



IEEE Ukraine Section  
IEEE Ukraine Section SP/AES Societies Joint Chapter  
National Aviation University

IEEE MSNMC-2023

# PROGRAM

2023 IEEE 7th International Conference  
on Methods and Systems of Navigation  
and Motion Control (MSNMC)



October, 24-27, 2023  
Kyiv, Ukraine



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IEEE Ukraine Section SP/AES Societies Joint Chapter  
National Aviation University

# **CONFERENCE PROGRAM**

## **2023 IEEE 7th International Conference on Methods and Systems of Navigation and Motion Control (MSNMC)**

October, 24-27, 2023  
Kyiv, Ukraine

**Kyiv 2023**

**2023 IEEE 7th International Conference  
on Methods and Systems of Navigation and Motion Control (MSNMC)**

CONFERENCE ORGANIZERS:

IEEE Ukraine Section  
IEEE Ukraine Section SP/AES Societies Joint Chapter  
National Aviation University (Kyiv, Ukraine)

ORGANIZATION COMMITTEE:

Chair: *Victor Sineglazov* – IEEE Senior Member, National Aviation University, Kyiv, Ukraine

Co-Chair: *Igor Sergeev* – National Aviation University, Kyiv, Ukraine

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**Serhii Tovkach**, IEEE Member, National Aviation University, Kyiv, Ukraine;  
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**Volodymyr Lytvynenko**, Kherson National Technical University, Khmelnytskyi, Ukraine;  
**Igor Sergeev**, National Aviation University, Kyiv, Ukraine;  
**Feliks Zakharin**, State Research Institute of Aviation, Kyiv, Ukraine

# CONFERENCE SCHEDULE

## October 24, 2023

9:45–10:00	Registration (Academic Council Hall/ online)
10:00–12:00	Plenary session (Academic Council / online)
12:00–13:00	Break
13:00–16:00	Track 1: 1A (5.407/online) and 1B (5.503/online)

## October 25, 2023

8:50–09:00	Registration on session (r. 5.103, 11.320/online)
09:00–12:00	Track 2: 2A (5.103/online) and 2B (r. 11.320/online)
12:00–13:00	Close session

## October 26, 2023

8:50–09:00	Registration on session (r. 5.411/online)
09:00–13:00	Track 3: 3A (r. 5.411/online)

## October 27, 2023

8:50–09:00	Registration on session (r. 5.411/online)
09:00–09:30	Final Session (r. 5.411/online)
09:30–10:00	Closing conference

## Reports regulations

Plenary report – 20 min and 5 min for questions

Session report – 15 min with 5 min for questions

## **Conference Tracks**

### **Track 1: Navigation and Flight Systems Methods and Simulation**

- Section 1A. Methods of Navigation
- Section 1B. Design of Optimal Control Systems

### **Track 2: Aerospace and Electronic Control Systems**

- Section 2A. Control of Moving Vehicle Motion
- Section 2B. Equipment and Software of Flight Control and Navigation Systems

### **Track 3: Computation Intelligence Methods and Systems of Navigation, Control and Data Processing**

- Section 3A. Intelligence Methods and Systems of Navigation, Control and Data Processing

**2023 IEEE 7th International Conference  
on Methods and Systems of Navigation and Motion Control (MSNMC)**

<b>10:00–11:25</b>	<b>Plenary Session, October 24, 2023 (Academic Council, meet link: <a href="https://meet.google.com/ikx-tjsr-xhd">https://meet.google.com/ikx-tjsr-xhd</a> )</b>
<b>09:45–10:00</b>	<b>Registration and online-connection</b>
10:00–10:10	<b>Welcome</b> <i>Victor Sineglazov</i> Organizing Committee Chair
10:10–10:25	<b>Object Detection and Classification Based on their 3D Models</b> <i>Victor Sineglazov, Kirill Ryazanovskiy</i> (IEEE Senior Member, National Aviation University, Kyiv, Ukraine)
10:25–10:50	<b>About one Approach to the Development of Universal Algorithmic Support of High-Precision Strapdown Inertial Navigation Systems for Aircraft and Rockets</b> <i>F. Zakharin, S. Ponomarenko</i> (National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine)
10:50–11:15	<b>Graph Analysis of Connections in Ukrainian-Turkish Flight Routes Networks</b> <i>A. Ivashchuk, I. Ostroumov</i> (National Aviation University, Kyiv, Ukraine)
11:15–11.35	<b>Wireless Technologies Modular Construction of Aviation Gas Turbine Engines</b> <i>S. Tovkach</i> (IEEE Member, National Aviation University, Kyiv, Ukraine)
<b>11:35–11:45</b>	<b>Final Plenary Session</b>
11:45–12:00	<b>Conclusion</b> <i>Victor Sineglazov</i> Organizing Committee Chair

## Track 1: Navigation and Flight Systems Methods and Simulation

### Section 1A. Methods of Navigation

Chair: *M. Filyashkin*

<b>13:00–16:00</b>	<b>Session 1A, October 24, 2023</b> (r. 5.407, meet link: <a href="https://meet.google.com/rcw-sdsg-aot">https://meet.google.com/rcw-sdsg-aot</a> )
<b>12:50– 13:00</b>	<b>Registration and online-connection</b>
13:00–13:15	<b>Software Solution for UAS Route Planning and Flight Control using Operative Meteorological Information</b> <i>M. Ivanytskyi, Y. Znakovska, Y. Averyanova</i> (National Aviation University, Kyiv, Ukraine)
13:15–13:30	<b>Method of Mobile Object Navigation Based on Recursive Galois Coding</b> <i>L. Petryshyn, M. Petryshyn</i> (AGH University of Krakow, Krakow, Poland)
13:30–13:45	Technical Break (Optional)
13:45–14:00	<b>Restrictions of CMV Concept for Aircraft Navigation During Final Approach</b> <i>S. Deviatkina, S. Vanetsyan</i> (National Aviation University, Kyiv, Ukraine)
14:00–14:15	<b>Development of a hybrid network traffic load management mechanism using smart components</b> <i>O. Barabash, N. Ausheva, N. Dovzhenko, D. Obidin, A. Musienko, T. Fedchuk</i> (National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine)
14:15–14:30	<b>Comparison of Two Methods of Signal Smoothing in the Development of Navigation Systems</b> <i>O. Koval, O. Barabash, Y. Havrylko, A. Makarchuk, A. Musienko, I. Salanda</i> (National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine)
14:30–14:45	Technical Break (Optional)
14:45–15:00	<b>Automatic Adjustment of the Visual Navigation System Based on the Results of Bench Tests</b> <i>O. Chumachenko, V. Ishchenko, I. Yudenko</i> (National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine)
15:00–15:15	<b>Determining the Coordinates of the UAV Physical Model as it Moves on the Simulation Stand using the Visual Navigation System</b> <i>V. Ishchenko, O. Chumachenko</i> (National Aviation University, Kyiv)
<b>15:15–15:30</b>	<b>Final Session 1A</b>

## Section 1B. Design of Optimal Control Systems

Chair: *O. Sushchenko*

Session 1B, October 24, 2023 (r. 5.503, meet link: <a href="https://meet.google.com/ttu-irnk-vrw">https://meet.google.com/ttu-irnk-vrw</a> )	
<b>12:50 – 13:00</b>	<b>Registration and online-connection</b>
13:00–13:15	<b>Two-contour System for Stabilization of Equipment for Moving Vehicles</b> <i>O. Sushchenko, O. Salyuk, Y. Bezkorovainyi</i> (National Aviation University, Kyiv, Ukraine)
13:15–13:30	<b>Optimal Controller Design for Plants with Polynomial Nonlinearities</b> <i>R. Voliansky, O. Statsenko, O. Sergienko, M. Zhelinsky, O. Sadovoi, N. Volianska</i> (National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine)
13:30–13:45	<b>Dynamics of UAV Discrete-Continuous Terminal Control System</b> <i>D. Kucherov, O. Poshyvailo, I. Miroshnichenko</i> (National Aviation University, Kyiv, Ukraine)
13:45 – 14:00	Technical Break (Optional)
14:00–14:15	<b>The removable unit of control and navigation for the fire-extinguishing bomb</b> <i>M. Filyashkin</i> (National Aviation University, Kyiv, Ukraine)
14:15–14:30	<b>Robust Structural-Parametric Synthesis of Stabilization Systems for Ground Moving Vehicle Equipment</b> <i>I. Ostroumov, O. Sushchenko, Y. Averyanova, M. Zaliskyi, O. Solometsev, O. Holubnychyi</i> (National Aviation University, Kyiv, Ukraine)
<b>15:45–16:00</b>	<b>Final Session 1B</b>



## Track 2: Aerospace and Electronic Control Systems

### Section 2A. Control of Moving Vehicle Motion

Chair: *S. Tovkach*

Session 2A, October 25, 2023 (r. 5.103, meet link: <a href="https://meet.google.com/ovh-tcbn-qgg">https://meet.google.com/ovh-tcbn-qgg</a> )	
08:50–09:00	<b>Registration and online- connection</b>
09:15–09:30	<b>Information technology and algorithm for maximizing accuracy of angular position of platform for vertical takeoff and landing of the UAV</b> <i>S. Osadchyi, V. Zozulia, I. Bereziuk</i> (State University of Trade and Economics, Kyiv, Ukraine)
09:30–09:45	<b>Proximate Time-Optimal Relay-Modal Motion Control Based on Constraint of State Coordinates</b> <i>O. Derets, O. Sadovoi, S. Derets</i> (Dniprovsky State Technical University, Kamianske, Ukraine)
09:45–10:00	Technical Break (Optional)
10:00–10:15	<b>The Adaptive Correction of Angular Velocities of an Unmanned Aerial Vehicle Based on Discrete Measurements of Orientation</b> <i>V. Pichkur, V. Sobchuk, O. Laptiev, D. Cherniy, V. Matvienko, J. Fedorenko</i> (Taras Shevchenko National University, Kyiv, Ukraine)
10:15–10:30	<b>Methodological Foundations of Optimal Swarm Management of UAVs in Energy Crop Spraying with Agrochemical Agents</b> <i>N. Pasichnyk, S. Shvoro, O. Opryshko, D. Komarchuk, O. Bahatska, M. Komarchuk</i> (National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine)
10:30–10:45	<b>Robust Stabilization of an Autonomous Marine Vehicle on Programmed Trajectories</b> <i>V. Timchenko, V. Horbov</i> (Admiral Makarov National University of Shipbuilding, Mykolaiv, Ukraine)
10:45–11:00	Technical Break (Optional)
11:00–11:15	<b>Drone-Assisted Path Planning Optimization for Mobile Robots in Dynamic Scenarios</b> <i>Muhammed Mirac Ozer, Murat Bakirci</i> (Tarsus University, Mersin, Turkey)
12:00–12:15	<b>Final Session 2A</b>

## Section 2B. Equipment and Software of Flight Control and Navigation Systems

Chair: *I. Ostroumov*

<b>09:00 – 12:00</b>	<b>Session 2B, October 25, 2023</b> <b>meet link: <a href="https://meet.google.com/qpc-zhbj-bwa">https://meet.google.com/qpc-zhbj-bwa</a></b> <b>(r. 11.320, )</b>
<b>08:50–09:00</b>	<b>Registration and online-connection</b>
09:00–09:15	<b>Spacecraft Magnetic Cleanliness Control Based on Optimal Compensating Dipoles Placement</b> <i>B. Kuznetsov, I. Bovdii, T. Nikitina, V. Kolomiets, B. Kobylanskyi, A. Yerisov</i> (Anatolii Pidhornyi Institute of Mechanical Engineering Problems of the National Academy of Sciences of Ukraine, Kharkiv, Ukraine)
09:15–09:30	<b>Software Simulation of a MEMS Accelerometer for Cargo Unmanned Aerial Vehicle</b> <i>J. Boiko, O. Svachii, I. Parkhomey, O. Horskyi</i> (Khmelnyskyi National University, Khmelnytskyi, Ukraine)
09:30–09:45	<b>Functional States Diagnosing in Vortex Energy Separator under Rational Control</b> <i>A. Kulik, S. Pasischnik, A. Zymovin, D. Sokol</i> (National Aerospace University "Kharkiv Aviation Institute", Kharkiv, Ukraine)
09:45–10:00	Technical Break (Optional)
10:00–10:15	<b>Prospective of camouflage ground objects to counter UAVs</b> <i>N. Pasichnyk, S. Shvorov, O. Opryshko, A. Dudnyk, O. Bahatska, D. Komarchuk</i> (National University of Life and Environmental Sciences of Ukraine, Kyiv, Ukraine)
10:15 – 10:30	<b>Study of Data Traffic in UAV Communications</b> <i>V. Kharchenko, A. Grekhov, V. Kondratiuk, Haoyang Li</i> (National Aviation University, Kyiv, Ukraine)
10:30–10:45	<b>Analysis of Air Traffic During Extreme Conditions of Earthquake Action of High Magnitude</b> <i>O. Ivashchuk, I. Ostroumov</i> (National Aviation University, Kyiv, Ukraine)
10:45–11:00	Technical Break (Optional)
11:00–11:15	<b>Dual slope adc based on a hydraulic cylinder as an integrator</b> <i>I. Sergeev</i> (National Aviation University, Kiyv, Ukraine)
<b>11:45–12:00</b>	<b>Final Session 2B</b>

## Track 3: Computation Intelligence Methods and Systems of Navigation, Control and Data Processing

### Section 3A. Intelligence Methods and Systems of Navigation, Control and Data Processing

Chair: *V. Sineglazov*

Session 3A, October 26, 2023	
09:00 – 12:00	(r. 5.411, meet link: <a href="https://meet.google.com/ova-ibak-koy">https://meet.google.com/ova-ibak-koy</a> )
08:50–09:00	<b>Registration and online-connection</b>
09:00–09:15	<b>Comparison of Full Modulation and Formant-Modulation Methods of Speech Intelligibility Measurement</b> <i>A. Prodeus, O. Dvornyk, A. Naida, M. Didkovska</i> (National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine)
09:15–09:30	<b>Drone-based landmine detection mission planning</b> <i>M. Popov, S. Stankevich, S. Mosov, S. Dugin, I. Saprykin</i> (Scientific Centre for Aerospace Research of the Earth, NAS of Ukraine, Kyiv, Ukraine)
09:30–09:45	Technical Break (Optional)
09:45–10:00	<b>Using of Chebyshev - Poisson’s Orthogonal Operators in Signal Processing</b> <i>A. Mishchuk, D. Shapovalov, M. Voloshyn, T. Voloshyna</i> (Lesya Ukrainka Volyn National University, Lutsk, Ukraine)
10:00–10:15	<b>Visual navigation systems implementation using hybrid convolutional neural networks</b> <i>V. Sineglazov, I. Boryndo</i> (National Aviation University, Kyiv, Ukraine)
10:15–10:30	<b>Super-resolution of images received from UAV</b> <i>V. Sineglazov, K. Lesohorskyi, O. Chumachenko</i> (National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Kyiv, Ukraine)
10:30–10:45	Technical Break (Optional)
10:45–11:00	<b>Methods of satellite images segmentation analysis</b> <i>A. Riabko</i> (National Aviation University, Kiev, Ukraine)
11:00–11:15	<b>Machine Learning Method for Optimal Route Calculation</b> <i>S. Migel, M. Zaliskyi, A. Osipchuck, M. Maloied, R. Odarchenko, O. Bondarev</i> (National Aviation University, Kiev, Ukraine)
11:15–11:30	<b>Using Recurrent and Convolution Neural Networks to Identify the Fake Audio Messages</b> <i>A. Khovrat, V. Kobziev</i> (Kharkiv National University of Radio Electronics, Kharkiv, Ukraine)
11:30–11:45	Technical Break (Optional)

11:45–12:00	<b>Using artificial intelligence to control drones</b> <i>V. Pavlenko, I. Ponomarenko, O. Morhulets, V. Osadchyi, D. Ponomarenko, O. Hrygorevska</i> (Kyiv National University of Technologies and Design, Kyiv, Ukraine)
12:00–12:15	<b>Ant algorithm with route reservation</b> <i>O. Andreeva, V. Zaiats, M. Sostar, A. Palichev, V. Serzhanov, F. Abramov</i> (National technical university "Kharkiv polytechnic institute", Kharkiv, Ukraine)
<b>12:15 –12:30</b>	<b>Final Session 3A</b>

<b>09:00–10:00</b>	<b>Closing Conference, October 27, 2023</b> (r. 5.411, meet link: <a href="https://meet.google.com/ikx-tjsr-xhd">https://meet.google.com/ikx-tjsr-xhd</a> )
<b>08:50– 09:00</b>	<b>Registration and online-connection</b>
09:00–09:15	<b>Conclusion</b> <i>Victor Sineglazov</i> Organizing Committee Chair
09:15 –09:35	<b>Section Chairs Reports. Top Rated Reports</b>
<b>09:35–10:00</b>	<b>Final Closing Session</b>

## *Notes*

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**CONFERENCE:**

**National Aviation University**

**1, Liubomyra Huzara ave**

**Kyiv, 03058, Ukraine,**

**tel. +38(044) 406-74-31**

**e-mail: [msnmc@ieee.org.ua](mailto:msnmc@ieee.org.ua)**

**CONFERENCE HOMEPAGE:**

**<https://msnmc.ieee.org.ua/>**

