li, Y. Liu, Q. W. Fu** (*Northwestern Polytechnical University, **P.R. China**)* Advantages of ECEF-Frame Based Global Navigation Mechanization for INS/GNSS Integrated Navigation System
	7.	**H. Benzerrouk** (*Polytechnic School of Montreal, Automation and Systems, Montreal, **Canada***), **A.V.Nebylov** (*State University of Aerospace Instrumentation, Saint Petersburg, **Russia***) Robust IMU/UWB Integration for Indoor Pedestrian Navigation
	8.	**K.H. Kou, D.Q. Tang, Y. Chen** (*Dept. Control Engineering, Naval Aeronautical and Astronautical University, Yantai, **P.R. China***) Two-Stage INS Error Cooperative Modification Method for Unmanned Aerial Vehicle Formation **PAPER WAS NOT PRESENTED**

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[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*

9. **M.Yu. Tkhorenko, B.V. Pavlov, E.V.Karshakov, A.K.Volkovitsky** (*V.A. Trapeznikov Institute of Control Sciences, Moscow, **Russia***)
On Integration of a Strapdown Inertial Navigation System with Modern Magnetic Sensors

10. **Y. Zhao, M. Yan, C. Song, D. Xiong** (*Tianjin Navigation Instrument Research Institute, Tianjin, **P.R. China***)
Vehicle Dynamic Model-Based Integrated Navigation System for Land Vehicles

11. **A.A. Zhilenkov, A.V. Ivanov** (*ITMO University, Saint Petersburg, **Russia***)
Motion Capture System Based on Inertial MEMS-Technology for Control of Antropomorphous Robotics
PAPER WAS NOT PRESENTED

12. **Q.Yang, K. Wang, S. H. Li, Y.Liu, Q.W. Fu** (*School of Automation, Northwestern Polytechnical University (NPU) Xi'an, **P.R. China***)
A Low-Cost Attitude Determination Algorithm Based on MEMS IMU/Dual-Antanna GNSS Receiver for UAVs

13. **K.A. Neusypin, M.S. Selezneva, A.V. Proletarsky** (*Bauman Moscow State Technical University, Moscow, **Russia***)**, Kai Shen** (*School of Automation, Beijing Institute of Technology, Beijing, **P.R. China***)
Algorithm for Building Models of INS/GNSS Integrated Navigation System Using the Degree of Identifiability

14. **B. Wang, J. Liang, Y.G. Wang, H.N.Weng, Q.Zhang** (*Tianjin Navigation Instrument Research Institute, Tianjin, **P.R. China***)
SINS/USBL Integrated Navigation Fault-Tolerant Method with Chi-Square Test

15. **A.A. Fedotov, S.Yu. Perepelkina, V.M. Kutovoy, O.I. Maslova** (*Scientific and Production Association of Automation named after the academician N.A. Semikhatov, JSC, Yekaterinburg, **Russia***)
Using High-Order Signal Variance Moments to Evaluate Noise Characteristics of Measuring Channels

16. **A.A. Golovan, E.V. Gorushkina, I.A. Papusha**
(*Lomonosov Moscow State University, Moscow, **Russia***)
On the Method of Parameterization Instrumental Errors for
a Gravity Gradiometer

17. **B.V. Klimkovich** (*Scientific Production Limited Liability
Company "OKB TSP", Minsk, **Belarus***)
Replacement of Kalman Filter with a Finite Impulse
Response Filter to Stabilize the System

18. **A.S. Solonar, P.A. Khmarskiy, A.A. Mihalkovskiy,
S.V. Tsuprik** (*Military Academy of the Republic of
Belarus, Minsk, **Belarus***)
Features of Trajector Measurement Coordinates and
Parameters of Movement of Ground Objects in On-Board
Optical-Location Systems

19. **Yu.L. Avanesov** (*Concern CSRI Elektropribor, JSC, Saint
Petersburg, **Russia***), **A.S. Voronov, M.I. Evstifeev**
(*Concern CSRI Elektropribor, JSC, ITMO University, Saint
Petersburg, **Russia***)
Relative Velocity Sensor for Deep-Sea Vehicles

12.50 **DISCUSSION OF THE POSTER PAPERS**

13.00 – 14.00 LUNCH

Chairmen: **Prof. O.A. Stepanov,** *Russia*
Prof. X.X. He, *P.R. China*

PLENARY PAPERS

14.00–14.20 20. **V.D. Dishel, E.L. Mezhiritskiy, O.S. Poyatsyka,
N.V. Sokolova** (*Academician Pilyugin Scientific-
Production Center of Automatics and Instrument-Making,
Moscow, **Russia***)
The Technology of Interval-Dynamic Estimation and
Identification as a Method of Increasing Accuracy and
Fault-Tolerance of Space Launch Vehicle Control
Systems of Today and Next Generations

| 14.20 – 14.40 | 21. | **S. B.Wang, Y.J.Zhang, F.X. Zhu** (*Dalian Maritime University, Dalian, **P.R. China***) Monocular Visual Slam Algorithm for Autonomous Vessel Sailing in Harbor Area |

POSTER PAPERS[1]

| 14.40–15.25 | 22. | **A.S. Nosov, O.A. Stepanov** (*Concern CSRI Elektropribor, JSC, ITMO University, Saint Petersburg, **Russia***) The Effect of Measurements Preprocessing on the Accuracy of Map-Aided Navigation |

23. **O.A. Stepanov, A.B. Toropov** (*Concern CSRI Elektropribor, JSC, ITMO University, Saint Petersburg, **Russia***), **V.A. Vasiliev** (*Concern CSRI Elektropribor, JSC, Saint Petersburg, **Russia***) Solution of Map-Aided Navigation Problem Using Polynomial Filtering Algorithm

24. **S.Yu. Kulik**, **A.Yu. Rodionov**, **F.S. Dubrovin** (*Institute of Marine Technology Problems of Far Eastern Branch of Russian Academy of Science, Vladivostok, **Russia**)*, **P.P. Unru** (*Far Eastern Federal University, Vladivostok, **Russia***) On Reliability of Data Transmission and Distance Estimation Using Mobile Underwater Acoustic Modems

25. **A.Yu. Knyazhsky, A. V. Nebylov**(*St. Petersburg State University of Aerospace Instrumentation, St. Petersburg**, Russia**)* Optimization of 3D Motion Trajectory of a Non-Displacement Marine Vehicle Near the Sea Surface According to the Criterion of Minimum Mean Geometric Altitude

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26. **N.V. Kamenov, N.V. Krapukhina** (*National University of Science and Technology, Moscow*, ***Russia***)
Method of Local Navigation for Road Scene Reconstruction in High-Speed or Dense Traffic Flow Based on Two On-Board Video Cameras
PAPER WAS NOT PRESENTED

27. **D.A. Bedin, A.G. Ivanov, A.A. Fedotov** (*Krasovskii Institute of Mathematics and Mechanics of the Ural Branch of the Russian Academy of Sciences, Yekaterinburg, **Russia***)
Recovering the Aircraft Trajectory by Using the Detection of the Motion Type

28. **D.A. Bedin** (*Krasovskii Institute of Mathematics and Mechanics, Ural Branch of the Russian Academy of Sciences*, *Yekaterinburg, **Russia***)
Problem of Multilateration with Several Signal Transmission Instants

29. **O. Serçekman** (*Middle East Technical University, Roketsan Missiles Industry Inc., Ankara, **Turkey***),
A.T. Kutay (*Middle East Technical University, Ankara, **Turkey***)
A Model Based Approach for Sensor Fault Detection in Civil Aircraft Control Surface
PAPER WAS NOT PRESENTED

30. **V.I. Baburov, N.V. Ivantsevich, O.I. Sauta** (*JSC AUSRIRE, NTC Navigator, St. Petersburg, **Russia***)
GNSS-Based Technique of Error Matrix Construction for Radio-Technical Short-Range Navigation and Landing Systems

31. **H. Guo** (*Nanchang University, Institute of Space Science and Technology, Nanchang, **P.R. China***), **M. Uradzinski** (*University of Warmia and Mazury in Olsztyn, Institute of Geodesy, Olsztyn, **Poland***)
The Usability of MTI IMU Sensor Data in PDR Indoor Positioning

32. **Zh.S. Pershina, S.Ya. Kazdorf, V.A. Abrosimov** (*Novosibirsk State Technical University, Novosibirsk, Russia*)
Application of Algorithms for Object Recognition Based on Deep Convolutional Neural Networks for Visual Navigation of a Mobile Robot

33. **D. Tang, K. Kou** (*Naval Aviation University, Yantai, P.R.China*), **Y. Tang** (*Nanjing University of Information Science and Technology, Nanjing, P.R.China*)
Automatic Landing System of Shipboard UAV Based on Integration of INS, DGPS and Vision by Adaptive Filtering
PAPER WAS NOT PRESENTED

34. **V.V. Lyubimov** (*Samara University, Russia*)
Calculation of the Landing Area for a Small Asymmetric Martian Probe under the Action of the Magnus Gyroscopic Moment

35. **O.S. Amosov** (*Komsomolsk-na-Amure State University, Russia*)
Peculiarities of Stochastic Processes with Fractal Properties and Their Applications in Problems of Navigation Information Processing

36. **R.V. Alaluev, M.V. Ryabtsev** (*Tula State University, Russia*)
Application of Neuro Network Modeling for Calibration of Pyrometric System for Unmanned Aircraft Orientation

15.25 **DISCUSSION OF THE POSTER PAPERS**

15.30–16.00 COFFEE BREAK

Chairmen: **Prof. I.M. Okon, *Russia, USA*
Prof. G. Trommer, *Germany***

PLENARY PAPERS

16.00–16.20 37. **V.N. Tyapkin, V.N. Ratushnyak, D.D. Dmitriev, A.B. Gladyshev, A.M. Mandranov** (*Siberian Federal University, Krasnoyarsk, Russia*)
Improving the Efficiency of Noise Suppression by Correcting the Frequency Characteristics of Receiving Channels in Satellite Navigation Equipment

16.20–16.40	38. **O. Bălan, M.-I. Dascălu, A. Moldoveanu** (*University POLITEHNICA of Bucharest, Bucharest, Romania*)**, S. Caraiman, F. Ungureanu, R. Lupu, A. Stan** (*«Gheorghe Asachi» Technical University of Iasi, Romania*) Brain Activation During Virtual and Real-World Mobility Tasks with Single And Multimodal Sensory Input Provided by an Assistive Navigational Device for Visually Impaired People
16.40–17.00	39. **I.N. Burdinsky** (*The office of Scientific Research, Pacific National University, Khabarovsk, Russia*)**, S.A. Otcheskiy** (*Institute of Marine Technology Problems of the Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia*) Assessment of the Possibility of Underwater Navigation Support for Autonomous Underwater Vehicles at Long Ranges

POSTER PAPERS[1]

17.00–17.30	40. **Yu.V. Bolotin, V.S. Vyazmin** (*Lomonosov Moscow State University, Moscow, Russia*) Accuracy Analysis of the Airborne Vector Gravimetry Algorithm Based on Two-Dimensional Random Fields for Gravity Modeling
	41. **S.V. Shafran, E.A. Gizatulova, I.A. Kudryavtsev** (*Samara National Research University, Samara, Russia*) Snapshot Technology in GNSS Receivers
	42. **H. Buchner, B.I. Ahmad, S. Godsill** (*Cambridge University, Cambridge, United Kingdom*)**, K. Helwani** (*Huawei European Research Center, Munich, Germany*) A Novel Class of Bayesian Algorithms for Array-Based Scene Analysis in Time-Varying Convolutive Scenarios with Special Focus on Stochastic Motion Models **PAPER WAS NOT PRESENTED**

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43. **I.O. Osipov, P.A. Yurovskikh, V.I. Shiryaev** (*South Ural State University* (*National Research University*)*, Chelyabinsk, **Russia***)
An Approach to the Synthesis of Control under Uncertainty

44. **I.O. Osipov, P.A. Yurovskikh, V.I. Shiryaev** *(South Ural State University* (*National Research University*)*, Chelyabinsk, **Russia***)
Preprocessing of Measurements and Estimation of the Disturbances as Methods to Increase the Accuracy of the Guaranteed Estimation Algorithm

45. **V.M. Nikiforov, I.Yu. Bykanov** (*Academician Pilyugin Scientific-Production Center of Automatics and Instrument-Making, Moscow, **Russia***)
CAD – Technology of Cross-Cutting Design of Dynamic Systems

46. **I.A. Tsikin, E.A. Shcherbinina** (*Institute of Physics, Nanotechnology and Telecommunications, Peter the Great St.Petersburg Polytechnic University, **Russia***)
Algorithms of GNSS Signal Processing Based on the Generalized Maximum Likelihood Criterion for Attitude Determination

47. **A.P. Melikhova, I.A. Tsikin** (*Institute of Physics, Nanotechnology and Telecommunications, Peter the Great St.Petersburg Polytechnic University, **Russia***)
Decision-Making Algorithms Based on Generalized Likelihood Ratio Test for Angle-of-Arrival GNSS Integrity Monitoring

48. **Yu.N. Chelnokov** (*RAS Institute of Precision Mechanics and Control, Saratov*, ***Russia***)
Inertial Navigation in Space Using Quaternion Regular Equations of Astrodynamics

17.30–17.50	**DISCUSSION OF THE POSTER PAPERS**
18.00–21.30	SIGHT-SEEING GUIDED TOUR OF SAINT PETERSBURG

SESSION II – INTEGRATED SYSTEMS
(Continued)

Chairmen: **Dr. Yu.A. Litmanovich,** *Russia*
Dr. J. Mark, *USA*

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

9.00–9.20	49.	**S.P. Gulevich** (*SC «Kronshtadt Group», Moscow,* **Russia**), **I.V. Sergushov, E.N. Skripal, A.V. Abakumov, I.K. Kuzmenko, D.Yu. Livshits, K.D. Shapovalova** (*JSC «Design Bureau of Industrial Automatics», Saratov,* **Russia**) Aircraft High Accuracy Positioning During Approach to a Platform Using Laser System with the GNSS Signals Outage
9.20–9.40	50.	**B.I. Ahmad, H. Buchner, P.M. Langdon, S.J. Godsill** (*University of Cambridge* **United Kingdom**) A Bayesian Framework for Intent Prediction in Object Tracking

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

9.40–10.05	51.	**M.N. Mikhaylov** (Lyceum 239, St. Petersburg, **Russia**), **I.A. Lositskii** (*Creative Robotics Lab, ITMO School of Computer Technologies and Control, St. Petersburg, Russia*) Application of Neural Networks for Forest Robot
	52.	**A.V. Pesterev, Yu.V. Morozov** (*V.A. Trapeznikov Institute of Control Sciences, Russian Academy of Sciences, Javad GNSS, Moscow, Russia*), **I.V. Matrosov, J. Ashjaee** (*Javad GNSS, Moscow, Russia*) Estimation of the Magnetic Field Generated by UAV in Flight
	53.	**E.G. Kharin, I.A. Kopylov, V.A. Kopelovich, O.S. Mordvinov, V.B. Ilyin, A.Yu. Makarova, A.F. Yakushev** (*JSC «M.M. Gromov Flight Research Institute», Zhukovsky,* **Russia**) Methods of System Specification Evaluation in Flights at High Latitudes

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54. **R. Pelc-Mieczkowska** (*Institute of Geoinformation and Cartography, University of Warmia and Mazury in Olsztyn (UWM), Olsztyn, Poland*), **D. Tomaszewski** (*Institute of Geodesy, University of Warmia and Mazury in Olsztyn (UWM), Olsztyn, Poland*)
GNSS Terrain Obstacle Modelling Using Fisheye Lense for Smartphones

55. **A.V. Polushkin, D.G. Borchaninov, I.V. Slistin, N.A. Kaldymov, S.F. Nakhov** (*Branch of the Federal State Unitary Enterprise "Academician Pilyugin Scientific-production Center of Automatics and Instrument-making" – Production Association "Korpus", Saratov, Russia*), **N.N. Brysin, N.A. Stroilov, E.A. Bazina, N.A. Slivko, V.A. Budkov** (*Space Research Institute of the Russian Academy of Sciences (IKI RAN), Moscow, Russia*)
Results of Application of a Hardware and Software Complex for Determining the Methodical Error of Star Trackers

56. **S.B. Berkovich, N.I. Kotov, R.N. Sadekov, A.V. Sholokhov, R.R. Bikmayev** (*Interregional Public Organization «Institute of Engineering Physics», Serpukhov, Russia*), **D.E. Bystrov** (*Office of Advanced Inter-Specific Research and Special Projects, Moscow, Russia*)
Recognition of Switch Layouts in the Task of Rolling Stock Positional Navigation

57. **A.V Sholokhov, S.B. Berkovich, N.I. Kotov, R.N. Sadekov** (*Inter-Regional Public Institution «Institute of Engineering Physics», Serpukhov, Russia*)
Forming a Trajectory of a Map-Matching Navigation System by the Criterion of Minimum Coordinate Errors

58. **X.M. Xing, Y.T. Zhang** (*Beijing Institute of Aerospace Control Devices, P.R. China*)
Small and Low-Cost Navigation Device for Pedestrian

59. **B.I. Adamov** (*National Research University MPEI, Moscow, **Russia***)
Influence of Mecanum Wheels Construction on Accuracy of the Omnidirectional Platform Navigation (On Example of *KUKA youBot* Robot)

SESSION III - INERTIAL SYSTEMS AND SENSORS

Chairmen: **Dr. A.V. Sokolov,** *Russia*
Mr. L. Camberlein, *France*

INVITED PAPER

10.05 – 10.50	60.	**George Schmidt (*USA*)**

George Schmidt (*USA*)
Navigation Sensors and Systems in GNSS Degraded and Denied Environments 2018 (Or How I Learned to Stop Worrying about GPS)

10.50   **DISCUSSION OF THE POSTER PAPERS (Nos. 51-59)**

10.55–11.25   COFFEE BREAK

PLENARY PAPERS

11.25–11.45   61. **F. Delhaye, J.-Ph. Girault** (*Safran Electronics & Defense, Boulogne-Billancourt, **France***)
SPACENAUTE: HRG Technological Breakthrough for Advanced Space Launcher Inertial Reference System

11.45–12.05   62. **V.M. Achildiev, V.A. Soldatenkov, N.A. Bedro, Yu.K. Gruzevich, Yu.N. Evseeva, A.D. Levkovich** (*SPU GEOPHIZIKA-NV St. Com, Moscow, **Russia***)
M.A. Basarab, N.S. Konnova (*Bauman Moscow State Technical University, **Russia***)
Cardioseismometer Unit Based on Micromechanical Sensors

POSTER PAPERS[1]

12.05–12.50   63.   **V.Ya. Raspopov, I.A. Volchikhin** (*FSBEI HE «Tula State University», Tula, Russia*)
Solid-State Wave Gyroscope. Ensuring the Required Accuracy Parameters

64.   **R.V. Ermakov, E.N. Skripal, A.A. Seranova, D.E. Gutsevich** (*JSC «Design Bureau of Industrial Automatics», Saratov, Russia*), **D.V. Kondratov** (*Saratov Branch of RANEPA, Saratov, Russia*), **A.A. L'vov** (*Yuri Gagarin State Technical University of Saratov, Saratov, Russia*)
Development of a Vibrational Error Model of a Hemispherical Resonator Gyroscope

65.   **A.A. Maslov, D.A. Maslov, I.V. Merkuryev, V.V. Podalkov** (*National Research University «Moscow Power Engineering Institute», Moscow, Russia*)
Methods to Eliminate Nonlinearity of Electrostatic Control Sensors of the Wave Solid-State Gyroscope

66.   **B.S. Lunin** (*Lomonosov Moscow State University, Moscow, Russia*), **M.A. Basarab, A.V. Yurin** (*Bauman Moscow State Technical University, Moscow, Russia*), **E.A. Chumankin** (*JSC "ANPP "TEMP-AVIA", Arzamas, Russia*)
Fused Quartz Cylindrical Resonators for Low-Cost Vibration Gyroscopes

67.   **B. Yang, Y. X. Xu, Q. F. Hu, C. Y. Xing, X. Rui** (*Beijing Institute of Aerospace Control Devices, Beijing, P.R.China*)
Research on Digital Closed-Loop Control for Silicon Resonant Accelerometer

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68. **B.H. Liu, W. Luo, L. Ma, X.L. Wu, X. M. Zhao** (*Tianjin Navigation Instrument Research Institute, Tianjin, P.R.China*)
Analysis of the Instability of the FOG Scale Factor Induced by the Fiber Coil Adhesive Thermal Stress
PAPER WAS NOT PRESENTED

69. **A.V. Molchanov** (*JAS «Moscow Institute of Electromechanics & Automatics»; Moscow, Russia*), **M.V. Chirkin, A.E. Serebryakov, V.V. Klimakov, H.N. Dao, V.Yu. Mishin** (*Ryazan State Radio Engineering University; Ryazan, Russia*)
The Effect of Slow Fluctuation Processes in the Ring Laser Gyroscope on Its Bias Instability

70. **E.A.Petrukhin** (*Metallist Serpukhov Plant, JSC, Serpukhov, Polyus Research Institute named after M.F. Stelmakh, Moscow, Russia*), **A.S.Bessonov** *(Moscow Technological University (MIREA), Moscow, Russia*)
Lock-in Threshold Minimization in a Laser Gyro at the Step of Assembling and Alignment of a Ring Cavity

71. **Yu.Yu. Broslavets, A.A. Fomichev** (*Moscow Institute of Physics and Technology (State University), JSC "Lasex", Dolgoprudny, Russia*), **D.M. Ambartsumyan, N.S. Kalmykova, E.A. Polukeev** (*Moscow Institute of Physics and Technology (State University), Russia*)
Controlling the Coupling of Counterpropagating Waves in a Laser Gyroscope with a Nonplanar Cavity when Working with a Zeeman Dither

72. **W.L. Zhao, L.X. Zhang, Y. X.Cheng, Q. Fan, S.L. Li, Y. Su, D.W. Zheng, L.Y. Fan, Y.J. Rong, J. M.Wu** (*Nanjing University of Science and Technology, Nanjing; Shanghai Aerospace Control Technology Institute; Shanghai Engineer Research Center of Inertia, P.R. China*)
Study on High Precision Control Circuit of Disk MEMS Gyroscope
PAPER WAS NOT PRESENTED

73. **M.A. Barulina** (*Institute of Problems of Precise Mechanics and Control of the Russian Academy of Sciences, Saratov, Russia*) **I.V. Papkova, A.V. Krysko** (*Yuri Gagarin State Technical University of Saratov, Saratov, Russia*)
Dynamics of the Round Sensing Element of a Nanoelectromechanical Sensor

74. **A.S. Shalimov, S.P. Timoshenkov, V.V. Kalugin** (*Institute NMST MIET, Moscow, Russia*)
Design Route for 3-Axis MEMS Accelerometer Optimized by Selected Parameters
PAPER WAS NOT PRESENTED

75. **E.N. Pyatyshev, Ya.B. Enns, Ya. A. Nekrasov** (*Peter the Great Saint Petersburg Polytechnic University, Russia*)
A Sensing Element for a High-Precision Micromechanical LL-Type Gyroscope

76. **E.N. Pyatyshev, Ya.B. Enns, R.V. Kleimanov, I.M. Komarevtsev, A.N. Kazakin** (*Peter the Great Saint-Petersburg Polytechnic University, Russia*)
Increasing the Capacity of Micromechanical Gyroscope Comb Actuator Using Bistable Suspension

77. **V.F. Zhuravlev** (*Institute of Applied Mathematics of RAS, Russia*), **B.E. Landau** (*Concern CSRI Elektropribor, JSC, St. Petersburg, Russia*), **P.K. Plotnikov** (*Yury Gagarin State Technical University, Saratov, Russia*)
An ESG-based Sensor for Measuring Three Angles of Moving Object Rotations: Design Features

12.50   **DISCUSSION OF THE POSTER PAPERS**

13.00–14.00   LUNCH

PLENARY PAPERS

Chairmen: **Prof. Yu.V. Filatov,** *Russia*
Ph.D. A.V. Motorin, *Russia*

14.00–14.20   78. **Ya.I. Binder, Yu.A. Litmanovich, T.V. Paderina**
(*Concern CSRI Elektropribor, JSC, St. Petersburg, Russia*)
Extension of Navigation Methods on a Basis of the Inertial
Principle

14.20–14.40   79. **P.Yuan, Y.Yang, G.Chen, Y.Wu** (*Beijing Aerospace
Times Laser Inertial Technology Company, LTD, Beijing,
P.R. China*)
Research on Moving-Base Ship-Borne SINS Rapid Self-
Calibration
PAPER WAS NOT PRESENTED

POSTER PAPERS[1]

14.40–15.30   80. **N.B. Vavilova, A.A. Golovan, A.V. Kozlov,
I.A. Papusha, N.A. Parusnikov** (*Lomonosov Moscow State
University, Moscow, Russia*)
Comparative Study of Several Variants of Strapdown
Inertial Navigation System Calibration

81. **Y.F. Jiang, S.H. Li** (*Northwestern Polytechnical
University, Xi'an, P.R.China*), **B. Xie** (*Xi'an Aerospace
Precision Electromechanical Institute, Xi'an, P.R.China*)
Gyro-Axis-Based Calibration Method for Rate-Bias Laser-
Gyroscope Inertial Navigation System
PAPER WAS NOT PRESENTED

82. **I.Kh. Shaimardanov, A.A. Dzuev, A.V. Nekrasov,
D.A. Rekunov** (*JSC «Inertial Technologies of
Technocomplex», Ramenskoye-8, Moscow Region, Russia*),
A.V. Kozlov (*Lomonosov Moscow State University,
Moscow, Russia*)
Synthesis and Results of Experimental Research of the
Iterative Calibration Procedure Accuracy Characteristics
Providing Labor Input Reduction in SINS Sensitive
Elements Calibration Process
PAPER WAS NOT PRESENTED

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[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*

83. **Z. Jin, S. H. Li** (*North-Western Polytechnic University, Xi'an, P.R.China*)
Method for MIMU in-Field Systematic Calibration Through Multi-Position Rotation

84. **V.A. Smirnov, V.V. Savelyev, A.V. Prohortsov** (*Tula State University, Russia*), **A.E. Yakovlev** (*JSC «KBP» named after academician A.G. Shipunov, Tula, Russia*)
Determination of Mutual Orientation of Inertial Modules Mounted on a Moving Object at a Distance from Each Other

85. **B. Li, C. L. Cai, X.T. Meng** (*Beijing Aerospace Times Optical-electronic Technology CO., Ltd Beijing, P.R.China*)
Backtracking Scheme for Alignment with Strict Reverse Process Based on FOG SINS
PAPER WAS NOT PRESENTED

86. **L.N. Belsky, L.V. Vodicheva, Yu.V. Parysheva** (*JSC «Academician N.A. Semikhatov Scientific and Production Association of Automatics», Yekaterinburg, Russia*)
A Strapdown Inertial Navigation System for Space Launch Vehicles: Initial Alignment Accuracy and Periodic Calibrations

87. **Q. Liang** (*ITMO University, Saint-Petersburg, Russia*), **Yu. A. Litvinenko** (*ITMO University, Concern CSRI Elektropribor, JSC, S.-Petersburg, Russia*)
Adaptive Algorithm for Processing Data of an AHRS with Two Units of Micromechanical Gyroscopes

88. **J. Gong, J. Liang, Y.G. Wang, H.N. Weng** (*Tianjin Navigation Instrument Research Institute, P.R.China*)
On-line Calibration Method of SINS/DVL Integrated Navigation System

89. **V.V. Avrutov** (*National Technical University of Ukraine (Igor Sikorsky Kiev Polytechnic Institute), Kiev, **Ukraine***)
Gyro North and Latitude Finder

90. **M.Yu. Loginov, Yu.N. Chelnokov** (*RAS Institute of Precision Mechanics and Control, Saratov*, **Russia**)
Analytical and Numerical Study of Differential Error Equations for Autonomous Strapdown INS Functioning in Normal Geographic Frame

91. **A.V. Molodenkov, Ya.G. Sapunkov** (*Institute of Precision Mechanics and Control of RAS, Saratov, **Russia***),
T.V. Molodenkova (*Yu. A. Gagarin Saratov State Technical University, Saratov*, **Russia**), **S.E. Perelyaev** (*Ishlinsky Institute for Problems in Mechanics of RAS, Moscow, **Russia***)
The Exact Solution of the Bortz Approximate Equation and Construction of the Quaternion Orientation Algorithm of Strapdown INS on its Basis

92. **M.M. Tchaikovsky, A.S. Kazakov, A.S. Kapustin, I.E. Vinogradov, E.S. Smirnov** (*Academician N.A. Pilyugin Scientific-Production Center of Automation and Instrument-Making, Moscow, **Russia***)
Improving the Accuracy of an Inertial Measurement Unit of a Spacecraft Control System by Computational Algorithms

93. **D.M. Malyutin** (*Tula State University, **Russia***)
Miniature Gyroscopic Orientation System for Unmanned Aerial Vehicle

94. **V.N. Enin** (*Bauman Moscow State Technical University, Moscow, **Russia***), **A.A. Aviev** (*NPK «Electrooptika» corp., Moscow, **Russia***)
Instrumental Errors of Optoelectronic System for Measuring Parameters of Dither System in Ring Laser Gyro

95. **S.Q. Cheng, H.X. Li, D.M. Li, R. Zhang, X.X. He** (*Tsinghua University, Beijing, **P.R.China***)
Selection of Electrodes Geometry for Contactless Suspension of a Conducting Sphere

15.30   **DISCUSSION OF THE POSTER PAPERS**

15.40–16.10   COFFEE BREAK

Chairmen: **Dr. Yu.A. Litmanovich,** *Russia*
Prof. G. Trommer, *Germany*

PLENARY PAPERS

16.10–16.30   96.   **A.V. Chernodarov, A.P. Patrikeev** (*NaukaSoft Experimental Laboratory, Ltd., Moscow, **Russia***), **O.A. Karpov** (*«Fazotron-RIR» Corporation, JSC, Moscow, **Russia***)
In-Flight Development of SINS-500NS Satellite Inertial Navigation System at High Latitudes

16.30–16.50   97.   **H.Y. Yu, M. Lei, Z. Feng, Y.J. Wu, X. Zheng** (*Beijing Institute of Automatic Control Equipment, Beijing, **P.R.China***)
A Novel Resonance Optical Gyroscope Using Photonic Crystal Fiber

16.50–17.10   98.   **Ya. V. Belyaev, A.A. Belogurov, A.N. Bocharov, D.V. Kostygov, I.V. Lemko, A.A. Mikhteeva, A.V. Yakimova** (*Concern CSRI Elektropribor, JSC, St. Petersburg, **Russia***)**, N.N. Nevirkovets, N.M. Chernetskaya** (*Concern CSRI Elektropribor, JSC, St. Petersburg Electrotechnical University LETI, St. Petersburg, **Russia***)
Development of a MEMS-Accelerometer

POSTER PAPERS[1]

17.10–17.35   99.   **A.V. Polushkin, I.A. Nazarov, I.V. Slistin, S.A. Chernov, D.G. Borchaninov**, **S.F. Nakhov** (*Branch of the Federal State Unitary Enterprise «Academician Pilyugin Scientific-production Center of Automatics and Instrument-making» – Production Association «Korpus», Saratov, **Russia***), **A.S. Kazakov, I. E. Vinogradov** (*Federal State Unitary Enterprise «Academician Pilyugin Scientific-production Center of Automatics and Instrument-making», Moscow, **Russia***)**, P. K. Plotnikov , Yu. A. Zakharov** (*Yuri Gagarin State Technical University of Saratov, Saratov, **Russia***)
Automatic Rotary Device for Verification of the Accuracy Characteristics of Strapdown Inertial Navigation System

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[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*

100. **V.M. Nikiforov, A.A. Gusev, K.A. Andreev, A.S. Shiryaev, T.A. Zhukova** (*Academician Pilyugin Scientific-Production Center of Automatics and Instrument-Making, Moscow, Russia*)
Combined Terminal Control of the Gyrostabilized Platform in the «Coarse» Alignment Mode

101. **N.A. Kaldymov, A.V. Polushkin, V.E. Maksimenko, B.A. Bolotin, I.V. Slistin, D.G. Borchaninov** (*Branch of the Federal State Unitary Enterprise «Academician Pilyugin Scientific-Production Center of Automatics and Instrument-Making» – Production Association «Korpus», Saratov, Russia*), **P.K.Plotnikov, A.O.Kuznetsov** (*Yuri Gagarin State Technical University, Saratov, Russia*)
Effects of Friction in the Pivots of the Floating Gyro Nodes Leading to Unbalancing

102. **V.M. Nikiforov, I.Yu. Bykanov** (*Academician Pilyugin Scientific-Production Center of Automatics and Instrument-Making, Moscow, Russia*)
Dynamic Compensating LMI-Controller for Output of the Pendulum Accelerometer

103. **A.A. Golozin, N.N. Vinogradov** (*Joint-Stock Company «Command Devices Research Institute», Saint Petersburg, Russia*)
Determining the Drifts of a Gyrostabilized Platform, Non-Linearly Dependent on the Overload

104. **D.M.Kalikhman, L.Ya.Kalikhman, V.I.Grebennikov, V.A.Turkin, A.A.Akmaev, A.Yu.Nikolaenko, D.S.Gnusarev** (*Branch of the Federal State Unitary Enterprise «Academician Pilyugin Scientific-production Center of Automatics and Instrument-making» – Production Association «Korpus», Saratov, Russia*)
Integrated Approach to the Development of Digital Regulators for Inertial Sensory Elements of Modern Strapdown Inertial Navigation Systems and of Corresponding Control Software

105. **V. I. Grebennikov, D. M. Kalikhman, L. Ya. Kalikhman, S. F. Nakhov, A. Yu. Nikolaenko, V. V. Skorobogatov** (*Branch of the Federal State Unitary Enterprise «Academician Pilyugin Scientific-production Center of Automatics and Instrument-making» – Production Association «Korpus», Saratov, Russia*)
Method to Increase Stability of the Scale Factor of a Precision Pendulum Accelerometer with Digital Feedback

106. **D.M. Kalikhman, L.Ya. Kalikhman, E.A. Deputatova, A.P. Krainov** (*Branch of the Federal State Unitary Enterprise "Academician Pilyugin Scientific-production Center of Automatics and Instrument-making" – Production Association "Korpus", Saratov, Russia*), **E.P. Krivtsov, A.A. Yankovskiy** (*Federal State Unitary Enterprise " D.I. Mendeleyev Institute for Metrology (VNIIM)", St. Petersburg, Russia*), **R. V. Ermakov** (*JSC "KBPA", Saratov, Russia*), **A.A. L'vov** (*Yuri Gagarin State Technical University, Saratov, Russia*)
Ways of Extending the Measurement Range and Increasing the Accuracy of Rotary Test Benches with Inertial Sensory Elements for Gyroscopic Devices

17.35–17.55	**DISCUSSION OF THE POSTER PAPERS**
18.30–21.30	BANQUET (onboard the CITY BLUES boat)

WEDNESDAY, 30 MAY

SESSION IV – SPACECRAFT CONTROL AND NAVIGATION

Chairmen: **Corresponding Member of the RAS Prof. G.P. Anshakov,** *Russia*
Dr. N.V. Mikhailov, *Russia*

PLENARY PAPERS

9.30–9.50   107. **I.V. Belokonov, A.M. Bogatyrev, A.V. Kramlikh** (*Samara University, Russia*)
Development and Investigation of Algorithms for Determining Relative Navigation and Orientation Based on Distance Measurements

9.50–10.10	108.	**F. Camps, P. R. Arantes Gilz, M. Joldes, C. Louembet** (*LAAS, University of Toulouse, CNRS, Toulouse, **France***) Embedding a SDP-based Control Algorithm for the Orbital Rendezvous Hovering Phases
10.10–10.30	109.	**G.P. Anshakov, G.N. Myatov, F.F. Yudakov** (*JSC «Space Rocket Centre «Progress» (JSC «SRC Progress»), Samara, **Russia***), **P.K. Kuznetsov, B.V. Martemyanov** (*Samara State Technical University, Samara Scientific Center of RAS, Samara, **Russia***) Experience of Non-Visual Information Recovery from Video Data Acquired by a Land-Survey Satellite

POSTER PAPERS[1]

10.30–11.00	110.	**A.A. Prutko, S.N. Atroshenkov** (*S.P. Korolev Rocket and Space Corporation "Energia", Korolev, **Russia***) Optimal Control of Large Space Construction Maneuvers
	111.	**Ye. I. Somov, S. A. Butyrin** (*Samara State Technical University, **Russia***) Guidance and Attitude Control of a Land-Survey Satellite at a Scanning Stereoscopic Imagery
	112.	**Ye.I. Somov, S.A. Butyrin, S.E. Somov** (*Samara State Technical University, **Russia***) Navigation, Guidance and Control of Free-Flying Robot During its Rendezvous with a Passive Space Vehicle
	113.	**T. E. Somova** (*Samara State Technical University, Samara, **Russia***) Guidance and Economical Digital Control of a Satellite Orientation in Initial Modes
	114.	**A.V. Kramlikh, I.A. Lomaka** (*Samara University, **Russia***) Nanosatellite's Rotational Motion Parameters Determination Using Light Sensor and Angular Velocity Sensor Measurements

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[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*

115. **I.V. Belokonov, I.A. Lomaka** (*Samara University, Samara, Russia*)
Investigation of the Possibility of Determining the Inertial Characteristics and the Angular Velocity Vector of a Chaotically Rotating Space Debris Using a Nanosatellite

116. **I.V.Belokonov, I.A.Timbai, D.D. Davydov** (*Samara University*, *Russia*)
Passive Three-Axis Stabilization of a Nanosatellite in Low-Altitude Orbits: Feasibility Study

117. **B. Ahi, M. Haeri** (*Sharif University of Technology, Tehran, Iran*)
Novel Nested Saturated Feedback Scheme for CLOS Guidance via Cubature Kalman Filter

118. **Yu.N. Gorelov, S.B. Danilov, L.V. Kurganskaya** (*Samara National Research University named after academician S. P. Korolev, Samara, Russia*),
A.I. Manturov, V.E. Yurin (*JSC SRC Progress, Samara, Russia*)
Optimization of Multiroute Scanning of Geometrically Complex Sensing Zones for Spacecraft with Optoelectronic Observation Equipment

119. **J. Janicka, J. Rapiński, D.Tomaszewski** (*University of Warmia and Mazury in Olsztyn, Poland*)
Extrapolation of Geocentric Orbit Corrections During Loss of Communication Link – Analysis of Different Methods

11.00   **DISCUSSION OF THE POSTER PAPERS**

11.15–11.45   COFFEE BREAK

11.45–13.50   **PANEL DISCUSSION** **"A Quarter Century of the Conference: Where to Now?"**

Moderator: Prof. V.G. Peshekhonov

I N V I T E D   P A P E R

11.45–12.30   120.   **B.S. Rivkin** (*Concern CSRI Elektropribor, JSC, St. Petersburg, **Russia***)
25 Years of the Saint Petersburg International Conference on Integrated Navigation Systems

12.30–13.50   **Speeches of the Panel Discussion participants (preliminary application is required)**

13.50–14.00   **C L O S I N G   C E R E M O N Y**

14.00–15.00   LUNCH